F

Chest

CONSOLIDATION (ALVEOLAR, AIR SPACE PATTERN)

MILIARY NODULAR, RETICULAR, OR INTERSTITIAL PATTERNS

F

HIGH RESOLUTION CT (HRCT) PATTERNS

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Gamut F-1-S

ROENTGEN SIGNS OF ALVEOLAR DISEASE (CONSOLIDATION, AIR SPACE PATTERN)

1. Acinar or peribronchiolar nodules
2. Air alveologram and bronchiologram
3. Air bronchogram
4. Butterfly or "bat's wing" distribution
5. Coalescence (early)
6. Fluffy, ill-defined margins
7. Perihilar, diffuse, segmental or lobar distribution
8. Present soon after onset of symptoms; rapid change

References

1. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979; 133:183–189
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973

Gamut F-2

LOCALIZED SEGMENTAL OR LOBAR CONSOLIDATION (ALVEOLAR, AIR SPACE) PATTERN, SOLITARY OR MULTIPLE

COMMON

1. Aspiration pneumonia (eg, acute—foreign body in bronchus; chronic—esophageal or neuromuscular disorder$_g$) (See F-7)
2. Atelectasis, incl. round atelectasis (See F-5)
3. Contusion of lung (pulmonary hemorrhage)
4. Obstructive pneumonia (eg, bronchogenic carcinoma; carcinoid; bronchial stenosis; foreign body aspiration; mucus plug; mucoid impaction)
5. Pneumonia, infectious, acute or organizing, lobar or lobular—bronchopneumonia (incl. bacterial—*Streptococcus, Staph. aureus, H. influenzae, E. coli, Proteus, Klebsiella, Bacteroides, Yersinia pestis* (plague), pseudomonas, tularemia, anthrax, legionella, tuberculous, nocardia, actinomyces; varicella; cytomegalovirus; other viral; mycoplasma; rickettsial; AIDS with secondary infection) (See F-74-S)
6. Pulmonary edema, localized
7. Pulmonary thromboembolism with infarction
8. Round pneumonia
9. Tuberculosis, primary or secondary; atypical mycobacterial infection

UNCOMMON

1. Bronchioloalveolar carcinoma
2. Eosinophilic pneumonia, acute (eg, PIE; Löffler syndrome) or chronic
3. Fungus disease, esp. histoplasmosis; coccidioidomycosis; cryptococcosis (torulosis); blastomycosis; zygomycosis (mucormycosis) (See F-74-S)
4. Lipoid pneumonia$_g$
5. Lung torsion (trauma in children)
6. Lupus erythematosus (lung base)
7. Lymphoma$_g$; pseudolymphoma
8. Mucoid impaction (eg, asthma; hypersensitivity aspergillosis; bronchial obstruction)
9. Parasitic disease* (eg, *Pneumocystis carinii* (late); ascariasis; strongyloidiasis; amebiasis; paragonimiasis)
10. Pneumoconiosis (conglomerate mass of silicosis or coal-worker's pneumoconiosis)
11. Pulmonary hemorrhage (See F-12)
12. Pulmonary sequestration (intralobar)
13. Radiation pneumonitis
14. Sarcoidosis

* Note: These parasitic diseases more often cause a diffuse bronchopeumonia or scattered mixed alveolar and interstitial pattern.

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 4–17
2. Felson B: Chest Roentgenology. Philadelphia, WB Saunders, 1973

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3. Fraser RG, Paré JAP, Paré PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia, WB Saunders, 1991, pp 11–20, 25–30
4. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
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Gamut F-3

LOBAR ENLARGEMENT (WITH BULGING INTERLOBAR FISSURE)

COMMON

1. Pneumonia (esp. *Klebsiella;* streptococcal; also tuberculous; pseudomonas; staphylococcal; *E. coli; H. influenzae;* plague; actinomycosis; mycoplasma)

UNCOMMON

1. Abscess
2. Bronchogenic carcinoma with obstructive pneumonia (drowned lung); bronchioloalveolar carcinoma
3. [Interlobar fluid]

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 84–85
2. Felson B: Chest Roentgenology. Philadelphia, WB Saunders, 1973
3. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, p 213

Gamut F-4

CHRONIC LOBAR CONSOLIDATION

COMMON

1. Bronchogenic carcinoma with obstructive pneumonia ("drowned lung")
2. Pneumonia, slowly resolving or organizing

UNCOMMON

1. Bronchioloalveolar carcinoma
2. Fungus disease (esp. cryptococcosis; zygomycosis; blastomycosis); actinomycosis; nocardiosis (See F-74-S)
3. Lipoid pneumonia$_g$
4. Lymphoma$_g$
5. Radiation pneumonitis
6. Tuberculous pneumonia

Reference

1. Epstein DM, Gefter WB, Miller WT: Lobar bronchioloalveolar cell carcinoma. AJR 1982; 139:463–468

Gamut F-5

LOBAR OR SEGMENTAL ATELECTASIS (COLLAPSE, VOLUME LOSS)

COMMON

1. Bronchiectasis
2. Bronchogenic carcinoma
3. Carcinoid
4. Compression atelectasis (eg, pleural effusion; large lung neoplasm; mesothelioma; diaphragmatic hernia; tension pneumothorax; congenital lobar emphysema; bullous emphysema)
5. Contraction atelectasis; pulmonary fibrosis (IPF)
6. Foreign body aspiration (eg, peanut; meat)
7. Mucous plugs, peripheral (eg, anesthesia; postoperative; pneumonia; chronic bronchitis; asthma, em-

physema; bronchiolitis obliterans; tetanus; bulbar paralysis)
8. Postoperative adhesive atelectasis (eg, left lower lobe collapse following CABG or other cardiac or thoracic surgery)

UNCOMMON

1. Amyloidosis
2. Aortic aneurysm
3. Broncholithiasis
4. Bronchomalacia
5. Cardiac enlargement (esp. dilated left atrium—ASD, mitral stenosis) with left lower lobe collapse
6. Cystic fibrosis (mucoviscidosis)
7. Endotracheal tube malposition (too low)
8. Lymphadenopathy, hilar (esp. bronchogenic or metastatic carcinoma; lymphoma$_g$; tuberculosis)
9. Mediastinal tumor
10. Metastatic disease to lymph nodes or endobronchial metastasis (esp. from carcinoma of kidney or breast or melanoma)
11. Middle lobe syndrome (chronic lymphadenopathy or bronchial stenosis due to histoplasmosis; tuberculosis; silicosis)
12. Mucoid impaction (eg, asthma; hypersensitivity bronchopulmonary aspergillosis)
13. Neoplasm of lung, other (eg, sarcoma; hamartoma; myoblastoma)
14. Parasitic disease (*Ascaris* in bronchus)
15. Pertussis
16. Pneumonia, organized
17. Pulmonary thromboembolism with infarction (unusual)
18. Radiation fibrosis; radiation pneumonitis (occasionally)
19. Rounded atelectasis
20. Scoliosis
21. Stricture of bronchus (eg, tuberculosis; histoplasmosis)
22. Trauma (eg, fractured bronchus)
23. Wegener granulomatosis

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 86–91
2. Felson B: Chest Roentgenology. Philadelphia, WB Saunders, 1973
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, pp 185–210
5. Teplick JG, Haskins ME: Roentgenologic Diagnosis. (ed 3) Philadelphia: WB Saunders, 1976

Gamut F-6

RECURRENT PNEUMONIA (See F-7)

COMMON

1. Alcoholism or debilitation with aspiration
2. Asthma
3. Bronchial disease, nonneoplastic (eg, bronchiectasis; inflammatory or congenital bronchial stenosis)
4. Cystic fibrosis (mucoviscidosis)
5. Esophageal disease with aspiration (eg, carcinoma; stricture; hiatus hernia; achalasia; scleroderma; Zenker diverticulum)
6. Foreign body in bronchus (esp. in children); mucus plug; broncholith
7. Idiopathic
8. Inadequate drug therapy
9. Neoplasm (eg, carcinoid; bronchogenic carcinoma)
10. Neuromuscular disorder$_g$ with aspiration (eg, brain damage; stroke; myasthenia gravis; paralysis$_g$)
11. Opportunistic infection, esp. *Pneumocystis carinii* pneumonia (eg, in HIV; AIDS; other immunologic disorder$_g$; excess steroid or immunosuppressive usage; chemotherapy; malignancy; cachexia; diabetes)
12. Parasitic disease (eg, ascariasis; strongyloidiasis; paragonimiasis; schistosomiasis; tropical pulmonary eosinophilia (filarial)

(continued)

UNCOMMON

1. Anemia$_g$, primary (esp. sickle cell disease)
2. Choanal atresia; cleft palate
3. Chronic granulomatous disease of childhood
4. Chronic pneumonia resolving by fibrosis (eg, tuberculosis; fungus disease)
5. Chronic sinusitis (incl. Kartagener S.; immotile cilia S.)
6. Connective tissue disease (collagen vascular disease)$_g$ (eg, lupus erythematosus)
7. Eosinophilic pneumonia$_g$ (eg, PIE; Löffler S.)
8. Esophageal bronchus
9. Extrinsic compression of tracheobronchial tree (eg, vascular ring); laryngeal disease
10. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; silo-filler's disease with multiple exposures; byssinosis) (See F-69)
11. Pulmonary sequestration (intralobar)
12. Rheumatoid or ankylosing spondylitis
13. Riley-Day S. (familial dysautonomia)
14. Tracheal lesion (See F-81-1)
15. Tracheoesophageal fistula
16. Tracheostomy

Reference

1. Berkmen YM: Aspiration and inhalation pneumonias. Semin Roentgenol 1980; 15:73–84

Gamut F-7

CHRONIC ASPIRATION PNEUMONIA IN A CHILD (See F-4, 6)

COMMON

1. Debilitation; malnutrition
2. Esophageal disease (eg, esophageal atresia or stenosis; achalasia; chalasia; hiatus hernia)
3. Idiopathic
4. Neuromuscular disorder$_g$ (eg, brain damage; cerebral palsy; meningomyelocele; poliomyelitis; paralysis$_g$; quadriplegia; amyotonia congenita; Duchenne muscular dystrophy; Werdnig-Hoffman disease)
5. Tracheoesophageal fistula (H-type or in association with esophageal atresia)

UNCOMMON

1. Choanal atresia; cleft palate
2. Laryngeal disease (incl. congenital wall deficiency; laryngotracheal cleft)
3. Lipoid pneumonia$_g$
4. Micrognathia
5. Riley-Day S. (familial dysautonomia)
6. Tracheal lesion (incl. vascular ring) (See F-81-1)

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Gatewood OMB, Vanhoutte JJ: The role of the barium swallow examination in evaluation of pediatric pneumonias. AJR 1966; 97:203–210
3. Hughes RL, Freilich RA, Bytell DE, et al: Aspiration and occult esophageal disorders: Clinical conference in pulmonary disease from Northwestern University Medical School, Chicago. Chest 1981; 80:489–495

Gamut F-8

ACUTE DISSEMINATED CONSOLIDATION (ALVEOLAR, AIR SPACE) PATTERN (INCL. BILATERAL CENTRAL DENSE OPACIFICATION)

COMMON

1. ARDS; oxygen toxicity

*2. Pneumonia (See F-75-S)
   a. Aspiration
   b. Bacterial (eg, staphylococcal; streptococcal; pseudomonas; plague; *Klebsiella; H. influenzae; E. coli;* legionella; leptospirosis; tuberculous;

atypical mycobacterial); nocardiosis; actinomycosis
   c. Chemical (eg, hydrocarbon)
   d. Eosinophilic$_g$ (eg, Löffler S.; PIE)
   e. Fungal, acute (eg, aspergillosis; histoplasmosis; blastomycosis; zygomycosis)
   f. Lipoid
   g. *Mycoplasma*
   h. Opportunistic or other unusual etiology (esp. *Pneumocystis carinii* or other parasitic)
   i. Rickettsial (eg, Rocky Mountain spotted fever; Q fever)
   j. Viral (eg, chickenpox; measles; influenza; cytomegalovirus; hantavirus) or chlamydial (psittacosis)
3. Pulmonary edema (See F-10)
*4. Respiratory distress S.; transient tachypnea of newborn

UNCOMMON

1. Embolism (eg, fat; amniotic fluid; pulmonary thromboembolism with infarction, septic or bland)
*2. Hypersensitivity pneumonitis (extrinsic allergic alveolitis)
3. Pulmonary hemorrhage (See F-12)
*4. Radiation pneumonitis

* Often has a mixed interstitial and alveolar pattern.

References

1. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979; 133:183–189
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-9

CHRONIC DISSEMINATED CONSOLIDATION (ALVEOLAR, AIR SPACE) PATTERN

COMMON

1. Alveolar proteinosis
2. Bronchioloalveolar carcinoma
3. Desquamative interstitial pneumonitis (DIP); nonspecific interstitial pneumonitis (NSIP); lymphocytic interstitial pneumonitis (LIP); bronchiolitis oibliterans with organizing pneumonia (BOOP)
4. Lymphoma$_g$
5. Obstructive pneumonia (eg, bronchogenic carcinoma "drowned lung"; carcinoid; foreign body)
6. Recurrent pneumonia (See F-6, F-7)
7. Sarcoidosis (alveolar phase)

UNCOMMON

1. Alveolar microlithiasis
2. Eosinophilic pneumonia, chronic
3. Fungus disease (eg, aspergillosis)
4. Lipoid pneumonia$_g$ (eg, mineral oil aspiration)
5. Metastases, hemorrhagic (eg, choriocarcinoma)
6. Pulmonary sequestration (intralobar)
7. Silicoproteinosis (resembles alveolar proteinosis but with acute course)
8. Tuberculosis; atypical mycobacterial infection

References

1. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979; 133:183–189
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-10-1

PULMONARY EDEMA

COMMON

*1. Agonal; terminal illness
*2. ARDS (eg, shock lung; respirator lung); cardiopulmonary bypass; open heart surgery; sepsis; oxygen toxicity
*3. Aspiration of gastric contents (Mendelson S.), hydrocarbons, or hypertonic contrast material
*4. Drug reaction (eg, nitrofurantoin; aspirin; hydrochlorothiazide; beta-adrenergic drugs; interleukin-2; radiologic contrast media) (See F-73-S)
*5. Heart failure with pulmonary venous hypertension (eg, left ventricular failure; mitral stenosis or insufficiency; left atrial myxoma or thrombus; thyrotoxicosis; myocardiopathy; sickle cell disease; arteriovenous fistula; left-to-right shunt; total APVR; coarctation of aorta; hypoplastic left heart S.$_g$) (See E-3, E-59)
6. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis) (See F-69)
*7. Iatrogenic (incl. hypervolemia; fluid overload; overtransfusion, drug overdose)
*8. Inhalation of noxious gas, smoke, paint fumes, sulfur dioxide, beryllium, silica, dinitrogen tetroxide, nitrogen dioxide (silo-filler's disease), carbon monoxide, fluorocarbons, hydrocarbons, paraquat, ammonium, chlorine, hydrogen sulfide, phosgene, cadmium (See F-72-S)
9. Narcotic abuse (esp. heroin; morphine; methadone; cocaine)
10. Neurogenic, cerebral (stroke; head trauma; epilepsy; intracranial neoplasm; increased intracranial pressure)
11. Pulmonary thromboembolism with infarction
*12. Renal failure; uremia; acute glomerulonephritis; nephrosis
13. Shock (eg, insulin reaction; gram-negative septicemia; snake bite; burn; electric shock; anaphylactic reaction to penicillin, blood transfusion, or radiologic contrast medium)
*14. Trauma, thoracic; contusion of lung; blast injury

UNCOMMON

*1. Amniotic fluid embolism
2. Connective tissue disease (collagen vascular disease)$_g$
*3. Disseminated intravascular coagulation (DIC)
4. Eclampsia
5. Fat embolism (incl. oily contrast medium)
*6. Hepatic disease (eg, acute hepatitis)
7. High altitude
*8. Hypoproteinemia (eg, malabsorption)
*9. Hypoxia, any cause
*10. Near-drowning
11. Pancreatitis, acute
*12. Parasitic disease (eg, malaria; strongyloidiasis)
13. Pericarditis (esp. constrictive)
14. Pheochromocytoma (catecholamine release)
15. Pleural air or fluid aspiration, rapid or excessive; rapid reexpansion of lung following treatment for a large pneumothorax
*16. [Pneumonia]
17. Pregnancy
18. [Pulmonary hemorrhage (incl. bleeding diathesis$_g$; idiopathic hemosiderosis; Goodpasture S.)] (See F-12)
*19. [Pulmonary lymphangiectasia]
20. Radiation pneumonitis
*21. Upper airway obstruction (eg, aspirated food; foreign body; epiglottitis; croup; hanging; suffocation)
*22. Venous or lymphatic obstruction (eg, pulmonary vein thrombosis or veno-occlusive disease; blockage by mediastinal mass; sclerosing mediastinitis)

* May occur in an infant.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Brodey PA, Fisch AE, Huffaker J: Acute pulmonary edema resulting from treatment for premature labor. Radiology 1981;140:631–633

2. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 18–25
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Heitzman ER: The Lung: Radiologic-Pathologic Correlations. (ed 2) St. Louis: CV Mosby, 1984, p 182
5. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
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Gamut F-10-2

UNILATERAL PULMONARY EDEMA

COMMON

1. Aspiration, unilateral (eg, water; kerosene; ethyl alcohol; gastric juice)
2. Contralateral disease (eg, emphysema; post-lobectomy; occlusion, absence, or hypoplasia of a pulmonary artery—Swyer-James-McLeod S.; pulmonary arterial thromboembolism)
3. Contusion of one lung
4. Idiopathic
5. Pleural air or fluid aspiration, rapid or excessive; rapid reexpansion of lung following treatment for a large pneumothorax
6. Postural (prolonged lateral decubitus position)

UNCOMMON

1. Bronchial obstruction with "drowned lung" (eg, carcinoid; bronchogenic carcinoma; foreign body in bronchus; mucus plug)
2. Catheter malposition with infusion into pulmonary artery and lung
3. Congenital heart disease (eg, unilateral ductus shunt)
4. Obstruction of pulmonary vein (eg, bronchogenic carcinoma or bronchogenic cyst; unilateral veno-occlusive disease)
5. Postoperative systemic-pulmonary artery shunt (eg, Potts, Blalock-Taussig, or Waterston operation)

References

1. Amjad H, Bigman O, Tabor H: Unilateral pulmonary edema. JAMA 1974; 229:1094–1095
2. Calenoff L, Kruglik GD, Woodruff A: Unilateral pulmonary edema. Radiology 1978;126:19–24
3. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 26–29
4. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-11-1

ADULT RESPIRATORY DISTRESS SYNDROME (ARDS)

COMMON

1. Anaphylactic reaction (eg, penicillin; bee sting; blood transfusion; radiologic contrast media)
2. Multi-system injury or failure
3. Respirator lung (oxygen toxicity)
4. Sepsis (gram-positive or gram-negative septicemia)
5. Shock lung (hemorrhagic, septic, cardiogenic, anaphylactic)
6. Trauma, massive (lung or body)

UNCOMMON

1. Aspiration
2. Disseminated intravascular coagulation (DIC)
3. Electric shock
4. Embolism of fat or amniotic fluid
5. Inhalation of smoke, paint or noxious fumes (eg, phosgene; nitrous oxide)
6. Insulin reaction
7. Narcotics (eg, heroin; methadone); other drugs
8. Near-drowning
9. Near-strangulation
10. Pancreatitis, acute

(continued)

11. Pneumonia, incl. severe viral (eg, varicella)
12. Snake bite

References

1. Dähnert W: Radiology Review Manual. (ed 4) Baltimore: Williams & Wilkins, 1999, pp 377–378
2. Seely JM, Effmann EL: Acute lung injury and acute respiratory distress syndrome in children. Semin Roentgenol 1998;33:163–173

Gamut F-11-2

ACUTE LUNG INJURY AND ARDS IN CHILDREN

1. ARDS (acute respiratory distress syndrome) (eg, sepsis; pneumonia; aspiration; near-drowning; near-strangulation; smoke inhalation; multi-system injury or failure; anaphylaxis)
2. Aspiration
3. Inhalation of smoke, paint or noxious fumes
4. Near-drowning
5. Oxygen toxicity
6. Trauma (eg, pulmonary laceration or contusion)

Reference

1. Seely JM, Effmann EL: Acute lung injury and acute respiratory distress syndrome in children. Semin Roentgenol 1998;33:163–173

Gamut F-12

PULMONARY HEMORRHAGE

COMMON

1. Contusion of lung; blunt trauma
2. Renal disease with or without immunologic abnormality (incl. Goodpasture S.)

UNCOMMON

1. Anticoagulant therapy; other drug-induced bleeding
2. Aspiration from a bleeding pulmonary lesion (eg, arteriovenous malformation bronchogenic carcinoma; vascular metastasis)
3. Bleeding or clotting disorder$_g$ (eg, hemophilia; leukemia; thrombocytopenia; Henoch-Schönlein purpura)
4. Bone marrow transplantation
5. Bronchitis; bronchiectasis
6. Connective tissue disease (collagen vascular disease)$_g$ (esp. lupus erythematosus; polyarteritis nodosa—vasculitis)
7. Disseminated intravascular coagulation (DIC)
8. Drug abuse (esp. heroin)
9. Heart failure
10. Iatrogenic (eg, bronchoscopy; lung biopsy)
11. Idiopathic
12. Idiopathic pulmonary hemosiderosis
13. Infection (eg, Rocky Mountain spotted fever; saprophytic fungal infection; aspergillosis; zygomycosis)
14. Leukocytoclastic vasculitis
15. Mitral stenosis
16. Parasitic disease (eg, malaria; strongyloidiasis)
17. Pulmonary thromboembolism (esp. with infarction)
18. Wegener granulomatosis

References

1. Albelda SM, Gefter WB, Epstein DM, et al: Diffuse pulmonary hemorrhage: A review and classification. Radiology 1985;154:289–297
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Fiegler VW, Siemoneit KD: Pulmonary manifestations in anaphylactoid purpura (Henoch-Schönlein syndrome). Fortschr Röntgenstr 1981;134:269–272
4. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
5. Herman PG, Balikian JP, Seltzer SE, et al: The pulmonary-renal syndrome. AJR 1978; 130:1141–1148
6. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
7. Schwartz EE, Teplick JG, Onesti G, et al: Pulmonary hemorrhage in renal disease: Goodpasture's syndrome and other causes. Radiology 1977;122:39–46

Gamut F-13

REVERSE BUTTERFLY PATTERN

COMMON

1. ARDS
2. Contusion of lung
3. Eosinophilic pneumonia (PIE; Löffler syndrome)
4. Pneumonia
5. Sarcoidosis

UNCOMMON

1. Bronchioloalveolar carcinoma
2. Bronchiolitis obliterans with organizing pneumonia (BOOP)
3. Connective tissue disease (collagen vascular disease)$_g$
4. Pulmonary edema, atypical
5. Pulmonary thromboembolism with multiple infarctions
6. Parasitic disease (esp. ascariasis; strongyloidiasis)
7. Radiation pneumonitis

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Liebow AA, Carrington CB: The eosinophilic pneumonias. Medicine 1969; 48:251–285

Gamut F-14

CONSOLIDATION (ALVEOLAR, AIR SPACE) PATTERN IN A PATIENT WITH LEUKEMIA OR LYMPHOMA

COMMON

1. Bacterial pneumonia
2. Fungus disease (esp. angioinvasive aspergillosis; cryptococcosis (torulosis); histoplasmosis; moniliasis; zygomycosis) (See F-74-S)
3. Lymphomatous or leukemic infiltration
4. *Pneumocystis carinii* pneumonia

UNCOMMON

1. Alveolar proteinosis
2. Cytomegalovirus pneumonia
3. Drug reaction (eg, methotrexate)
4. Leukostasis; leukemia cell lysis
5. Mycoplasma pneumonia
6. Parasitic disease (eg, strongyloidiasis)
7. Pulmonary edema (eg, heart failure)
8. Pulmonary hemorrhage
9. Varicella (chickenpox) pneumonia

References

1. Miller WT, Talbot GH, Epstein DM, et al: Radiographic findings in acquired immune deficiency syndrome. Appl Radiol 1985; May/June:86–95
2. Pennington JE: Dilemma: Pneumonia in the immunocompromised patient. J Resp Dis 1982;3:25–29

Gamut F-15

MULTIFOCAL ILL-DEFINED OPACITIES IN THE LUNGS*

COMMON

1. ARDS; shock lung; respirator lung (See F-11-1, F-11-2)
2. Aspiration pneumonia
3. Bronchopneumonia (esp. staphylococcal; streptococcal; *Pseudomonas; Klebsiella; Legionella; E. coli;* other gram-negative bacteria; melioidosis; nocardiosis) (See F-74-S)
4. Eosinophilic pneumonia, idiopathic (eg, Löffler S.) or secondary to parasitic disease (eg, paragonimiasis; ascariasis; strongyloidiasis; hookworm disease; schistosomiasis; toxocariasis; tropical eosinophilia {filarial})
5. Fungus disease (eg, histoplasmosis; coccidioidomycosis; blastomycosis; candidiasis; actinomycosis;

(continued)

aspergillosis; cryptococcosis (torulosis); zygomycosis; sporotrichosis)
6. Metastases (eg, choriocarcinoma; vascular tumors)
7. Pneumoconiosis (esp. silicosis; coal worker's pneumoconiosis; asbestosis)
8. *Pneumocystis carinii* pneumonia (esp. in AIDS)
9. Pulmonary edema
10. Pulmonary thromboembolism with infarctions; septic emboli
11. Sarcoidosis
12. Tuberculosis; atypical mycobacterial infection (esp. in AIDS)
13. Viral and *Mycoplasma* pneumonias (See F-74-S)

UNCOMMON

1. Amyloidosis; Waldenström macroglobulinemia
2. Arteriovenous fistulas
3. Bronchiolitis obliterans with organizing pneumonia (BOOP)
4. Bronchioloalveolar carcinoma
5. Drug reaction (esp. chemotherapeutic agents) (See F-73-S)
6. Langerhans cell histiocytosis (eosinophilic granuloma)
7. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis)
8. Kaposi sarcoma (esp. in AIDS)
9. Lung abscesses, multiple
10. Lymphoma$_g$
11. Neonatal retained fluid S.; bronchopulmonary dysplasia
12. Pneumonia of unusual etiology (eg, lipoid; rickettsial—Q fever, Rocky Mountain spotted fever)
13. Pulmonary hemorrhage (eg, Goodpasture S.; hemolytic-uremic S.; idiopathic pulmonary hemosiderosis)
14. Pulmonary sequestration (intralobar)
15. Radiation therapy (pneumonitis or fibrosis)
16. Usual interstitial pneumonitis (UIP); desquamative interstitial pneumonitis (DIP); lymphocytic interstitial pneumonitis (LIP)
17. Vasculitis (eg, collagen vascular disease$_g$—esp. polyarteritis nodosa, lupus erythematosus; Wegener granulomatosis; lymphomatoid granulomatosis; zygomycosis; aspergillosis)

* Not confined to lobar or segmental distribution.

References

1. Heitzmann ER: The Lung: Radiologic-Pathologic Correlations. (ed 2) St. Louis: CV Mosby, 1984
2. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, pp 249–279

Gamut F-16

DIFFUSE PULMONARY DISEASE WITH A MIXED ALVEOLAR (AIR SPACE) AND INTERSTITIAL (RETICULONODULAR OR SMALL IRREGULAR) PATTERN

COMMON

1. Bronchioloalveolar carcinoma
2. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis) (See F-69)
3. *Pneumocystis carinii* pneumonia (esp. in AIDS)
4. Pulmonary edema in heart failure or ARDS
5. Sarcoidosis

UNCOMMON

1. Desquamative interstitial pneumonitis (DIP); nonspecific interstitial pneumonitis (NSIP)
2. Drug or poison toxicity (eg, bleomycin; methotrexate; busulfan; Cytoxan; mitomycin; amiodarone; gold)
3. Goodpasture syndrome
4. Pneumonia of unusual etiology (eg, mycoplasma, cytomegalovirus, or
5. *Strongyloides,* esp. in AIDS or other immunocompromised host)
6. Pulmonary hemorrhage, recurrent or chronic (eg, bleeding or clotting disorder$_g$; idiopathic pulmonary hemosiderosis)

Reference

1. Fraser RG, Paré JAP, Paré PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia: WB Saunders, 1991, pp 85–88

Gamut F-17-S

ROENTGEN PATTERNS OF INTERSTITIAL DISEASE

1. Bronchial disease (eg, peribronchial thickening; mucoid impaction; bronchiectasis)
2. Discrete miliary nodules
3. Honeycomb lung
4. Kerley lines
5. Small irregular shadows (reticular or reticulonodular pattern)
6. Vascular abnormality (incl. pulmonary arterial, pulmonary venous, or bronchial arterial)

References

1. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979;133:183–189
2. Felson B: Disseminated interstitial diseases of the lung. Ann Radiol 1966; 9:325–345

Gamut F-18

ACUTE DIFFUSE FINE RETICULAR OPACITIES (KERLEY LINES, ACUTE—A, B, AND C) (See F-19)

COMMON

1. Pneumonia (esp. interstitial—infectious mononucleosis, cytomegalovirus, *H. influenzae; Mycoplasma;* atypical mycobacterial; *Pneumocystis carinii*)
2. Pulmonary edema (esp. heart failure; myocardial infarction; valvular heart disease; renal failure; uremia; fluid overload; drug reaction) (See F-10)
3. Transient tachypnea of the newborn (retained fetal lung fluid); Wilson-Mikity S.; bronchopulmonary dysplasia

UNCOMMON

1. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis) (See F-69)
2. Hypoproteinemia (eg, cirrhosis; nephrosis; burn; exudative skin disorder)
3. Pulmonary hemorrhage (incl. Henoch-Schönlein purpura) (See F-12)
4. Pulmonary veno-occlusive disease, acute

References

1. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979;133:183–189
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Trapnell DH: The differential diagnosis of linear shadows in chest radiographs. Radiol Clin North Am 1973;11:77–92

Gamut F-19

KERLEY LINES, CHRONIC—A, B, AND C (See F-18)

COMMON

1. Bronchogenic carcinoma (lymphangitic spread of tumor)
2. Idiopathic pulmonary fibrosis (IPF) (See F-22)
3. Lymphangitic metastases
4. Pneumoconiosis (esp. silicosis) (See F-70-S)
5. Mitral stenosis

UNCOMMON

1. Alveolar proteinosis (late)
2. Bronchioloalveolar carcinoma
3. Congenital heart disease (eg, total APVR)
4. Connective tissue disease (collagen vascular disease)$_g$ (eg, rheumatoid lung; scleroderma)

(continued)

5. Desquamative interstitial pneumonitis (DIP); lymphocytic interstitial pneumonitis (LIP)
6. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis) (See F-69)
7. Left atrial neoplasm (esp. myxoma)
8. Lipoid pneumonia$_g$
9. Lymphoma$_g$ (esp. alveolar); leukemia
10. Mediastinal mass with lymphatic obstruction; fibrosing mediastinitis
11. Pulmonary hemorrhage, late (eg, idiopathic pulmonary hemosiderosis) (See F-12)
12. Pulmonary lymphangiectasia
13. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis
14. Pulmonary veno-occlusive disease; pulmonary vein atresia
15. Radiation fibrosis
16. Sarcoidosis
17. Thoracic duct ligation, obstruction, or injury

References

1. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979; 133:183–189
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Heitzman ER: The Lung: Radiologic-Pathologic Correlations. (ed 2) St Louis: CV Mosby, 1984
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
5. Trapnell DH: The differential diagnosis of linear shadows in chest radiographs. Radiol Clin North Am 1973;11:77–92

Gamut F-20-1

WIDESPREAD MILIARY NODULES IN THE LUNGS (LESS THAN 5 MM DIAMETER)

COMMON

*1. Fungus disease (esp. histoplasmosis; blastomycosis; coccidioidomycosis; candidiasis) (See F-74-S)
2. Langerhans cell histiocytosis$_g$ (esp. eosinophilic granuloma)
3. [Interstitial fibrosis (eg, early stage or subliminal honeycombing)]
4. Metastases, hematogenous (esp. carcinoma of thyroid; melanoma); lymphangitic carcinomatosis (esp. carcinoma of breast, lung, stomach, pancreas, prostate)
5. Pneumoconiosis (esp. silicosis; coal-worker's pneumoconiosis; asbestosis; siderosis; stannosis; berylliosis) (See F-70-S)
6. Sarcoidosis
*7. Tuberculosis, miliary

UNCOMMON

1. Alveolar microlithiasis
2. Amyloidosis
*3. Bronchiolitis, acute or chronic
*4. Bronchiolitis obliterans (eg, noxious vapors; chemicals) (See F-72-S, 73-S); Asian panbronchiolitis
5. Bronchioloalveolar carcinoma
*6. Fat embolism (esp. oily contrast medium after lymphangiography or hysterosalpingography)
7. Gaucher disease; Niemann-Pick disease
*8. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis; byssinosis) (See F-69)
9. Lymphocytic interstitial pneumonitis (LIP)
10. Lymphoma$_g$; leukemia
*11. Melioidosis
*12. Parasitic disease (esp. schistosomiasis; tropical pulmonary eosinophilia {filarial})
*13. Pneumonia of unusual etiology (eg, viral—chickenpox, measles, influenza; pertussis; nocardiosis; listeriosis; chlamydia; opportunistic) (See F-74-S, 75-S)
14. Pulmonary hemosiderosis (eg, mitral stenosis; idiopathic)
15. Pulmonary lymphangioleiomyomatosis
*16. Infantile respiratory distress S. (hyaline membrane disease)
17. Tuberous sclerosis

* Usually acute disease.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 56-59
2. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979;133:183–189
3. James DG, Carstairs LS: Miliary diseases of the lung. Dis Mon. July 1962;1–40
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, pp 280–294

Gamut F-20-2

WIDESPREAD MILIARY NODULES IN THE LUNGS OF A NEONATE OR YOUNG INFANT

*1. Acute bronchiolitis
2. Langerhans cell histiocytosis (esp. Letterer-Siwe disease)
*3. Pneumonia (esp. *Chlamydia*)
4. [Pulmonary lymphangiectasia]
*5. Respiratory distress S.
6. [Total APVR]

* Acute.

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Gamut F-21

WIDESPREAD SMALL IRREGULAR OPACITIES (RETICULAR, NODULAR, OR RETICULONODULAR PATTERN) (See F-22)

COMMON

1. Chronic bronchitis; COPD
*2. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis; byssinosis; mushroom-worker's lung) (See F-69)
3. Idiopathic pulmonary fibrosis (IPF); usual interstitial pneumonitis (UIP) (See F-23-S1)
4. Interstitial fibrosis or leiomyomatosis (eg, from recurrent infection; chronic aspiration; radiation; lung trauma; prior thromboembolism) (See F-22)
5. Interstitial pulmonary edema with pulmonary venous hypertension (eg, Kerley lines in chronic mitral valve disease)
6. Metastases, hematogenous (esp. from thyroid carcinoma; melanoma); lymphangitic carcinomatosis (esp. from carcinoma of breast, lung, larynx, stomach, pancreas, cervix, or prostate); leukemia
7. Pneumoconiosis (esp. silicosis; coal-worker's pneumoconiosis; asbestosis; talcosis; berylliosis; siderosis; stannosis; baritosis; aluminum pneumoconiosis) (See F-70-S)
*8. Pneumonia of unusual etiology (eg, staphylococcal; salmonella; legionella; melioidosis; measles; chickenpox; cytomegalovirus; echovirus; mycoplasma; *Pneumocystis carinii; Toxoplasma;* other opportunistic) (See F-74-S, 75-S)
9. Sarcoidosis
10. Tuberculosis; atypical mycobacterial infection

UNCOMMON

1. Alveolar microlithiasis
2. Amyloidosis (bronchopulmonary)
*3. Bronchiolitis, acute or chronic with peribronchial cuffing (eg, bronchiolitis obliterans; noxious vapors; Asian panbronchiolitis)

(continued)

4. Bronchioloalveolar carcinoma
5. Connective tissue disease (collagen vascular disease)$_g$ (eg, scleroderma; dermatomyositis; polymyositis; lupus erythematosus)
6. Cystic fibrosis (mucoviscidosis)
7. Desquamative interstitial pneumonitis (DIP); lymphocytic interstitial pneumonitis (LIP); nonspecific interstitial pneumonitis (NSIP)

*8. Drug-induced (esp. nitrofurantoin; busulfan; bleomycin; methotrexate; Cytoxan; amiodarone; methysergide; procainamide) (See F-73-S)

*9. Fat embolism$_g$ (incl. oily contrast medium)

*10. Fungus disease (esp. histoplasmosis; coccidioidomycosis; cryptococcosis {torulosis}; blastomycosis) (See F-74-S)

11. Gaucher disease; Niemann-Pick disease
12. Goodpasture syndrome
13. Idiopathic pulmonary hemosiderosis (late)
14. Langerhans cell histiocytosis (eosinophilic granuloma)
15. Lymphoma$_g$; leukemia
16. Neurofibromatosis

*17. Oxygen toxicity (usually infants)

*18. Parasitic disease (esp. schistosomiasis; ascariasis; tropical pulmonary eosinophilia (filarial); paragonimiasis; toxoplasmosis)

19. Pulmonary lymphangiectasia
20. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis
21. Pulmonary veno-occlusive disease
22. Rheumatoid lung
23. Riley-Day S. (familial dysautonomia)
24. Sjögren S.
25. "Small airways disease"

*26. Thromboembolism of talc in drug addicts or of metallic mercury

*27. Transient tachypnea of the newborn

28. Waldenström macroglobulinemia
29. Wilson-Mikity S.; bronchopulmonary dysplasia

* May be acute.

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 30–39
2. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979; 133:183–189
3. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
4. Fraser RG, Paré JAP, Paré PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia: WB Saunders, 1991, pp 71–84
5. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
6. Friedman PJ: Idiopathic and autoimmune type III-like reactions: Interstitial fibrosis, vasculitis, and granulomatosis. Semin Roentgenol 1975; 10:43–51
7. Gaensler EA, Carrington CB: Open biopsy for chronic diffuse infiltrative lung disease: Clinical, roentgenographic, and physiological correlations in 502 patients. Ann Thorac Surg 1980; 30:411–426

Gamut F-22

INTERSTITIAL FIBROSIS (INCLUDING HONEYCOMB LUNG—END-STAGE INTERSTITIAL FIBROSIS)

COMMON

*1. Connective tissue disease (collagen vascular disease)$_g$ (esp. scleroderma; also rheumatoid lung; dermatomyositis; polymyositis)

2. [Cystic bronchiectasis (incl. cystic fibrosis and tuberculosis)]

*3. Idiopathic pulmonary fibrosis (IPF); acute interstitial pneumonitis (formerly Hamman-Rich syndrome); usual interstitial pneumonitis (UIP) (See F-23-S1)

*4. Langerhans cell histiocytosis (eosinophilic granuloma)

*5. Pneumoconiosis (esp. silicosis; coal-worker's pneumoconiosis; asbestosis; talcosis; berylliosis; siderosis; stannosis; baritosis; aluminum pneumoconiosis) (See F-70-S)

*6. Sarcoidosis

UNCOMMON

1. Amyloidosis
*2. Ankylosing spondylitis (upper lobes)
*3. Desquamative interstitial pneumonitis (DIP); nonspecific interstitial pneumonitis (NSIP)
*4. Drug sensitivity (esp. bleomycin; busulfan; methotrexate; Cytoxan; carmustine; nitrofurantoin; hexamethonium; amiodarone; methysergide; procainamide) (See F-73-S)
*5. Gaucher disease; Niemann-Pick disease
*6. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis; bird-fancier's lung; air-conditioner lung) (See F-69)
*7. Inhalation of noxious fumes or chemicals, late (eg, silo-filler's disease; sulfur dioxide; cadmium; chlorine; phosgene) (See F-72-S)
*8. Lipoid pneumonia$_g$; chronic aspiration (usually localized in lower lobe)
*9. Neurofibromatosis (rare)
*10. Oxygen toxicity; shock lung; [ARDS]
11. Pulmonary hemorrhage; idiopathic pulmonary hemosiderosis (late) (See F-12)
*12. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis
13. Radiation fibrosis
14. Schistosomiasis

* Can often progress to development of end-stage interstitial fibrosis or honeycomb lung.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Carrington CB, Gaensler EA, Couty RE, et al: Natural history and treated course of usual and desquamative interstitial pneumonia. N Engl J Med 1978; 298:801–809
2. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 40–43
3. Felson B: A new look at pattern recognition of diffuse pulmonary disease. AJR 1979; 133:183–189
4. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
5. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
6. Genereux GP: The end-stage lung: Pathogenesis, pathology, and radiology. Radiology 1975; 116:279–289
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8. Lynch JP III: Practice guidelines in idiopathic pulmonary fibrosis. J Resp Dis 1981; 121–131
9. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, pp 314–327
10. Scadding JG: Diffuse pulmonary alveolar fibrosis. Thorax 1974; 29:271–281
11. Spencer H: Pathology of the Lung (Excluding Pulmonary Tuberculosis). (ed 3) New York: Pergamon Press, 1977

Gamut F-23-S1

SYNONYMS FOR IDIOPATHIC OR USUAL INTERSTITIAL PNEUMONITIS

1. Bronchiolar emphysema
2. Chronic interstitial pneumonitis
3. Diffuse chronic fibrosing interstitial pneumonitis
4. Diffuse interstitial fibrosis
5. Fibrosing (or sclerosing) alveolitis
6. Hamman-Rich syndrome (acute form)
7. Idiopathic pulmonary fibrosis (IPF)
8. Muscular cirrhosis
9. Organizing interstitial pneumonia

Reference

1. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, p 299

Gamut F-23-S2

ENTITIES THAT CAN PRODUCE HISTOLOGIC CHANGES SIMILAR TO USUAL INTERSTITIAL PNEUMONITIS

1. Connective tissue disease (collagen vascular disease)$_g$ (scleroderma; rheumatoid lung; lupus erythematosus; erythema nodosum)
2. Drug therapy (eg, bleomycin; busulfan; methotrexate; amiodarone)
3. Idiopathic
4. Noxious gases
5. Pneumoconiosis (eg, asbestosis; talcosis)
6. Radiation injury
7. Viral disease

References

1. Gaensler EA, Carrington CB, Coutu RE: Chronic interstitial pneumonias. Clinical Notes on Respiratory Diseases, Vol. 10. New York: American Thoracic Society, 1972, pp 1–16
2. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, p 299

Gamut F-24

DIFFUSE INTERSTITIAL DISEASE WITH PLEURAL EFFUSION

COMMON

1. Metastatic disease (esp. lymphangitic carcinomatosis)
2. Pneumonia (eg, viral, mycoplasma)
3. Pulmonary edema (eg, heart failure; renal failure)
4. Tuberculosis

UNCOMMON

1. Asbestosis
2. Connective tissue disease (collagen vascular disease)$_g$ (eg, lupus erythematosus; rheumatoid disease)
3. Drug-induced pulmonary disease (eg, nitrofurantoin; hydralazine; procainamide) (See F-73-S)
4. Lymphoma$_g$; leukemia
5. Parasitic disease (eg, paragonimiasis; filariasis—tropical pulmonary eosinophilia)
6. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis; lymphangiomatosis
7. Sarcoidosis
8. Waldenström macroglobulinemia

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-25

DIFFUSE INTERSTITIAL DISEASE WITH ASSOCIATED LYMPHADENOPATHY

COMMON

1. AIDS (eg, cytomegalovirus or atypical mycobacterial infection; Kaposi sarcoma; lymphoma)
2. Metastatic disease (eg, lymphangitic carcinomatosis)

UNCOMMON

1. Amyloidosis
2. Cystic fibrosis (mucoviscidosis)
3. Drug reaction (eg, hydantoin {Dilantin}; trimethadione; methotrexate)
4. Fungus disease (esp. histoplasmosis; coccidioidomycosis; blastomycosis) (See F-74-S)
5. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (esp. mushroom-worker's lung—rare in other entities)
6. Langerhans cell histiocytosis (rarely)
7. Lymphoma$_g$; leukemia
8. Parasitic disease (eg, acute schistosomiasis; filariasis-tropical pulmonary eosinophilia) (occasionally)

9. Pneumoconiosis (eg, silicosis; coal-worker's pneumoconiosis; berylliosis)
10. Pulmonary lymphangioleiomyomatosis
11. Sarcoidosis
12. Tuberculosis
13. Viral infection (eg, infectious mononucleosis; chickenpox; measles; cat-scratch fever; ECHO virus; *Mycoplasma*); *Chlamydia*—psittacosis

Gamut F-26

HIGH-RESOLUTION CT (HRCT) PATTERNS OF CHRONIC INTERSTITIAL LUNG DISEASE (CILD)—SEPTAL THICKENING*

COMMON

1. Pulmonary edema	Smooth, often associated areas of ground-glass opacity
2. Pulmonary fibrosis (eg, idiopathic; drug-induced; connective tissue disease$_g$—esp. scleroderma, rheumatoid lung, dermatomyositis; sarcoidosis; asbestosis; chronic pneumonia; neurofibromatosis)	Irregular thickening with architectural distortion and traction bronchiectasis
3. Lymphangitic carcinomatosis (esp. from carcinoma of breast, lung, stomach, and pancreas; leukemia)	Interstitial nodules ± peribronchovascular and subpleural thickening and effusion
4. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung, bagassosis) (See F-69)	Immunologic response to inhaled organic antigens; bilateral small nodules, ground-glass opacities, patchy consolidation and septal lines acutely; chronic exposure leads to fibrosis
5. Infection (eg, viral pneumonia; mycoplasma; miliary tuberculosis; miliary histoplasmosis)	Symmetric perihilar interstitial infiltrate; no pleural effusion
6. Sarcoidosis	Widely variable pulmonary patterns including interstitial thickening, 2 to 10 mm nodules, perilymphatic distribution, ± lymphadenopathy
7. Silicosis or coal-worker's pneumoconiosis	Small, upper lobe predominant, frequently calcified nodules and septal thickening; may coalesce to PMF with honeycombing; calcified nodes common

UNCOMMON

1. Alveolar microlithiasis	Calcific interlobular septal thickening; 1 mm punctate calcified nodules (microliths), patchy or diffuse
2. Alveolar proteinosis	Idiopathic overproduction of surfactant by pneumocytes; diffuse airspace disease ± septal thickening; treatment with BAL; predisposed to infection, particularly *Nocardia*

(continued)

3. Kaposi sarcoma	Lower lobe bronchovascular thickening; skin or mucous membrane lesions invariably present; irregular "flame-shaped" nodules; lymphadenopathy; pleural effusions
4. Lymphoma$_g$; leukemia	Uncommon pattern of direct perihilar lymphatic spread
5. Pulmonary lymphangiectasia	Rare; generalized lymphatic dilatation; small effusions
6. Pulmonary lymphangioleiomyomatosis	Rare; extensive septal thickening; pleural effusions; pneumothorax

* Fluid or cellular infiltrates in interlobular septa. Linear opacities (1 to 2 cm) seen best in lung periphery. Visualization of a few peripheral interlobular septa is normal.

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-27

GROUND-GLASS OPACITIES ON HRCT*

COMMON

1. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung, bagassosis) (See F-69)	Immunologic response to inhaled organic antigens; acute or subacute phase shows diffuse or lower lung zone predominance; often associated with diffuse centrilobular nodules, ground-glass opacities, patchy consolidation and septal lines acutely; chronic exposure leads to fibrosis
2. Nonspecific interstitial pneumonia (NSIP) (idiopathic or associated with collagen vascular disease$_g$ or AIDS)	Patchy or diffuse; mild, if any, fibrosis; may have areas of consolidation
3. Acute interstitial pneumonia (AIP)	Patchy or diffuse; often associated with reticulation or consolidation; consolidation involves predominantly dependent lung regions
4. Idiopathic pulmonary fibrosis (IPF) and active phase	Usually in association with predominantly peripheral lower lung zone interstitial fibrosis
5. Pulmonary hemorrhage (eg, bronchitis; bronchiectasis; pulmonary thromboembolism; bronchogenic carcinoma; contusion of lung; vasculitis—Wegener granulomatosis, Goodpasture S., lupus erythematosis; aspergilloma; anticoagulation; bleeding diathesis; arteriovenous malformation; DIC; vascular metastases	Focal or diffuse

6. Connective tissue disease$_g$ (esp.lupus erythematosus; scleroderma)	In association with interstitial fibrosis, hemorrhage or pneumonia
7. Sarcoidosis	Widely variable pulmonary involvement + adenopathy, including interstitial, nodular, and occasional alveolar pattern; peribronchovascular nodules on HRCT
8. BOOP	Usually associated with typically peripheral or peribronchial consolidation
9. Bronchiolitis obliterans	Small airway inflammation or fibrosis; air trapping on expiration; areas with ground-glass opacity have increased vascularity due to blood flow redistribution (mosaic perfusion)
10. Infection	
a. *Pneumocystis carinii* pneumonia	Common AIDS infection; perihilar interstitial or ground-glass pattern early; airspace, nodules, cysts, and pneumothorax when advanced; effusion and adenopathy rare; BAL usually diagnostic
b. Viral (esp. cytomegalovirus in immunocompromised patients)	Often associated with consolidation
c. Bacterial	Usually in association with consolidation
d. Tuberculosis; atypical mycobacterial infection	Usually in association with centrilobular nodules and branching linear opacities (“tree-in-bud”)

UNCOMMON

1. Alveolar proteinosis	Idiopathic overproduction of surfactant by pneumocytes; diffuse, symmetric airspace disease ± septal thickening; treatment with BAL; predisposing to infection, particularly *Nocardia*
2. Desquamative interstitial pneumonitis (DIP)	Lower lung zone and peripheral predominance; mild, if any, fibrosis
3. Eosinophilic pneumonia	Usually associated consolidation
4. Langerhans cell histiocytosis (eosinophilic granuloma)	Upper lobe-predominant interstitial disease with a variable combination of small nodules and cysts; fibrosis and pneumothorax may develop
5. Lymphocytic interstitial pneumonitis (LIP)	Idiopathic condition in children with AIDS or adults with Sjögren syndrome or multicentric Castleman disease; septal thickening and ill-defined nodules

* Partial airspace filling or alveolar septal inflammation that does not obscure vessels. Typically represents an active, acute, and reversible disease process.

References

1. Müller NL: Lecture at 16th Masters Diagnostic Radiology Conference, Kauai, Hawaii, 1999
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-28

CHRONIC AIRSPACE CONSOLIDATION ON HRCT

1. Bronchiolitis obliterans with organizing pneumonia (BOOP)
2. Bronchioloalveolar carcinoma
3. Chronic eosinophilic pneumonia
4. Lymphoma$_g$
5. Sarcoidosis (alveolar phase)

References

1. Müller N: Lecture at Eleventh Masters Diagnostic Radiology Conference, Kauai, Hawaii, 1992
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-29

PERIBRONCHOVASCULAR INTERSTITAL THICKENING ON HRCT

COMMON

1. Pulmonary edema	Smooth interstitial thickening with cardiomegaly and pleural effusions
2. Sarcoidosis	Widely variable pulmonary patterns including interstitial thickening and peribronchovascular nodules ± lymphadenopathy
3. Lymphangitic carcinomatosis (esp. carcinoma of breast, lung, stomach and pancreas; leukemia)	Interstitial nodules ± peribronchovascular and subpleural thickening and effusion; local spread of lung cancer or hematogenous spread of breast cancer are most common
4. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (See F-69)	Immunologic response to inhaled organic antigens; bilateral small nodules, ground-glass opacities, patchy consolidation and septal lines acutely that clear over weeks; chronic exposure leads to fibrosis
5. Interstitial fibrosis (idiopathic pulmonary fibrosis—IPF)	Reticular pattern and associated traction bronchiectasis
6. Pneumoconiosis (silicosis; coal worker's pneumoconiosis; stannosis; siderosis)	Small, upper lobe predominant, frequently calcified 2 to 5 mm nodules and septal thickening; may coalesce to PMF; calcified nodes common
7. Asbestosis	Basilar reticular pattern, often associated with pleural plaques or thickening and pleural calcification

UNCOMMON

1. Berylliosis	Pattern resembles sarcoidosis
2. Connective tissue disease$_g$ (esp. scleroderma; dermatomyositis; rheumatoid lung)	Reticular pattern

3. Kaposi sarcoma	Bronchovascular thickening; skin or mucous membrane lesions invariably present; irregular "flame-shaped" nodules; lymphadenopathy; pleural effusions
4. Lymphoma$_g$; leukemia	Smooth or nodular; usually associated with mediastinal adenopathy ± unilateral hilar adenopathy

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1. Müller NL: Lecture at 16th Masters Diagnostic Radiology Conference, Kauai, Hawaii, 1999
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders,1999

Gamut F-30

INCREASED LUNG LUCENCY (USUALLY CYSTIC PATTERN) ON HRCT

COMMON

1. Bronchiectasis	Tram-tracks; cystic lesions
2. Bronchiolitis obliterans	Peripheral attenuation of vessels; hyperinflation. HRCT shows mosaic pattern of perfusion (Note: Does *not* show a cystic pattern on HRCT)
3. Emphysema	Centrilobular, paraseptal, panacinar, bullous
4. Interstitial fibrosis, end-stage (eg, idiopathic pulmonary fibrosis (IPF); scleroderma; rheumatoid lung)	Honeycomb pattern
5. Pneumatocele	Traumatic or post-infectious (esp. in *Pneumocystis carinii* or staphylococcal pneumonia)

UNCOMMON

1. Langerhans cell histiocytosis (eosinophilic granuloma)	Cystic lesions; nodules; involves mainly mid and upper lung zones
2. Pulmonary lymphangioleiomyomatosis	Cystic lesions on high-resolution CT

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-31

UPPER LUNG DISEASE ON HRCT

COMMON

1. Cystic fibrosis (mucoviscidosis)	Bronchiectasis; hyperinflation
2. Sarcoidosis	Nodules; fibrosis; lyrnphadenopathy
3. Silicosis and coal worker's pneumoconiosis	Nodules or conglomerate masses
4. Tuberculosis	Nodules, cavitation, consolidation and scarring

UNCOMMON

1. Ankylosing spondylitis	Upper lobe fibrosis
2. Talcosis	Intravenous drug abuse; small nodules, conglomerate masses, centrilobular emphysema

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders,1999

Gamut F-32

LOWER LUNG DISEASE ON HRCT

COMMON

1. Asbestosis	Reticulation, honeycombing; pleural thickening
2. Aspiration pneumonia	Dependent lung zones
3. Connective tissue disease$_g$ (esp. scleroderma; rheumatoid lung; dermatomyositis)	Reticulation and honeycombing
4. Idiopathic pulmonary fibrosis (IPF)	Reticulation and honeycombing
5. Lymphangitic carcinomatosis	Septal lines; pleural effusion; lymphadenopathy

UNCOMMON

1. Hypersensitivity pneumonitis (extrinsic allergic alveolitis)	Centrilobular nodules; ground-glass attenuation; reticulation
2. Lipoid pneumonia	Dependent lung zones. HRCT shows areas with fat attenuation

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-33

SMALL NODULAR OPACITIES ON HRCT*

COMMON

1. Asbestosis	Subpleural nodules; interstitial fibrosis predominantly in lower lung zones; pleural thickening ± plaques
2. Bronchiolitis (eg, respiratory, cellular, infectious, and panbronchiolitis)	Small airway inflammation; ground-glass attenuation, small centrilobular nodules, and "tree-in-bud'"opacities on HRCT; expiratory images may show air trapping
3. Bronchopneumonia (eg, *Pseudomonas; Staphylococcus; Streptococcus; Klebsiella;* bacillary angiomatosis; anaerobes; *Mycoplasma; Legionella; Nocardia; Actinomyces;* tuberculous; viral; fungal—histoplasmosis, aspergillosis; lipoid—chronic oil aspiration)	Ill-defined focal consolidation
4. Granulomatous disease, old (esp. histoplasmosis; tuberculosis)	Often calcified
5. Mycobacterial infection (esp. miliary tuberculosis)	Transbronchial or hematogenous spread
6. Lymphangitic carcinomatosis (esp. from carcinoma of breast, lung, stomach, and pancreas; leukemia)	Interstitial nodules ± peribronchovascular and subpleural thickening and effusion
7. Pulmonary metastases	Smooth, round, various size; predominantly lower lobe and peripheral nodules; ill-defined if hemorrhagic
8. Sarcoidosis	Widely variable pulmonary patterns ± adenopathy, including interstitial thickening and ill-defined nodules; characteristic peribronchovascular nodules on HRCT
9. Silicosis and coal worker's pneumoconiosis	Small, upper lobe- and posterior-predominant; frequently calcified nodules and septal thickening; may coalesce to PMF; calcified nodes common

UNCOMMON

1. Amyloidosis	Variable patterns, including interstitial disease and solitary or multiple nodules, ± calcification or cavitation
2. Bronchioloalveolar cell carcinoma	Can present as focal or multifocal consolidation, nodules, or a mass
3. Follicular bronchiolitis (lymphoid hyperplasia)	Centrilobular nodules; peribronchial nodules; patchy ground-glass opacities
4. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (See F-69)	Immunologic response to inhaled organic antigens such as moldy hay or bird droppings; patterns include bilateral small nodules, ground-glass opacities, patchy consolidation, and septal lines

(continued)

5. Lymphoma$_g$ (esp. recurrent non-Hodgkin)	Almost always mediastinal adenopathy; nodules ± air bronchograms
6. Lymphocytic interstitial pneumonitis (LIP)	Idiopathic pseudolymphomatous condition in children with AIDS or adults with Sjögren syndrome or multicentric Castleman disease; septal thickening and ill-defined centrilobular, peribronchovascular, and septal nodules
6. Langerhans cell histiocytosis (eosinophilic granuloma)	Upper lobe-predominant interstitial disease with a variable combination of small nodules and cysts; fibrosis and pneumothorax may develop

* Usually interstitial.

References

1. Müller NL: Lecture at 16th Masters Diagnostic Radiology Conference, Kauai, Hawaii, 1999
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-34-1

SMALL NODULE DISTRIBUTION ON HRCT—PERILYMPHATIC (Peribronchovascular, Septal, and Subpleural)

COMMON

1. Lymphangitic carcinomatosis (esp. from carcinoma of breast, lung, stomach and pancreas; leukemia)	Interstitial nodular thickening (beaded septa) ± peribronchovascular and subpleural thickening and pleural effusion
2. Sarcoidosis	Widely variable pulmonary patterns ± adenopathy, including 2–10 mm peribronchovascular and subpleural nodules
3. Silicosis and coal worker's pneumoconiosis	Upper lobe- and posterior-predominant; frequently calcified 2–5 mm nodules and septal thickening; may coalesce to PMF; calcified nodes common

UNCOMMON

1. Amyloidosis	Solitary or multiple nodules ± calcification or cavitation
2. Follicular bronchiolitis (lymphoid hyperplasia)	Centrilobular nodules; peribronchial nodules; patchy ground-glass opacities
3. Lymphocytic interstitial pneumonitis (LIP)	Idiopathic pseudolymphomatous condition in children with AIDS; septal thickening and ill-defined nodules
4. Lymphoma$_g$; leukemia	Usually associated mediastinal adenopathy ± unilateral hilar adenopathy

Gamut F-34-2

SMALL NODULE DISTRIBUTION ON HRCT—Randomly or Evenly Distributed Throughout Lung

1. Miliary tuberculosis	Typically very ill or immunocompromised patient
2. Pulmonary metastases	Smooth, round, variable size; peripheral and lower lobe predominance; hemorrhagic nodules ill defined

Gamut F-34-3

SMALL NODULE DISTRIBUTION ON HRCT—Centrilobular

COMMON

1. Bronchiolitis	Ground-glass and "tree-in-bud" opacities. Expiratory images may show air trapping in involved regions
2. Bronchopneumonia due to viruses, mycoplasma, bacteria or *Aspergillus*	Ill-defined nodules and ground-glass attenuation; bronchiectasis
3. Cystic fibrosis (mucoviscidosis)	Hyperinflation; bronchiectasis; mucus plugging; allergic bronchopulmonary aspergillosis; asthma
4. Silicosis and coal worker's pneumoconiosis	Upper lobe- and posterior-predominant, frequently calcified 2–5 mm nodules and septal thickening; may coalesce to PMF; calcified nodes common
5. Tuberculosis; atypical mycobacterial infection	Endobronchial spread with "tree-in-bud" pattern

UNCOMMON

1. Bronchioloalveolar cell carcinoma	Can present as focal or multifocal consolidation, nodules, or a mass
2. Follicular bronchiolitis (lymphoid hyperplasia)	Centrilobular nodules; peribronchial nodules; patchy ground-glass opacities
3. Hypersensitivity pneumonitis (extrinsic allergic alveolitis)	Ill-defined nodules and ground-glass opacities; patchy consolidation, and septal lines
4. Langerhans cell histiocytosis (eosinophilic granuloma)	Upper lobe-predominant interstitial disease with a variable combination of small nodules and cysts; interstitial fibrosis and pneumothorax may develop

References

1. Müller N: Lecture at 16th Masters Diagnostic Radiology Conference, Kauai, Hawaii, 1999
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-35-S

WORLD HEALTH ORGANIZATION 1982—HISTOLOGIC CLASSIFICATION OF LUNG NEOPLASMS (SLIGHTLY MODIFIED)

I. EPITHELIAL NEOPLASMS

A. BENIGN

1. Papillomas
   a. Squamous cell papilloma
   b. Transitional papilloma
2. Adenomas
   a. Pleomorphic adenoma (mixed tumor)
   b. Monomorphic adenoma
   c. Others

B. DYSPLASIA

1. Carcinoma in situ

C. MALIGNANT

1. Squamous cell carcinoma (epidermoid carcinoma)
   a. Variant
      i. Spindle cell (squamous) carcinoma
2. Small cell carcinoma
   a. Oat cell carcinoma
   b. Intermediate cell type
   c. Combined oat cell carcinoma
3. Adenocarcinoma
   a. Acinar adenocarcinoma
   b. Papillary adenocarcinoma
   c. Bronchiolo-alveolar carcinoma
   d. Solid carcinoma with mucus formation
4. Large cell carcinoma
   a. Variants
      i. Giant cell carcinoma
      ii. Clear cell carcinoma
5. Adenosquamous carcinoma
6. Carcinoid
7. Bronchial gland carcinomas
   a. Adenoid cystic carcinoma
   b. Mucoepidermoid carcinoma
   c. Others
8. Others

II. SOFT TISSUE NEOPLASMS

III. MESOTHELIAL NEOPLASMS

A. LOCALIZED FIBROUS PLEURAL TUMOR

B. MALIGNANT MESOTHELIOMA

1. Epithelial
2. Fibrous (spindle cell)
3. Biphasic

IV. MISCELLANEOUS NEOPLASMS

A. BENIGN

1. Hamartoma

B. MALIGNANT

1. Carcinosarcoma
2. Blastoma
3. Melanoma
4. Lymphoma$_g$
5. Others

V. SECONDARY NEOPLASMS

VI. UNCLASSIFIED NEOPLASMS

VII. NEOPLASM-LIKE LESIONS

1. Inflammatory pseudotumor
2. Langerhans cell histiocytosis$_g$ (eosinophilic granuloma)
3. Lymphoproliferative lesions
4. Tumorlet
5. Others

Reference

1. World Health Organization histological typing of lung tumours. Am J Clin Pathol 1982; 77:123–136.

Gamut F-36-S

CHEST TUMORS IN INFANTS, CHILDREN, AND ADOLESCENTS

LUNGS

COMMON

1. [Inflammatory pseudotumor (eg, plasma cell granuloma; sclerosing hemangioma)]
2. Metastatic tumor (esp. Wilms' tumor; osteosarcoma)

UNCOMMON

1. Askin tumor
2. Bronchogenic carcinoma
3. Carcinoid; cylindroma; mucoepidermoid carcinoma; pleomorphic adenoma
4. Hamartoma
5. Metastatic tumor, other (eg, Ewing sarcoma; rhabdomyosarcoma; lymphoma$_g$; leukemia; hepatoblastoma; neuroblastoma; germ cell tumor; carcinoma of thyroid; laryngeal papillomatosis)
6. Pulmonary blastoma
7. Spindle cell tumor (eg, leiomyoma; neurofibroma)

MEDIASTINUM (See Gamuts F-86 to F-91)

HEART

1. Metastatic tumor (eg, lymphoma; neuroblastoma; Wilms' tumor; sarcomas; hepatoblastoma)
2. Primary tumor (eg, rhabdomyoma; fibroma; lipoma; myxoma—esp. atrial; teratoma; rhabdomyosarcoma; other sarcomas; hemangiopericytoma)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Gamut F-37

SOLITARY PULMONARY NODULE (UNDER 4 CM DIAMETER)

COMMON

1. Carcinoid$_g$
*2. Carcinoma, bronchogenic (incl. bronchioloalveolar)
3. [Chest wall lesion (skin tumor; nipple shadow; rib lesion); artifact; foreign body]
*4. Fungus disease (esp. histoplasmosis; rarely coccidioidomycosis) (See F-74-S)
5. Hamartoma
6. Idiopathic (incl. postinflammatory scar)
*7. Metastasis (esp. from sarcoma; melanoma; carcinoma of breast, colon, kidney, testis)
8. Round pneumonia (eg, atypical viral; pneumococcal; streptococcal; legionella; nocardia)
*9. Tuberculoma

UNCOMMON

*1. Abscess of lung
*2. Amyloidoma
3. Blood vessel (eg, normal vessel seen end-on near hilum; arteriovenous malformation; varix; pulmonary artery aneurysm; anomalous pulmonary vein)
*4. Bulla, fluid-filled (infected)
*5. Cyst, fluid-filled (bronchial; bronchiectatic)
6. [Diaphragmatic hernia, localized]
7. [Encapsulated pleural fluid; interlobar effusion; fibrin ball]
8. [Extramedullary hematopoiesis; splenosis]
*9. Fungus ball (esp. *Aspergillus*)
10. Granuloma, other (eg, paraffinoma; sarcoidosis)
11. Gumma
*12. Hematoma
*13. Inflammatory pseudotumor; organized pneumonia
14. Lipoid pneumonia$_g$ (paraffinoma)
15. [Localized fibrous tumor of pleura; mesothelioma]
16. Lymph node, intrapulmonary; giant lymph node hyperplasia (Castleman disease)

(continued)

*17. Lymphoma$_g$
*18. [Mediastinal mass]
19. Mucoid impaction (eg, obstructive; *Aspergillus* hypersensitivity; asthma); mucocele (bronchial atresia)
20. Mucus plug (eg, cystic fibrosis {mucoviscidosis})
21. Neoplasm, benign (eg, spindle cell tumor$_g$)
*22. Parasitic disease (eg, hydatid cyst; paragonimiasis; *Dirofilaria immitis*)
23. Plasmacytoma, pulmonary
24. [Pleural plaque (eg, asbestos related pleural disease)]
25. Pneumoconiosis (conglomerate mass from silicosis or coal-worker's pneumoconiosis; also asbestosis; talcosis) (See F-70-S)
*26. Pulmonary infarct
*27. Pulmonary sequestration (intralobar)
*28. Rheumatoid nodule
29. Rounded atelectasis
30. Sarcoma of lung (eg, leiomyosarcoma; rhabdomyosarcoma); pulmonary blastoma
*31. Wegener granulomatosis$_g$

* May show cystic appearance or cavitation.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RG, Pare JAP, Pare PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia: WB Saunders, 1991, pp 39–48
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, pp 328–345
5. Reeder MM, Hochholzer L, Evans RG: RPC of the Month from the AFIP: Amyloid tumor of the lung. Radiology 1969;93:1369–1375
6. Siegelman SS, Zerhouni EA, Leo FP, et al: CT of the solitary pulmonary nodule. AJR 1980; 135:1–13
7. Steele JD: The Solitary Pulmonary Nodule. Springfield, IL: CC Thomas, 1964
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9. Toomes H, Delphendahl A, Manke H-G, et al: The coin lesion of the lung. A review of 955 resected coin lesions. Cancer 1983; 51:534–537

Gamut F-38

SOLITARY PULMONARY MASS (GREATER THAN 4 CM DIAMETER)

COMMON

*1. Abscess of lung (pyogenic or amebic)
*2. Carcinoma of lung (bronchogenic or bronchioloalveolar)
*3. Metastasis (esp. from sarcoma; melanoma; carcinoma of breast, colon, kidney, testis)
4. Round pneumonia

UNCOMMON

*1. Adenomatoid malformation (fluid-filled)
*2. Amyloidosis
3. Arteriovenous malformation
*4. Bulla (fluid-filled)
5. Carcinoid$_g$
6. [Chest wall lesion (eg, lipoma; rib lesion); breast implant or prosthesis]
*7. Cyst, fluid-filled (eg, bronchial; bronchiectatic) *
8. [Diaphragmatic hernia]
9. [Encapsulated pleural fluid; interlobar effusion; fibrin ball]
*10. Fungus ball (esp. *Aspergillus*)
*11. Fungus disease (eg, cryptococcosis (torulosis); blastomycosis; histoplasmosis; coccidioidomycosis); actinomycosis, nocardiosis (See F-74-S)
12. Giant lymph node hyperplasia (Castleman disease)
*13. Granuloma (esp. tuberculoma; fungal)
14. Hamartoma
*15. Hematoma of lung
*16. Hydatid cyst
*17. Inflammatory pseudotumor$_g$; organized pneumonia
18. Lipoid pneumonia$_g$ (paraffinoma)
19. [Localized fibrous tumor of pleura; mesothelioma]

*20. Lymphoma$_g$
*21. [Mediastinal mass]
22. Neoplasm, benign (eg, spindle cell tumor$_g$)
23. Plasmacytoma, pulmonary
24. [Pleural plaque (eg, asbestos-related pleural disease)]
25. Pneumoconiosis (conglomerate mass from silicosis or coal-worker's pneumoconiosis; also asbestosis) (See F-70-S)
26. Pulmonary blastoma
*27. Pulmonary infarct
*28. Pulmonary sequestration (intralobar)
29. Radiation pneumonitis (nodular)
30. Rounded atelectasis
31. Sarcoma of lung (eg, leiomyosarcoma; rhabdomyosarcoma);
*32. Wegener granulomatosis$_g$

* May have cystic appearance or cavitation.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RG, Pare JAP, Pare PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia: WB Saunders, 1991, pp 49–58
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-New York, 1997
5. Reeder MM, Hochholzer L, Evans RG: RPC of the Month from the AFIP: Amyloid tumor of the lung. Radiology 1969;93:1369–1375
6. Steele JD: The Solitary Pulmonary Nodule. Springfield, IL: CC Thomas, 1964

Gamut F-39

SUPERIOR SULCUS LESION

COMMON

1. [Artifact (eg, hair braid)]
2. Bulla or bleb
3. Fracture of rib, clavicle, or spine (incl. hematoma and callus)
4. Hemorrhage, extrapleural (eg, trauma; rupture of aorta or other great vessel)
5. Iatrogenic (esp. subclavian catheter perforation)
6. Metastasis
7. Neoplasm, benign (esp. lipoma; schwannoma; neurofibroma)
8. Neoplasm, malignant (esp. bronchogenic carcinoma—Pancoast tumor; rarely liposarcoma)
9. Neoplasm of rib, clavicle, or spine
10. [Normal variant; apical cap; subclavian artery]
11. Pleural thickening or fluid (eg, tuberculosis)
12. Pneumothorax (apical)

UNCOMMON

1. Abscess, esp. extrapleural with osteomyelitis of rib
2. Arteriovenous fistula
3. Cervical lesion with extension (eg, infection; thyroid goiter or neoplasm)
4. Dilated great vessel (eg, subclavian artery with coarctation of aorta)
5. Localized fibrous tumor of the pleura; mesothelioma
6. Lymphoma$_g$
7. Mediastinal fat extension (eg, steroid lipomatosis)
8. Radiation reaction (esp. therapy for carcinoma of breast)
9. Spinal fluid leakage (eg, neoplasm; fracture; avulsion of nerve root)
10. Spinal lesion extension (eg, tuberculosis; metastasis)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

(continued)

References
1. Gondos B: The left apical cap (Letter to the editor). Radiology 1982;142:254
2. McLoud TC, Isler RJ, Novelline RA, et al: Review: the apical cap. AJR 1981;137:299–306

Gamut F-40

MASS-LIKE PERIHILAR OR CENTRAL PULMONARY OPACITY OR LESION RADIATING FROM THE HILUM

COMMON
1. Bronchogenic carcinoma
2. Lymphadenopathy, hilar (See F-103, 104)
3. Lymphoma$_g$
4. Metastasis
5. Pneumonia (incl. chronic aspiration)
6. Pulmonary edema (See F-10)
7. Tuberculosis

UNCOMMON
1. Alveolar proteinosis (rarely)
2. Fungus disease (esp. actinomycosis; blastomycosis)
3. Lipoid pneumonia$_g$
4. Pneumoconiosis (conglomerate mass of silicosis or coal-worker's pneumoconiosis)
5. Pulmonary hemorrhage (eg, bleeding or clotting disorder$_g$; hemolytic-uremic S.) (See F-12)

Gamut F-41

SHAGGY PULMONARY NODULE OR MASS WITH FUZZY BORDERS, SOLITARY OR MULTIPLE

COMMON
1. Abscess of lung; infected bulla or cyst
2. Carcinoma of lung (bronchogenic; bronchioloalveolar)
3. Fungus disease (eg, histoplasmosis; coccidioidomycosis; blastomycosis; cryptococcosis (torulosis); actinomycosis; nocardiosis (See F-74-S)
4. Metastasis (esp. choriocarcinoma)
5. Pneumoconiosis with conglomerate mass (eg, silicosis; coal-worker's pneumoconiosis; asbestosis; talcosis)
6. Pulmonary infarct, bland or septic
7. Round pneumonia
8. Tuberculosis

UNCOMMON
1. Amyloidosis
2. Hematoma of lung (esp. traumatic)
3. Inflammatory pseudotumor$_g$
4. Lipoid pneumonia$_g$
5. Lymphoma$_g$
6. Parasitic disease (esp. amebic abscess; complicated hydatid cyst; paragonimiasis)
7. Postoperative scar
8. Pulmonary sequestration (intralobar)
9. Radiation-treated carcinoma
10. Rheumatoid nodule
11. Rounded atelectasis
12. Sarcoidosis ("alveolar" pattern)
13. Wegener granulomatosis$_g$

Reference
1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-42

MULTIPLE DISCRETE PULMONARY NODULES OR MASSES (NONMILIARY)

COMMON

1. Bronchioloalveolar carcinoma
2. [Chest wall lesions (neurofibromatosis; nipple shadows; rib lesions); foreign bodies; artifacts]
*3. Fungus disease (esp. histoplasmosis; coccidioidomycosis) (See F-74-S)
*4. Metastases
*5. Tuberculosis

UNCOMMON

1. Abscesses of lung (usually staphylococcal); bacillary angiomatosis (*Bartomella henselae*)
*2. Amyloidosis
3. Arteriovenous malformations or fistulas; varices; pulmonary arterial coarctations
4. Bronchiectatic cysts, fluid-filled
5. [Encapsulated pleural effusions]
6. Gaucher disease; Niemann-Pick disease
*7. Hamartomas (incl. Carney's triad)
8. Hematomas of lung
9. Hydatid cysts
10. Kaposi sarcoma
11. Langerhans cell histiocytosis (eosinophilic granuloma)
*12. Leiomyomatosis (benign metastasizing leiomyomas)
13. Lipoid pneumonia$_g$
14. Lymphoma$_g$
15. Measles, atypical with round nodule complexes
16. Melioidosis
17. Mucoid impactions (esp. allergic bronchopulmonary aspergillosis)
18. Mucus plugs (eg, cystic fibrosis {mucoviscidosis})
19. Multiple myeloma (plasmacytomas)
20. Papillomatosis of lung
*21. Paragonimiasis
22. Pneumoconiosis (eg, conglomerate masses in silicosis or coal-worker's pneumoconiosis; asbestosis; talcosis; stannosis; berylliosis)
23. Polyarteritis nodosa
*24. Pulmonary hemosiderosis with ossification (eg, mitral stenosis)
25. Pulmonary infarcts
26. Rheumatoid nodules (incl. Caplan S.)
27. Sarcoidosis
28. Septic emboli
29. Wegener granulomatosis$_g$

* May be calcified.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Gamut F-43-1

SHARPLY DEFINED CAVITARY LESION(S) OF THE LUNG—THIN-WALLED

COMMON	NUMBER
1. Abscess of lung (bacterial, fungal, septic, amebic, opportunistic)	SM
2. Bronchogenic carcinoma	S
3. Bulla; bleb	SM
4. Cystic bronchiectasis	M
5. Fungus disease (esp. coccidioidomycosis) (See F-74-S); fungus ball (esp. *Aspergillus*)	SM S
6. Honeycomb lung (See F-22)	M
7. Metastasis	SM
8. Pneumatocele (esp. staphylococcal or hydrocarbon pneumonia; traumatic) (See F-48)	SM
9. *Pneumocystis carinii* pneumonia (esp. in AIDS)	SM
10. Tuberculosis (incl. granuloma)	SM

UNCOMMON	
1. Amyloidosis	SM
2. Behçet syndrome	M
3. Cyst (eg, bronchial)	S

(continued)

4. Cystic adenomatoid malformation	M
5. Cystic fibrosis (mucoviscidosis)	M
6. [Diaphragmatic hernia]	S
7. Langerhans cell histiocytosis$_g$	M
8. Hydatid cyst	SM
9. [Hydropneumothorax, encapsulated (incl. interlobar bronchopleural fistula); loculated pneumothorax]	SM
10. Inflammatory pseudotumor$_g$	S
11. Lymphoma$_g$ (esp. Hodgkin lymphoma)	SM
12. Melioidosis	SM
13. Papillomatosis of lung	M
14. Parasitic disease, other (esp. paragonimiasis)	SM
15. [Plombage, lucite]	M
16. Polyarteritis nodosa; lupus erythematosus	M
17. Pulmonary infarct	SM
18. Pulmonary sequestration (intralobar)	SM
19. Rheumatoid nodule	SM
20. Sarcoidosis (cystic)	M
21. Septic embolus	SM
22. Traumatic lung cyst (hematoma; laceration)	SM
23. Wegener granulomatosis$_g$	SM

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

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1. Castaneda-Zuniga WR, Hogan MT: Cavitary pulmonary nodules in systemic lupus erythematosus. Radiology 1976; 118:45–48
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Fraser RG, Paré JAP, Paré PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia: WB Saunders, 1991, pp 31–38
4. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
5. Godwin JD, Webb WR, Savoca CJ, et al: Multiple, thin-walled cystic lesions of the lung. AJR 1980;135:593–604
6. Woodring JH, Fried AM: Significance of wall thickness in solitary cavities of the lung: A follow-up study. AJR 1983; 140:473–474

Gamut F-43-2

SHARPLY DEFINED CAVITARY LESION(S) OF THE LUNG—THICK-WALLED

COMMON	NUMBER
1. Abscess of lung (bacterial—staphylococcal, *klebsiella* pseudomonas, proteus; fungal; septic; amebic; opportunistic)	SM
2. Bronchogenic carcinoma	S
3. Cystic bronchiectasis	M
4. Fungus disease (esp. coccidioidomycosis) (See F-74-S)	SM
5. Metastasis	SM
6. Tuberculosis (incl. granuloma)	SM

UNCOMMON	
1. Amyloidosis	SM
2. Cystic adenomatoid malformation	M
3. Cystic fibrosis (mucoviscidosis)	M
4. Hydatid cyst	SM
5. [Hydropneumothorax, encapsulated (incl. interlobar bronchopleural fistula); loculated pneumothorax]	SM
6. Inflammatory pseudotumor$_g$	S
7. Lymphoma$_g$ (esp. Hodgkin lymphoma)	SM
8. Melioidosis	SM
9. Papillomatosis of lung	M
10. Parasitic disease, other (esp. paragonimiasis, dirofilariasis)	SM
11. Pneumoconiosis (silicosis or coal-worker's pneumoconiosis with conglomerate mass)	S
12. Pneumonia, cavitating	SM
13. Pulmonary infarct	SM
14. Pulmonary sequestration (intralobar)	SM
15. Rheumatoid nodule	SM
16. Septic embolus	SM
17. Traumatic lung cyst (hematoma; laceration)	SM
18. Wegener granulomatosis$_g$	SM

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RG, Paré JAP, Paré PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia: WB Saunders, 1991, pp 31–38
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Woodring JH, Fried AM: Significance of wall thickness in solitary cavities of the lung: A follow-up study. AJR 1983; 140:473–474

Gamut F-44

CYST-LIKE OR CAVITARY PULMONARY LESION(S) IN AN INFANT OR CHILD

COMMON

1. Abscess of lung (eg, bacterial or amebic)
2. Bronchopulmonary dysplasia (sequel to RDS—ventilator lung); Wilson-Mikity S.; interstitial pulmonary emphysema
3. Cystic bronchiectasis (eg, cystic fibrosis {mucoviscidosis})
4. Pneumatocele (See F-48)
5. Pneumonia with cavitation (eg, staphylococcus; pseudomonas; *Klebsiella; S. pneumoniae;* bacteroides; mycoplasma; cold agglutinin; or opportunistic—*Pneumocystis carinii* in AIDS; *Aspergillus; Candida;* zygomycosis)
6. Pulmonary sequestration (intralobar)
7. Tuberculosis

UNCOMMON

1. Bronchial or bronchogenic cyst
2. Bulla; bleb
3. [Congenital lobar emphysema]
4. Cystic adenomatoid malformation
5. [Diaphragmatic or paraesophageal hiatal hernia]
6. [Eventration with elevation of air-filled stomach]
7. Fungus disease (esp. coccidioidomycosis) (See F-74-S); fungus ball (esp. *Aspergillus*)
8. Honeycomb lung (eg, Langerhans cell histiocytosis$_g$)
9. Kartagener S. with bronchiectasis
10. Lymphoma$_g$ (eg, Hodgkin disease)
11. Metastasis
12. Mounier-Kuhn S. (tracheobronchomegaly)
13. Papillomatosis (laryngeal or tracheobronchial with spread to lungs)
14. Parasitic disease (esp. hydatid disease; paragonimiasis) (See F-74-S)
15. [Pneumothorax, loculated]
16. Pulmonary blastoma
17. Rheumatoid nodules with cavitation
18. Septic embolus
19. Traumatic lung cyst (laceration of lung)
20. Williams-Campbell S. with saccular bronchiectasis

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Coussement AM, Gooding GA: Cavitating pulmonary metastatic disease in children. AJR 1973;117:833–839
2. Ebel KD, Blickman H, Willich E, Richter E: Differential Diagnosis in Pediatric Radiology. New York: Thieme, 1999, pp 82–90
3. Godwin JD, Webb WR, Savoca CJ, et al: Multiple, thin-walled cystic lesions of the lung. AJR 1980;135:593–604
4. Kaufman HJ, Mahboubi S: Unusual air distribution patterns in prematures on positive pressure ventilation. Ann Radiol 1975;18:431–438

Gamut F-45

SOLITARY CAVITARY PULMONARY LESION (CYST, NODULE, OR MASS) WITH A SHARP OUTLINE (See F-43-2)

COMMON

1. Abscess (eg, bacterial or amebic)
2. Bronchogenic carcinoma
3. Bulla; bleb
4. Fungus disease (esp. coccidioidomycosis)
5. Metastasis
6. Opportunistic infection (esp. fungus such as *Cryptococcus; Candida;* zygomycosis; fungus ball—esp. *Aspergillus*) (See F-75-S)
7. Pneumatocele (See F-48)
8. Tuberculosis

UNCOMMON

1. Amyloidosis
2. Behçet syndrome
3. Cyst (bronchial or traumatic)
4. Granuloma
5. Hamartoma
6. Hydatid cyst
7. [Hydropneumothorax, encapsulated]
8. Lymphoma$_g$ (esp. Hodgkin disease)
9. Parasitic disease, other (eg, paragonimiasis; dirofilariasis immitis)
10. Pulmonary blastoma
11. Pulmonary infarct
12. Rheumatoid nodule
13. Sequestration of lung (intralobar)
14. Wegener granulomatosis$_g$

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Lubbers DL: Gamut: Solitary pulmonary nodule with cavitation. Semin Roentgenol 1984;19:160–161
2. Woodring JH, Fried AM: Significance of wall thickness in solitary cavities of the lung: A follow-up study. AJR 1983; 140:473–474

Gamut F-46

SOLITARY CAVITARY LESION OF THE LUNG WITH A SHAGGY (IRREGULAR OR SPICULATED) OUTLINE

COMMON

1. Abscess (bacterial; amebic; opportunistic infection)
2. Carcinoma (bronchogenic; bronchioloalveolar)
3. Fungus disease (esp. coccidioidomycosis) (See F-74-S)
4. Metastasis
5. Pneumatocele, infected (See F-48)
6. Pulmonary infarct
7. Sequestration of lung (intralobar)
8. Tuberculosis

UNCOMMON

1. [Diaphragmatic hernia]
2. Granuloma (incl. idiopathic)
3. Hematoma
4. [Hydropneumothorax, encapsulated]
5. Lymphoma$_g$ (esp. Hodgkin disease)
6. Parasitic disease (eg, hydatid cyst—esp. infected; *Paragonimus* cyst)
7. Pneumoconiosis (conglomerate mass of silicosis or coal-worker's pneumoconiosis)
8. Pneumonia, localized (eg, staphylococcal; *Klebsiella;* aspiration)
9. Rheumatoid nodule
10. Wegener granulomatosis$_g$

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Gamut F-47-S

PREDISPOSING FACTORS FOR A LUNG ABSCESS

DEPRESSED GAG REFLEX

1. Alcoholism
2. Anesthesia; postoperative state
3. Cerebral disease (eg, stroke; neoplasm)
4. Debilitation
5. Drug abuse
6. Epilepsy; other convulsive disorders
7. Intubation (eg, indwelling nasogastric tube)

UPPER AIRWAY INFECTION

1. Gingivitis
2. Tonsillitis

ESOPHAGOGASTRIC DISEASE WITH ASPIRATION

1. Achalasia
2. Chalasia (gastroesophageal regurgitation)
3. Other esophageal disease (eg, scleroderma)
4. Peptic disease
5. Tracheoesophageal fistula

PULMONARY DISEASE

1. Actinomycosis; nocardiosis
2. Bronchiectasis
3. Bronchogenic carcinoma
4. Cystic fibrosis (mucoviscidosis)
5. Foreign body (eg, peanut in bronchus)
6. Fungus disease (eg, blastomycosis; aspergillosis; coccidioidomycosis; cryptococcosis; zygomycosis) (See F-74-S)
7. Immotile cilia S.; Kartagener S.
8. Immunosuppression; opportunistic infection (See F-75-S)
9. Parasitic disease (esp. amebiasis; hydatid disease) (See F-74-S)
10. Pneumonia (esp. staphylococcal; *Klebsiella; E. coli;* pseudomonas; proteus; aspiration)
11. Sequestration of lung (intralobar)
12. Tuberculosis

MISCELLANEOUS

1. Antitrypsinase deficiency
2. Sickle cell disease

Reference

1. Arms RA, Dines DE, Tinstman TC: Aspiration pneumonia. Chest 1974; 65:136–139

Gamut F-48

PNEUMATOCELE

1. Hemorrhage in lung with interstitial emphysema
2. Hydrocarbon aspiration$_g$
3. Hyperimmunoglobulinemia E syndrome (Buckley S. or Job S.)
4. Pneumonia (eg, staphylococcal; pneumococcal; *Klebsiella; E. coli;* legionella*; H. influenzae;* viral; *Pneumocystis carinii*)
5. Pulmonary infarct
6. Respirator therapy
7. Trauma (contusion, laceration or hematoma of lung)
8. Tuberculosis

References

1. Albelda SM, Gefter WB, Kelley MA, et al: Ventilator-induced subpleural air cysts: Clinical, radiographic, and pathologic significance. Am Rev Respir Dis 1983;127:360–365
2. Dines DE: Diagnostic significance of pneumatocele of the lung. JAMA 1968;204:79–82
3. Fagan CJ, Swischuk LE: Traumatic lung and paramediastinal pneumatoceles. Radiology 1976;120:11–18

Gamut F-49

MULTIPLE LUCENT OR CAVITARY LESIONS OF THE LUNG (See F-43, 44)

COMMON

1. Bronchiectasis
2. Bullae; blebs
3. Fungus disease (esp. coccidioidomycosis) (See F-74-S)
4. Honeycomb lung (end-stage interstitial fibrosis) (See F-22)
5. [Hydropneumothorax, encapsulated; pneumothorax, loculated]
6. Metastases, necrotic
7. Opportunistic infection (esp. *Pneumocystis carinii;* fungus disease; pseudomonas) (See F-75-S)
8. Pneumatoceles (See F-48)
9. Pulmonary thromboembolism with infarcts
10. Septic emboli or abscesses (eg, narcotic addiction)
11. Tuberculosis (incl. atypical mycobacterial infection)

UNCOMMON

1. Abscesses (usually staphylococcal)
2. Amyloidosis
3. Carcinoma of lung, primary multicentric
4. Cystic adenomatoid malformation
5. [Diaphragmatic hernia]
6. Granulomas
7. Hydatid cysts
8. Langerhans cell histiocytosis (eosinophilic granuloma)
9. Lymphoma$_g$ (eg, Hodgkin disease); lymphomatoid granulomatosis
10. Melioidosis
11. Papillomatosis (laryngeal or tracheobronchial with spread to lungs)
12. Paragonimiasis
13. Pneumoconiosis (coal-worker's pneumoconiosis or silicosis with conglomerate masses; progressive massive fibrosis)
14. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis
15. Rheumatoid nodules
16. Sarcoidosis (cystic form)
17. Wegener granulomatosis$_g$; pulmonary angiitis and granulomatosis

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RG, Paré JAP, Paré PD, Fraser RS: Differential Diagnosis of Diseases of the Chest. Philadelphia: WB Saunders, 1991, pp 31–38, 59–64
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
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Gamut F-50

EXTENSIVE PULMONARY OPACITY WITH CAVITATION (DESTRUCTIVE PATTERN) (See F-46)

COMMON

1. Abscess of lung, acute or chronic (eg, bacterial; amebic; aspiration)
2. Bronchial obstruction with distal abscess (eg, from bronchogenic carcinoma; carcinoid; lymphadenopathy; foreign body; bronchial stricture)
3. [Bronchiectasis, esp. cystic]
4. Bronchogenic carcinoma
5. Fungus disease, primary (eg, blastomycosis; coccidioidomycosis; cryptococcosis; zygomycosis) or opportunistic (*Aspergillus; Candida*) (See F-74-S)
6. Pneumonia (esp. *Pneumocystis carinii; Staphylococcus aureus; Klebsiella*)
7. Sepsis

8. Traumatic laceration of lung
9. Tuberculosis (incl. atypical mycobacterial infection)

UNCOMMON

1. Actinomycosis; nocardiosis
2. Gangrene of lung; infarcted pneumonia (esp. *Klebsiella*)
3. Pulmonary thromboembolism with infarction
4. Lymphoma$_g$ (esp. Hodgkin disease)
5. Melioidosis
6. Metastatic disease
7. Paragonimiasis
8. Sequestration of lung (intralobar)
9. Wegener granulomatosis$_g$

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Godwin JD, Webb WR, Savoca CJ, et al: Multiple, thin-walled cystic lesions of the lung. AJR 1980;135:593–604
3. O'Reilly GV, Dee PH, Otteni GV: Gangrene of the lung: Successful medical management of three patients. Radiology 1978;126:575–579

Gamut F-51

MASS IN A PULMONARY CAVITY (MENISCUS OR BULL'S-EYE SIGN), MOBILE OR FIXED

COMMON

*1. Fungus ball (esp. *Aspergillus;* rarely *Cryptococcus; Candida;* Coccidioides)
*2. Hydatid cyst

UNCOMMON

*1. Abscess with inspissated pus
*2. Blood clot in a tuberculous cavity, pulmonary infarct, or laceration of lung
*3. Gangrene of lung; infarcted lung in cavity (esp. *Klebsiella;* angioinvasive fungal disease)
4. Neoplasm (bronchogenic carcinoma; pulmonary blastoma; sarcoma; metastasis)
5. Opportunistic infection (esp. fungus disease; *Pseudomonas;* nocardia)
*6. Paragonimiasis (worm in cyst—corona sign)

* Usually mobile.

References

1. Braman SS: Case records of the Massachusetts General Hospital. N Engl J Med 1983;310:178–187
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Reeder MM: RPC of the Month from the AFIP: Hydatid cyst of the lung. Radiology 1970;94:429–437

Gamut F-52

INCREASED RADIOLUCENCY OF BOTH LUNGS (BILATERAL HYPERINFLATION)

COMMON

1. Asthma
2. Bronchiolitis, acute diffuse of infants (usually viral)
3. Bronchitis, acute or chronic
4. Bronchopulmonary dysplasia sequela (eg, respirator lung)
5. Bullous emphysema, advanced ("vanishing lung" disease)
6. Congenital heart disease (esp. cyanotic—right-to-left shunts, esp. tetralogy of Fallot, pseudotruncus arteriosus; right heart obstruction; Eisenmenger physiology) (See E-8, E-18, E-19)
7. Cystic fibrosis (mucoviscidosis)
8. Emphysema, chronic obstructive (COPD)
9. Hyperventilation (eg, air hunger—metabolic disturbance; acidosis; dehydration; gastroenteritis)
10. Kyphosis (eg, senile "emphysema")

(continued)

11. Normal profound inspiration (eg, athlete; horn player)
12. Pectoral muscle absence, congenital (Poland syndrome) or surgical (bilateral mastectomy) or atrophy (eg, polio)
13. Pulmonary hypertension, primary or secondary
14. [Technical factors: overpenetrated film; thin patient]
15. Tracheal or laryngeal obstruction, stenosis, or compression (eg, foreign body; vascular ring; tumor—carcinoma, adenoid cystic carcinoma {cylindroma}, papilloma, hemangioma, cyst; mediastinal neoplasm, cyst, or lymphadenopathy; tracheobronchomegaly; tracheomalacia; cutis laxa; congenital, posttraumatic, postintubation or tracheostomy stenosis; saber-sheath trachea; relapsing polychondritis) (See F-81-1, 83)

UNCOMMON

1. Bronchiolitis obliterans
2. Bronchiolitis, other (eg, thermal; graft versus host disease)
3. Bronchopneumonia, infantile diffuse, with hyperinflation (eg, measles, influenza, pertussis)
4. Immunologic disorder$_g$; antitrypsin deficiency
5. Pulmonary thromboembolism, central or widespread
6. Tracheoesophageal fistula

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Ebel KD, Blickman H, Willich E, Richter E: Differential Diagnosis in Pediatric Radiology. New York: Thieme, 1999, pp 14–17
2. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
3. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, pp 373–389
5. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 1–6
6. Thurlbeck WM, Simon G: Radiographic appearance of the chest in emphysema. AJR 1978;130:427–440

Gamut F-53

UNILATERAL HYPERLUCENT SEGMENT, LOBE, LUNG, OR HEMITHORAX (See F-52)

COMMON

1. Compensatory distention of adjacent lobe or lung (secondary to lobar atelectasis, agenesis or hypoplasia, or lobectomy or shunting procedure)
2. [Contralateral increased density (eg, chest wall hemihypertrophy; pleural effusion)]
3. Emphysema, bullous or diffuse; large bulla
4. Emphysema, obstructive endobronchial with air trapping (eg, bronchial foreign body, stricture, atresia, granuloma; broncholith; mucus plug or mucoid impaction; neoplasm—bronchogenic carcinoma, carcinoid, endobronchial metastasis)
5. Normal variant
6. Pectoral muscle absence, congenital (eg, Poland syndrome) or surgical (mastectomy) or atrophy (eg, polio)
7. Pneumothorax
8. Scoliosis
9. [Technical factors: heel effect; lateral decubitus film; positioning (eg, patient rotation); grid cutoff]

UNCOMMON

1. Congenital lobar emphysema (See F-54)
2. Cystic adenomatoid malformation
3. [Diaphragmatic hernia]
4. Extrabronchial obstruction or compression (eg, mediastinal mass; hilar lymphadenopathy—tuberculosis, histoplasmosis, sarcoidosis, lymphoma, metastatic disease; anomalous vessels)
5. Pneumatocele (eg, staphylococcal pneumonia; hydrocarbon inhalation) (See F-48)

*6. Pulmonary artery atresia, hypoplasia, coarctation, branch stenosis or anomalous origin (eg, "pulmonary sling" with left PA arising from right PA)

*7. Pulmonary artery compression by inflammatory process or neoplasm

*8. Pulmonary sequestration (intralobar)
*9. Pulmonary vein atresia or stenosis
10. Pulmonary thromboembolism
*11. Swyer-James S.; bronchiolitis obliterans
*12. Venolobar S. (scimitar S.)

* Small hyperlucent hemithorax, especially in children.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Ebel KD, Blickman H, Willich E, Richter E: Differential Diagnosis in Pediatric Radiology. New York: Thieme, 1999, pp 18–27
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Gaensler EA: Unilateral hyperlucent lung. In: Simon M, Potchen J, LeMay M: Frontiers of Pulmonary Radiology. New York: Grune & Stratton, 1969
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997, pp 373–389
5. Reid L, Simon G: Unilateral lung transradiancy. Thorax 1962; 17:230–239
6. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 17–29

Gamut F-54

CONGENITAL LOBAR EMPHYSEMA (LOBAR AIR TRAPPING)

COMMON

1. Bronchial cartilage ring anomaly with partial collapse and air trapping (cartilage absence, hypoplasia, or malacia)
2. Idiopathic

UNCOMMON

1. Bronchial atresia (segmental)
2. Bronchial kinking; lobar torsion
3. Extrinsic pressure on bronchus (eg, bronchogenic cyst)
4. Foreign body in bronchus
5. Mucosal flap or enlarged fold in bronchus
6. Neoplasm of bronchus
7. Patent ductus arteriosus
8. Postinflammatory cyst
9. Pulmonary sling with left PA arising from right PA

References

1. Cremin BJ, Movsowitz H: Lobar emphysema in infants. Br J Radiol 1971;44:692–6962.
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-55

NEONATAL RESPIRATORY DISTRESS

COMMON

1. Aspiration of meconium or amniotic fluid
2. Congenital heart disease (esp. cyanotic)
3. Diaphragmatic hernia
4. Hyaline membrane disease (incl. its sequel—bronchopulmonary dysplasia)
5. Pneumonia
6. Pulmonary immaturity
7. Respirator therapy (eg, PEEP); shock lung; Wilson-Mikity S.
8. Transient tachypnea of the newborn (retained fetal alveolar fluid)

UNCOMMON

1. Choanal atresia
2. Congenital lobar emphysema
3. Cystic adenomatoid malformation
4. Eventration or paralysis of diaphragm
5. Laryngeal atresia
6. Neuromuscular disorder$_g$ (eg, Werdnig-Hoffmann disease)
7. Overly medicated mother
8. Persistent fetal circulation

(continued)

9. Pierre Robin S. (Robin sequence)
10. Pneumothorax; chylothorax
11. Pulmonary edema
12. Pulmonary hemorrhage
13. Pulmonary hypoplasia or agenesis (eg, asphyxiating thoracic dysplasia {Jeune S.}; short ribpolydactyly syndromes)
14. Pulmonary lymphangiectasia
15. Tracheoesophageal fistula
16. Vascular ring

References

1. Silverman FN, Kuhn JP (eds): Caffey's Pediatric X-ray Diagnosis. (ed 9) St. Louis: CV Mosby, 1993
2. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995
3. Wesenberg RL: The Newborn Chest. Hagerstown, MD: Harper & Row, 1973

Gamut F-56

BUBBLY LUNGS IN INFANTS AND CHILDREN

COMMON

1. Bronchiectasis, cylindical or saccular (esp. cystic fibrosis; severe infections; chronic foreign bodies)
+2. Bronchopulmonary dysplasia
*3. Pulmonary interstitial emphysema from positive pressure ventilation

UNCOMMON

1. Cystic adenomatoid malformation
*2. Infantile respiratory distress S. (hyaline membrane disease) (tiny bubbles)
+3. Wilson-Mikity S.

* From overdistention of terminal bronchioles and alveolar ducts.
\+ From uneven pattern of alveolar aeration.

Reference

1. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 54–55

Gamut F-57

BILATERAL UNDERAERATION (Esp. in Children)

COMMON

1. Abdominal distention (eg, ascites; mass)
2. Poor inspiration

UNCOMMON

1. Bilateral eventration of diaphragm
2. Cheyne-Stokes breathing in neonate
3. Diaphragmatic paralysis (eg, polio; phrenic nerve injury or paralysis)
4. Inspiratory airway obstruction (eg, tracheal or laryngeal obstruction, stenosis, or compression) (See no. 15 in F-52)
5. Maternal oversedation in neonate
6. Neurologic disorder$_g$
7. Primary muscle disorder$_g$
8. Pulmonary hypoplasia in neonate

Reference

1. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, p 6.

Gamut F-58

ASYMMETRY OF LUNG SIZE

COMMON

1. Atelectasis (eg, bronchogenic carcinoma; carcinoid; foreign body or mucus plug in bronchus)
2. Displacement of hemidiaphragm by subphrenic mass or abscess, hepatomegaly, splenomegaly, distended stomach or colon
3. Emphysema, unilateral or asymmetrical (eg, bullous emphysema; ball-valve obstruction)
4. Eventration of hemidiaphragm
5. Phrenic nerve paralysis

6. Pleural effusion or malignancy, diffuse unilateral or asymmetrical (eg, mesothelioma; metastatic adenocarcinoma; invasive thymoma)
7. Postoperative lobectomy or partial lung resection; fibrothorax
8. Pulmonary fibrosis, unilateral (eg, healed tuberculosis; postradiation)

UNCOMMON

1. Bronchial atresia or stenosis
2. Congenital lobar emphysema
3. Cystic adenomatoid malformation
4. Diaphragmatic hernia
5. Hypoplastic lung or pulmonary artery
6. Lung transplantation
7. Swyer-James S.
8. Thoracoplasty
9. Venolobar S. (scimitar S.)

Gamut F-59

LOCALIZED CHRONIC PULMONARY INFILTRATE

COMMON

1. Abscess of lung (bacterial, fungal, amebic)
2. Aspiration pneumonia, chronic (eg, neurologic or neuromuscular disorder$_g$; pharyngeal or esophageal disease—Zenker's diverticulum; achalasia; chalasia; hiatus hernia; esophageal atresia; tracheoesophageal fistula; scleroderma; carcinoma of esophagus) (See F-7)
3. Bronchial obstruction (eg, carcinoid; bronchogenic carcinoma; foreign body; stricture; mucus plug; mucoid impaction—*Aspergillus* sensitivity, asthma)
4. Bronchiectasis (See F-80)
5. Infection, esp. untreated or antibiotic resistant (eg, tuberculosis; fungus disease; *Klebsiella; Mycoplasma*)
6. Opportunistic infection (eg, in immune deficiency disorder$_g$; AIDS; steroid or immunosuppressive therapy) (See F-77)
7. Pneumonia, organized; inflammatory pseudotumor

UNCOMMON

1. Alveolar proteinosis
2. Bronchioloalveolar carcinoma
3. Cystic fibrosis (mucoviscidosis)
4. Foreign body in pulmonary tissue (eg, splinter, needle); lycoperdonosis
5. Idiopathic pulmonary fibrosis (IPF)
6. Lipoid pneumonia
7. Lymphoma$_g$
8. Parasitic disease (esp. amebiasis; paragonimiasis; ascariasis) (See F-74-S)
9. Pulmonary hemorrhage, late or recurrent (eg, hemophilia; idiopathic pulmonary hemosiderosis)
10. Pulmonary sequestration (intralobar)
11. Radiation pneumonitis or fibrosis

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995

Gamut F-60

UNILATERAL DIFFUSE LUNG DISEASE

COMMON

*1. Aspiration, acute or chronic
2. Bronchiectasis (incl. destroyed lung of tuberculosis)
*3. Contusion of lung
*4. Fungus disease (See F-74-S)
5. Metastases, esp. lymphangitic
6. Neoplasm, malignant (esp. bronchioloalveolar carcinoma)

(continued)

*7. Pneumonia (incl. opportunistic)
*8. Pulmonary edema (See F-10)
9. Radiation therapy (eg, for breast or lung carcinoma)
*10. Tuberculosis

UNCOMMON

*1. Atelectasis, entire lung, central obstructive or nonobstructive (eg, postoperative, traumatic)
2. Cystic adenomatoid malformation
3. Cysts (esp. hydatid)
4. Esophageal lung, congenital
5. Lymphoma$_g$
*6. Pulmonary gangrene
*7. Pulmonary infarcts; septic emboli

* May be acute.

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Youngberg AS: Unilateral diffuse lung opacity. Differential diagnosis with emphasis on lymphangitic spread of cancer. Radiology 1977;123:277–281

Gamut F-61

BILATERAL BASILAR PULMONARY DISEASE

COMMON

1. Asbestosis
2. Aspiration pneumonia (incl. hydrocarbon) (see F-7)
3. Atelectasis (eg, immobilization; splinting; post-cardiac surgery—usually unilateral LLL)
4. Bronchiectasis (often secondary to chronic pneumonia)
5. Connective tissue disease$_g$ (collagen vascular disease) (eg, scleroderma; rheumatoid lung; dermatomyositis; lupus erythematosus; Sjögren syndrome)
6. Interstitial fibrosis$_g$ [esp. idiopathic pulmonary fibrosis (IPF)]
7. Pulmonary edema (See F-10)
8. Viral pneumonia

UNCOMMON

1. Alveolar proteinosis
2. Bronchiolitis obliterans with organizing pneumonia (BOOP)
3. Chemotherapy, other drugs (eg, methotrexate; busulfan; bleomycin; amiodarone; nitrofurantoin; BCNU—carmustine; methysergide; cyclophosphamide; procainamide) (See F-73-S)
4. Desquamative interstitial pneumonitis (DIP); lymphocytic interstitial pneumonitis (LIP)
5. Kaposi sarcoma
6. Lipoid pneumonia$_g$
7. Lymphomatoid granulomatosis
8. Metastases (esp. lymphangitic)
9. Neurofibromatosis
10. Nonspecific interstitial pneumonitis (NSIP) and nonspecific interstitial pulmonary fibrosis (NIPF)

References

1. Berkman YM: Aspiration and inhalation pneumonias. Semin Roentgenol 1980; 15:73–84
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-62

RETROCARDIAC LESION

COMMON

1. Aortic aneurysm or ectasia
2. Atelectasis of lower lobe
3. Diaphragmatic hernia (eg, hiatal; Bochdalek; traumatic)
4. Esophageal lesion (eg, carcinoma; leiomyoma; varices; achalasia)

5. Granuloma of lung (eg, tuberculoma; fungus disease, esp. histoplasmoma)
6. Left atrial enlargement
7. Lymphadenopathy (eg, inflammatory; lymphoma; metastatic disease)
8. Mediastinal lesion, middle or posterior (eg, bronchogenic cyst; lymphadenopathy; neurogenic tumor; thoracic kidney; extramedullary hematopoiesis) (See F-89, F-90)
9. Neoplasm of lung (eg, bronchogenic carcinoma; bronchioloalveolar carcinoma; carcinoid; hamartoma; metastasis)
10. Pleural effusion
11. Pneumonia or other disease in lower lobe (eg, aspiration pneumonia; tuberculosis; fungus disease; abscess of lung; bronchiectasis—esp. cystic)
12. Pulmonary infarct
13. Pulmonary sequestration (intralobar)
14. Spinal lesion (eg, osteoarthritic spurring; fracture; osteomyelitis; discogenic disease; hemangioma, sarcoma, myeloma or other primary or metastatic neoplasm); paraspinal abscess, hematoma, adenopathy or neoplasm)

UNCOMMON

1. Azygos vein dilatation
2. Cardiac tumor or aneurysm (esp. left ventricular)
3. Cystic adenomatoid malformation
4. Hydatid cyst
5. Neoplasm of pleura (eg, mesothelioma; localized fibrous tumor of pleura; metastasis)

Gamut F-63

BLURRING OF THE HEART BORDER ON PA CHEST FILM

COMMON

1. Idiopathic
2. Infiltrate or edema in left lingula, right middle lobe, or anterior segment of an upper lobe
3. Mediastinal lesion, anterior (eg, thymoma; thymic cyst; thymolipoma; teratoma; lymphoma$_g$; pericardial cyst; lipoma; mediastinitis; fibrosis) (See F-88)
4. Normal or congested blood vessels (esp. right heart border)
5. Pericardial fat pad
6. Pleural fluid
7. Pleuropericardial adhesion; postinfarction myocardial scar
8. Pneumoconiosis (esp. asbestosis) (See F-70-S)

UNCOMMON

1. Hernia (hepatic or Morgagni)
2. Pectus excavatum; funnel breast
3. Pericarditis (constrictive)
4. Venolobar S. (scimitar S.)

Reference

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973

Gamut F-64

SUBPLEURAL OR PERIPHERAL LESION ARISING IN LUNG (See F-125)

COMMON

1. Asbestosis
2. Carcinoma of lung (esp. Pancoast tumor)
3. Eosinophilic pneumonia (Löffler syndrome; PIE)
4. Granuloma (eg, tuberculosis; histoplasmosis; coccidioidomycosis)
5. Metastasis
6. Pulmonary infarct
7. Rounded atelectasis

UNCOMMON

1. Actinomycosis; nocardiosis
2. Fungus disease (eg, cryptococcosis {torulosis})
3. Inflammatory pseudotumor$_g$; organized pneumonia

(continued)

4. Lymphoma$_g$
5. [Mesothelioma; localized fibrous tumor of pleura]
6. Pulmonary sequestration (intralobar)
7. Rheumatoid nodule
8. Wegener granulomatosis$_g$

Reference

1. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Gamut F-65

LONG LINEAR OR CURVILINEAR SHADOW(S) IN THE LUNG

COMMON

1. Azygos lobe (rarely hemiazygos lobe on left)
2. Bronchial wall thickening, enlarged bronchus (eg, chronic bronchitis, bronchiectasis—"tram lines")
3. Bulla, pneumatocele, or thin-walled cavity (partially visible)
4. Interlobar fissure, normal or thickened or fluid-filled; accessory fissure
5. Kerley lines
6. Linear (plate-like, discoid) atelectasis, transverse or vertical (Fleischner line)
7. Lymphangitic carcinomatosis
8. Pneumothorax (edge of lung)
9. Pulmonary artery or vein (eg, scimitar syndrome; arteriovenous malformation; other anomalous vessel)
10. Scar (linear)
11. [Skin fold; artifact]

UNCOMMON

1. Bronchial artery (eg, cyanotic congenital heart disease)
2. Mucoid impaction in bronchus
3. Paragonimiasis (with worm burrows or bronchiectasis)
4. [Pleural band or scar]

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Fleischner F, Hampton AD, Castleman B: Linear shadows in the lung (interlobar pleuritis, atelectasis and healed infarction). AJR 1941;46:610–618
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Simon G: Further observations on the long line shadow across a lower zone of the lung. Br J Radiol 1970;43:327–332
4. Sutton D: Textbook of Radiology and Imaging. (ed 6) New York: Churchill Livingstone, 1998, pp 321–323
5. Trapnell DH: The differential diagnosis of linear shadows in chest radiographs. Radiol Clin North Am 1973;11:77–92

Gamut F-66

COMBINED SKIN AND WIDESPREAD LUNG OR PLEURAL DISORDER

COMMON

1. Chickenpox; measles
2. Connective tissue disease (collagen vascular disease)$_g$ (esp. scleroderma; lupus erythematosus, rheumatoid arthritis, dermatomyositis)
3. Immunologic disorder$_g$; congenital or acquired (esp. AIDS)
4. Malignant neoplasm of skin with metastasis (eg, melanoma; squamous cell carcinoma)
5. Radiation therapy
6. Sarcoidosis

UNCOMMON

1. Acanthosis nigricans
2. Amyloidosis
3. Bleeding or clotting disorder$_g$
4. Burn

5. Cutis laxa
6. Drug reaction; chemotherapy
7. Ectodermal dysplasia
8. Ehlers-Danlos S.
9. Erythema nodosum; erythema multiforme
10. Fungus disease (eg, candidiasis; blastomycosis) (See F-74-S)
11. Kaposi sarcoma
12. Langerhans cell histiocytosis$_g$
13. Lymphoma; leukemia; mycosis fungoides
14. Melioidosis
15. Neurofibromatosis
16. Osler-Weber-Rendu S. (familial telangiectasia)
17. Parasitic disease (eg, amebiasis; acute schistosomiasis; strongyloidiasis)
18. Progeria
19. Tuberous sclerosis
20. Wegener granulomatosis$_g$
21. Yellow nail S.

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Ruben EG, Siegelman SS: The Lungs in Systemic Diseases. Springfield, IL: CC Thomas, 1969
3. Taybi H, Lachman RS: Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. (ed 4) St. Louis: Mosby-Year Book, 1996

Gamut F-67

COMBINED LUNG AND BONE DISORDER

COMMON

1. Bronchogenic carcinoma with thoracic or extrathoracic bone metastasis
2. Connective tissue disease (collagen disease)$_g$ (esp. scleroderma; dermatomyositis)
3. Immunologic disorder$_g$ (esp. AIDS; chronic granulomatous disease of childhood)
4. Infection (eg, osteomyelitis and pneumonia; septic emboli)
5. Langerhans cell histiocytosis$_g$ (eosinophilic granuloma)
6. Lymphoma$_g$; leukemia
7. Metastatic disease
8. Rheumatoid arthritis
9. Sarcoidosis
10. Sickle cell disease; other primary anemia
11. Trauma
12. Tuberculosis (incl. atypical mycobacterial infection)

UNCOMMON

1. Actinomycosis; nocardiosis
2. Amyloidosis; plasma cell dyscrasia
3. Ankylosing spondylitis
4. Asphyxiating thoracic dysplasia (Jeune S.) and other congenital bone dysplasias (eg, thanatophoric dysplasia; chondroectodermal dysplasia {Ellis-van Creveld S.})
5. Cystic fibrosis (mucoviscidosis)
6. Drug addiction (sepsis)
7. Ehlers-Danlos S.; Marfan S.; homocystinuria; cutis laxa
8. Farber's disease (disseminated lipogranulomatosis)
9. Fat embolism (traumatic)
10. Fungus disease (esp. blastomycosis; coccidioidomycosis; histoplasmosis) (See F-74-S)
11. Gaucher disease; Niemann-Pick disease
12. Hyperparathyroidism
13. Melioidosis
14. Multiple myeloma
15. Neurofibromatosis
16. Parasitic disease (esp. hydatid disease—*Echinococcus granulosus*)
17. Radiation fibrosis and osteitis
18. Rubella S.
19. Steroid therapy
20. Tuberous sclerosis
21. Wegener granulomatosis$_g$

(continued)

References
1. Edeiken J, Dalinka M, Karasick D: Edeiken's Roentgen Diagnosis of Diseases of Bone. (ed 4) Baltimore: Williams & Wilkins, 1989
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Garrett MK: Gamut: Combined lung and bone disorder. Semin Roentgenol 1985; 20:323–324
4. Murray RO, Jacobson HG, Stoker DJ: The Radiology of Skeletal Disorders. (ed 3) London: Churchill Livingstone, 1990
5. Taybi H, Lachman RS: Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. (ed 4) St. Louis: Mosby-Year Book, 1996

Gamut F-68

PULMONARY DISEASE WITH EOSINOPHILIA

COMMON

1. Asthma (incl. allergic granulomatosis)
2. Drug reaction (eg, penicillin; sulfonamides; isoniazid; nitrofurantoin; nonsteroid anti-inflammatory drug—NSAID; aminosalicylic acid) (See F-73-S)
3. Eosinophilic leukemia; Hodgkin's disease
4. Eosinophilic pneumonia, idiopathic acute (Löffler S.) or chronic
5. Hypersensitivity bronchopulmonary aspergillosis (mucoid impaction)
6. Parasitic disease (eg, ascariasis; paragonimiasis; strongyloidiasis; tropical pulmonary eosinophilia (filarial); schistosomiasis; ancylostomiasis; visceral larval migrans; dirofilariasis immitis) (See F-74-S)
7. PIE (pulmonary infiltrate with eosinophilia)

UNCOMMON

1. Bacterial infection (eg, brucellosis)
2. Carcinoma (esp. bronchogenic)
3. Connective tissue disease (collagen vascular disease)$_g$ (esp. polyarteritis nodosa)
4. Desquamative interstitial pneumonitis (DIP)
5. Fungus disease (esp. coccidioidomycosis) (See F-74-S)
6. Hypereosinophilic S.
7. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) (eg, farmer's lung; bagassosis) (See F-69)
8. Langerhans cell histiocytosis$_g$ (eosinophilic granuloma)
9. Rheumatoid lung
10. Sarcoidosis
11. Tuberculosis
12. Wegener granulomatosis$_g$

References
1. Eisenberg RL: Clinical Imaging. An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Heitzman ER: The Lung: Radiologic-Pathologic Correlations. (ed 2) St. Louis: CV Mosby, 1984, pp 241, 276
4. Liebow AA, Carrington CB: The eosinophilic pneumonias. Medicine 1969;48:251–285
5. Schatz M, Wasserman S, Patterson R: The eosinophil and the lung. Arch Intern Med 1982;142:1515–1519

Gamut F-69

HYPERSENSITIVITY PNEUMONITIS (EXTRINSIC ALLERGIC ALVEOLITIS {EAA}, ORGANIC DUST DISEASE)

COMMON

1. Bagassosis (sugarcane)
2. Byssinosis (cotton)
3. Farmer's lung (moldy hay, wheat dust, tabacosis)
4. Humidifier lung; air-conditioner lung
5. Pigeon-breeder's lung; bird-fancier's lung; budgerigar lung; ostrich feather lung

UNCOMMON

1. Auto-worker's lung (machine operator's lung)
2. Basement shower EAA
3. Black fat tobacco smoker's lung
4. Building-associated EAA
5. Castor bean lung
6. Cave explorer's lung
7. Cheese brusher's lung
8. Coffee-worker's lung
9. Detergent-worker's lung
10. Fish meal-worker's lung
11. Fog-fever
12. Furrier's lung
13. Green coffee-worker's disease
14. Hemp dust inhalation disease
15. Hot-tub lung
16. Isocyanate-associated EAA
17. Japanese summer-type EAA
18. Malt worker's pneumonia
19. Maple bark stripper's disease
20. Mushroom-worker's lung; lycoperdonosis (puff-ball fungus spores from mushrooms)
21. Organophosphate insecticide inhalation
22. Paprika splitter's lung
23. Pituitary snuff-taker's lung
24. Prawn-worker's lung
25. Sequoiosis
26. Starch sprayer's lung
27. Suberosis (cork)
28. Thatched roof dust disease
29. Thesaurosis (hair spray)
30. Wheat weevil disease
31. Wood pulp-worker's lung

References

1. Fink JN: Organic dust-induced hypersensitvity pneumonitis. J Occup Med 1973;15:245–247
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Webb WR, Möller NL, Naidich DP: High Resolution CT of the Lung. (ed 3) Philadelphia: Lippincott, Williams & Wilkins, 2001

Gamut F-70-S

INORGANIC DUSTS THAT CAUSE PNEUMOCONIOSIS

COMMON

1. Asbestos
2. Coal
3. Silica

UNCOMMON

1. Aluminum, bauxite (Shaver's disease)
2. Antimony
3. Barium sulfate (baritosis)
4. Beryllium
5. Cadmium
6. Carcinogens (arsenic; chromate; uranium; thorium; plutonium; radioactive ore; radon)
7. Cement dust
8. Cerium (arc lamp)
9. Cobalt and tungsten carbide ("hard metal")
10. Diatomaceous earth
11. Fuller's earth
12. Graphite
13. Iron (siderosis)
14. Kaolin (clay)
15. Manganese
16. Mica
17. Osmium
18. Platinum
19. Polyvinyl chloride
20. Silicon carbide
21. Silver; ferric oxide + silver (argyrosiderosis)
22. Synthetic mineral fibers
23. Talc (incl. drug abuse)
24. Tin oxide (stannosis)
25. Titanium dioxide (rutile)
26. Vanadium
27. Volcanic dust
28. Zeolites (Erionite)
29. Zirconium

(continued)

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Lapp NL: Lung disease secondary to inhalation of nonfibrous minerals. Clin Chest Med 1981;2:219–233
3. Morgan WKC, Seaton A: Occupational Lung Diseases. Philadelphia: WB Saunders, 1975, p 241
4. Ostiguy GL: Summary of task force report on occupational respiratory disease (pneumoconiosis). Can Med Assoc J 1979;121:414–421
5. Sander OA: The nonfibrogenic (benign) pneumoconioses. Semin Roentgenol 1967;2:312–321

Gamut F-71-S

ILO 1980 INTERNATIONAL CLASSIFICATION OF RADIOGRAPHS OF THE PNEUMOCONIOSES: SUMMARY OF DETAILS OF CLASSIFICATION (INTERNATIONAL LABOUR OFFICE, GENEVA)

Features		Codes	Definitions
TECHNICAL QUALITY		1	Good.
		2	Acceptable,with no technical defect likely to impair classification of the radiograph for pneumoconiosis.
		3	Poor, with some technical defect but still acceptable for classification purposes.
		4	Unacceptable.
PARENCHYMAL ABNORMALITIES			
Small Opacities	*Profusion*		The category of profusion is based on assessment of the concentration of opacities by comparison with the *standard radiographs.*
		0/- 0/0 0/1	Category 0—small opacities absent or less profuse than the lower limit of category 1.
		1/0 1/1 1/2	Category 1, 2, and 3—represent increasing profusion of small opacities as defined by the corresponding standard radiographs.
		2/1 2/2 2/3 3/2 3/3 3/+	
	Extent	RU RM RL	The zones in which the opacities are seen are recorded. The right (R) and left (L) thorax are both divided into three zones—upper (U), middle (M), and lower (L).
		LU LM LL	The category of profusion is determined by considering the profusion as a whole over the affected zones of the lung and by comparing this with the standard radiographs.

Gamut F-71-S Continued

Features		Codes	Definitions
	Shape and Size		
	rounded	p/p q/q r/r	The letters p, q, and r denote the presence of small rounded opacities. Three sizes are defined by the appearances on standard radiographs. p = diameter up to about 1.5 mm. q = diameter exceeding about 1.5 mm and up to about 3 mm. r = diameter exceeding about 3 mm and up to about 10 mm.
	irregular	s/s t/t u/u	The letters s, t, and u denote the presence of small irregular opacities. Three sizes are defined by the appearances on standard radiographs. s = width up to 1.5 mm. t = width exceeding about 1.5 mm and up to about 3 mm. u = width exceeding 3 mm and up to about 10 mm.
	mixed	p/s p/t p/u p/q p/r q/s q/t q/u q/p q/r r/s r/t r/u r/p r/q s/p s/q s/r s/t s/u t/p t/q t/r t/s t/u u/p u/q u/r u/s u/t	For mixed shapes (or sizes) of small opacities the predominant shape and size is recorded first. The presence of a significant number of another shape and size is recorded after the oblique stroke.
Large Opacities		A B C	The categories are defined in terms of the *dimensions* of the opacities. Category A—an opacity having a greatest diameter exceeding about 10 mm and up to and including 50 mm, or several opacities each greater than about 10 mm, the sum of whose greatest diameters does not exceed about 50 mm. Category B—one or more opacities larger or more numerous than those in category A whose combined area does not exceed the equivalent of the right upper zone. Category C—one or more opacities whose combined area exceeds the equivalent of the right upper zone.
PLEURAL ABNORMALITIES			
Pleural Thickening			
Chest Wall	Type		Two types of pleural thickening of the chest wall are recognized: circumscribed (plaques) and diffuse. Both types may occur together.
	Site	R L	Pleural thickening of the chest wall is recorded separately for the right and left thorax.
	Width	a b c	For pleural thickening seen along the lateral chest wall the measurement of *maximum width* is made from the inner line of the chest wall to the inner margin of the shadow seen most sharply at the parenchymal-pleural boundary. The maximum width usually occurs at the inner margin of the rib shadow at its outermost point. a = maximum width up to about 5 mm. b = maximum width over about 5 mm and up to about 10 mm. c = maximum width over about 10 mm.

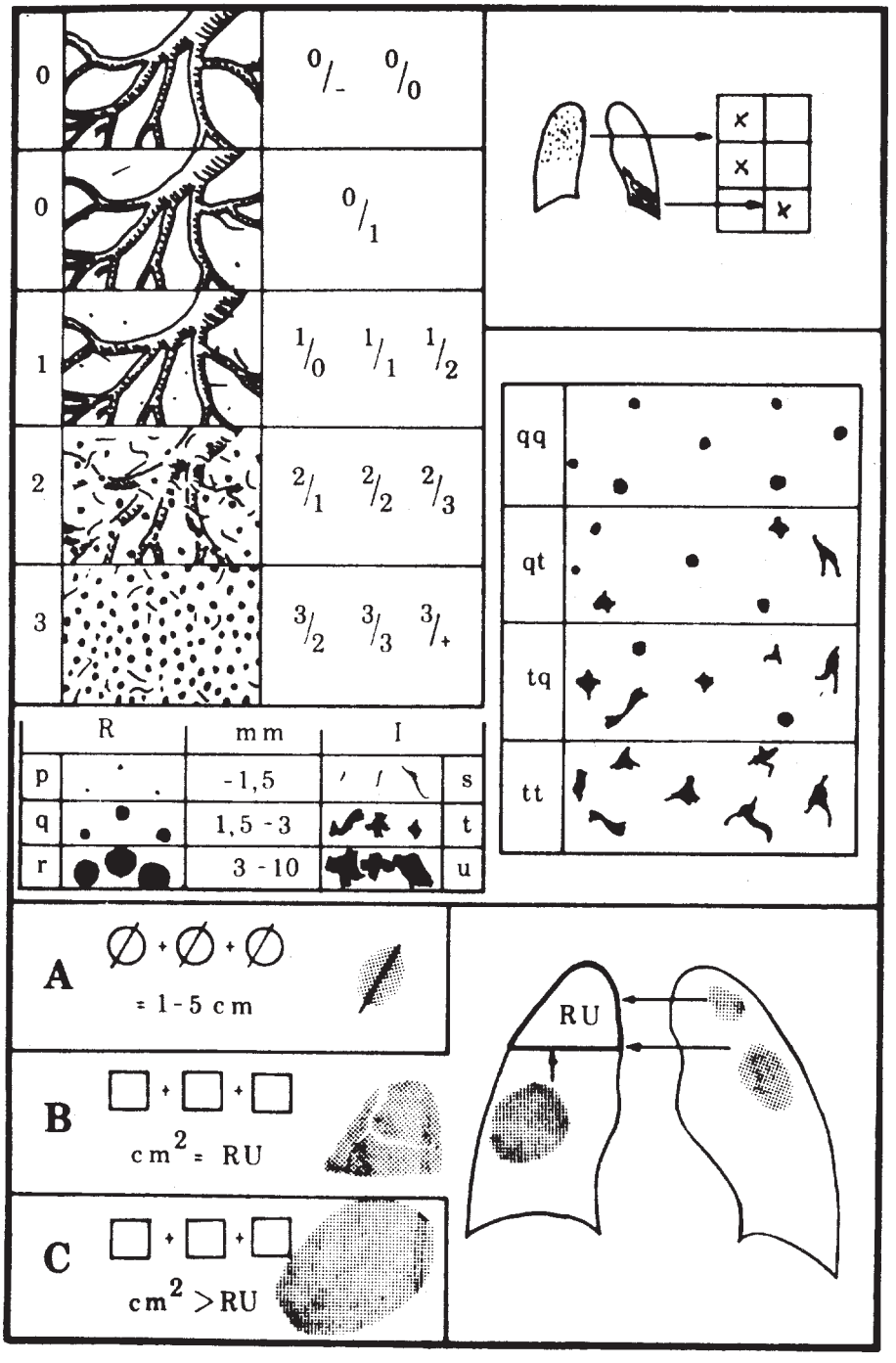
(continued)

Gamut F-71-S Continued

Features		Codes	Definitions
	Face on	Y N	The presence of pleural thickening seen face on is recorded even if it can be seen also in profile. If pleural thickening is seen face on only, width cannot usually be measured.
	Extent	1 2 3	Extent of pleural thickening is defined in terms of the *maximum length* of pleural involvement, or as the sum of maximum lengths, whether seen in profile or face on. 1 = total length equivalent up to one-quarter of the projection of the lateral chest wall. 2 = total length exceeding one-quarter but not one-half of the projection of the lateral chest wall. 3 = total length exceeding one-half of the projection of the lateral chest wall.
Diaphragm	Presence	Y N	A plaque involving the diaphragmatic pleura is recorded as present (Y) or absent (N), separately for the right and left thorax.
	Site	R L	
Costophrenic Angle Obliteration	Presence	Y N	The presence (Y) or absence (N) of costophrenic angle obliteration is recorded separately from thickening over other areas, for the right (R) and left (L) thorax. The lower limit for this obliteration is defined by a *standard radiograph.*
	Site	R L	If the thickening extends up the chest wall then both costophrenic angle obliteration and pleural thickening should be recorded.
Pleural Calcification			The site and extent of pleural calcification are recorded separately for the two lungs, and the extent defined in terms of *dimensions.*
	Site		
	chest wall	R L	
	diaphragm	R L	
	other	R L	"Other" includes calcification of the mediastinal and pericardial pleura.
	Extent	1 2 3	1 = an area of calcified pleura with greatest diameter up to about 20 mm, or a number of such areas the sum of whose greatest diameters does not exceed about 20 mm. 2 = an area of calcified pleura with greatest diameter exceeding about 20 mm and up to about 100 mm, or a number of such areas the sum of whose greatest diameters exceeds about 20 mm but does not exceed about 100 mm. 3 = an area of calcified pleura with greatest diameter exceeding about 100 mm, or a number of such areas whose sum of greatest diameter exceeds about 100 mm.
SYMBOLS			It is to be taken that the definition of each of the symbols is preceded by an appropriate word or phrase such as "suspect," "changes suggestive of," or "opacities suggestive of," etc.
		ax	–coalescence of small pneumoconiotic opacities
		bu	–bulla(e)
		ca	–cancer of lung or pleura
		cn	–calcification in small pneumoconiotic opacities
		co	–abnormality of cardiac size or shape

Gamut F-71-S Continued

Features		Codes	Definitions
		cp	–cor pulmonale
		cv	–cavity
		di	–marked distortion of the intrathoracic organs
		ef	–effusion
		em	–definite emphysema
		es	–eggshell calcification of hilar or mediastinal lymph nodes
		fr	–fractured rib(s)
		hi	–enlargement of hilar or mediastinal lymph nodes
		ho	–honeycomb lung
		id	–ill-defined diaphragm
		ih	–ill-defined heart outline
		kl	–septal (Kerley) lines
		od	-other significant abnormality
		pi	-pleural thickening in the interlobar fissure or mediastinum
		px	-pneumothorax
		rp	-rheumatoid pneumoconiosis
		tb	-tuberculosis
COMMENT	Presence	Y N	Comments should be recorded pertaining to the classification of the radiograph, particularly if some other cause is thought to be responsible for a shadow that could be thought by others to have been due to pneumoconiosis, also to identify radiographs for which the technical quality may have affected the reading material.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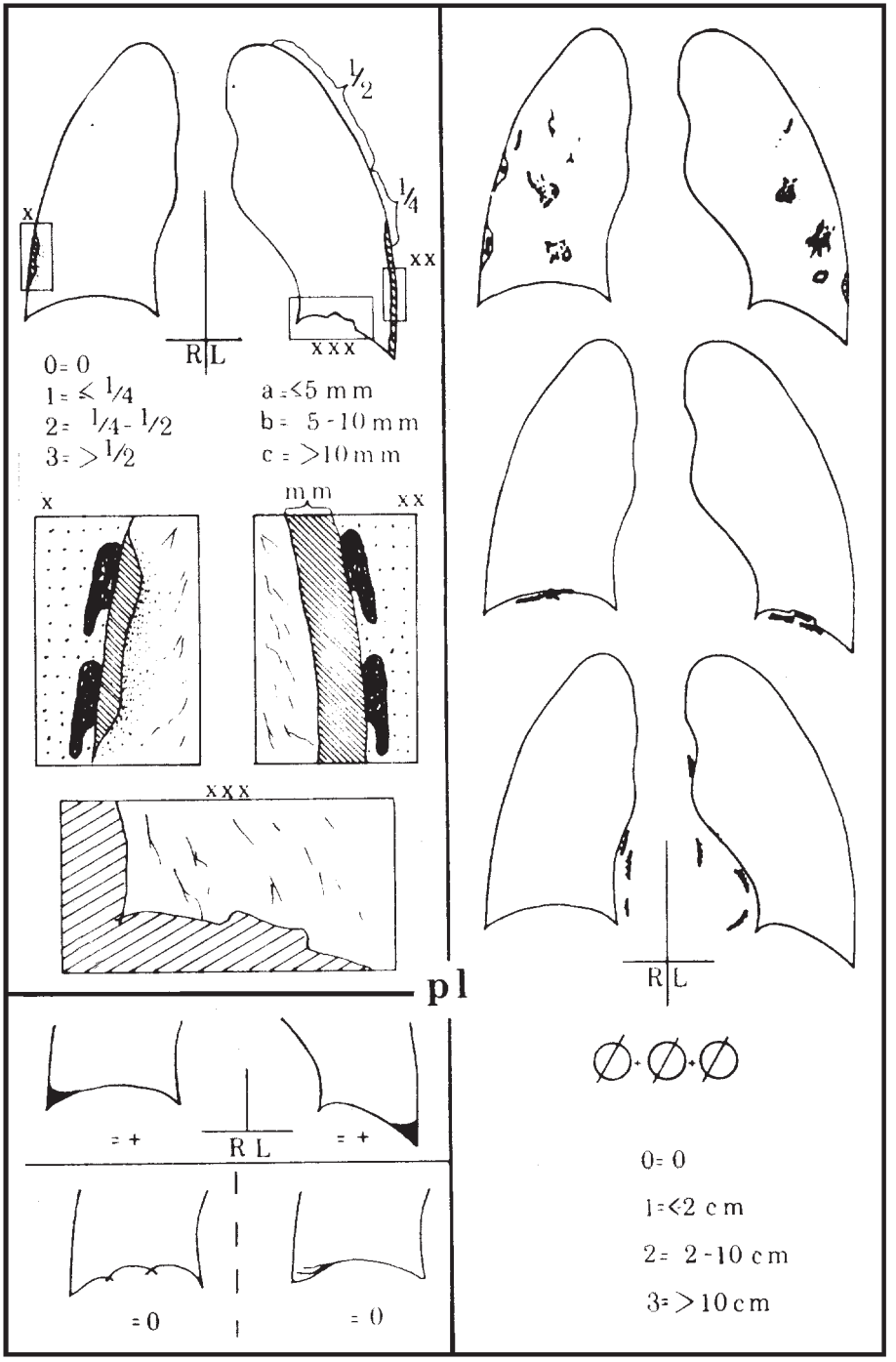
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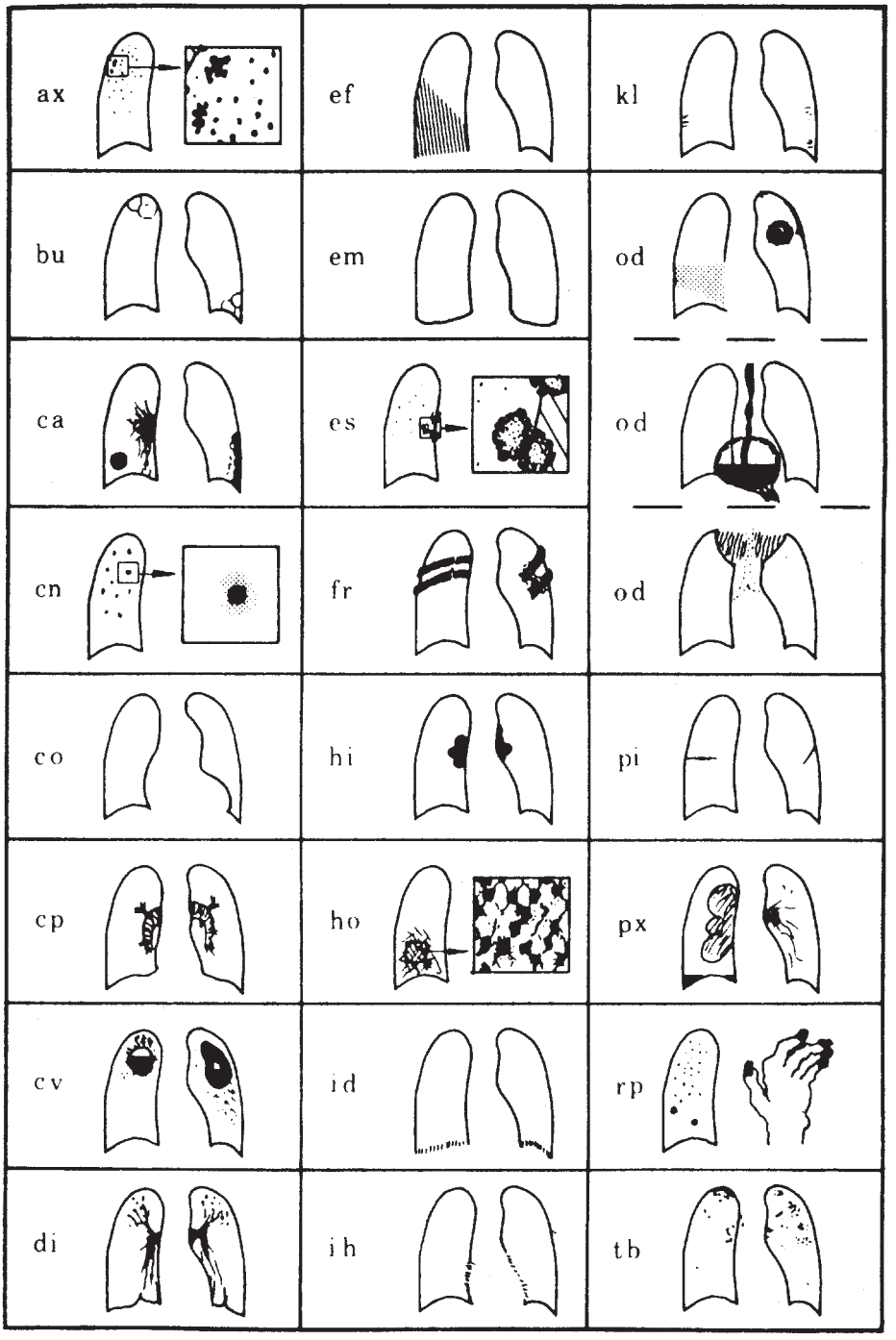
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Gamut F-72-S

NOXIOUS VAPORS THAT CAUSE PULMONARY DAMAGE

HALOGENS
1. Bromine
2. Chlorine

HALOGENATED HYDROCARBONS
1. Carbon tetrachloride
2. Chloropicrin
3. Methyl bromide
4. Methyl chloride
5. Trichloroethylene

OXIDES OF NITROGEN
1. Nitric oxide (electric arc welding)
2. Nitrogen dioxide (silo-filler's disease)

IRRITANT GASES
1. Ammonia
2. Hydrogen fluoride
3. Hydrogen sulfide
4. Lewisite
5. Mustard gas
6. Nickel carbonyl
7. Phosgene
8. Sulfur dioxide

OTHERS
1. Acetone
2. Acrolein
3. Hair spray (thesaurosis)
4. Insecticides
5. Isoamyl acetate
6. Oxygen (high concentration)
7. Ozone
8. Smoke

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1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Putman CE, Loke J, Matthay PA, et al: Radiologic manifestations of acute smoke inhalation. AJR 1977;129:865–870
3. Teixidor HS, Rubin E, Novick GS, et al: Smoke inhalation: Radiologic manifestations. Radiology 1984;149:383–387

Gamut F-73-S

DRUGS OR CHEMICALS THAT CAN INDUCE LUNG DISEASE

ANTIBIOTICS
1. Ampicillin
2. Cephalosporin
3. Ethambutol
4. Griseofulvin
5. Isoniazid (INH)
6. Nitrofurantoin
7. Para-aminosalicylic acid (PAS)
8. Penicillin
9. Pyrimethamine
10. Sulfonamides
11. Tetracycline and minocycline

CHEMOTHERAPEUTIC AGENTS
1. 5-Fluoruracil
2. 6-Mercaptopuran
3. Azathioprine
4. Bleomycin
5. Busulfan
6. Chlorambucil
7. Cyclophosphamide (Cytoxan)
8. Cyclosporin A
9. Cytosine arabinoside
10. Etoposide
11. Fludarabine
12. Hormonal agents (tamoxifen; nilutomide)
13. Hydroxyurea

(continued)

14. Ifosphamide
15. Interleukin
16. L-Asparaginase
17. Melphalan
18. Methotrexate
19. Mitomycin
20. Nitrosoureas
21. Peplomycin
22. Procarbazine
23. Vinca alkaloids

ANALGESICS

1. Acetylsalicylic acid
2. Codeine
3. Colchicine
4. Mesalamine

NARCOTICS AND SEDATIVES

1. Bromocarbamide
2. Buprenorphine
3. Chlordiazepoxide (Librium)
4. Codeine
5. Ethchlorvynol (Placidyl)
6. Febarbamate
7. Heroin
8. Methadone
9. Naloxone
10. Paraldehyde
11. Propoxyphene (Darvon)

ANTICONVULSANTS

1. Carbamazepine
2. Hydantoin (Dilantin)
3. Trimethadione

ANTICOAGULANTS

1. Coumadin
2. Quinidine
3. Warfarin

ANTIHYPERTENSIVES

1. Hexamethonium
2. Hydrochlorothiazide; hydralazine

MISCELLANEOUS AGENTS

1. 5-Aminosalycilic acid
2. Amiodarone
3. Amitriptyline
4. Beclomethasone diproprionate aerosol
5. Beta-adrenergic blocking agents (beta-blockers)
6. $Beta_2$ sympathomimetics with corticosteroids
7. Chlorpromazine
8. Chlorpropamide
9. Clomipramine
10. Cocaine
11. Desferioxamine
12. Diproprionate aerosol
13. Ergotamine and derivatives (bromocriptine; mesulergine)
14. Fluoxetine hydrochloride (Prozac)
15. Gold
16. Imipramine
17. Lidocaine
18. Marijuana
19. Mesalamine
20. Methacrylate
21. Methysergide (Sansert)
22. Mineral oil
23. Neocarzinostatin
24. Penicillamine
25. Phenothiazines
26. Procainamide (Pronestyl)
27. Propylthiouracil
28. Sulfasalazine
29. Sympathetic drugs (terbutaline; ritodrine; isoxsuprine)
30. Tocainide
31. Trimipramine
32. Verapamil

References

1. Batist G, Andrews JL Jr: Pulmonary toxicity of antineoplastic drugs. JAMA 1981; 246:1449–1453
2. Cooper JAD Jr., Matthay RA: Drug-induced pulmonary disease. In: Bone RC (ed): Disease-a-Month. Chicago, IL: Year Book Med Publ, 1987, vol 33

3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Morrison DA, Goldman AL: Radiographic patterns of drug-induced lung disease. Radiology 1979;131:299–304
5. Rigsby CM, Sostman HD, Matthay RA: Drug-induced lung disease. In: Flenley DC, Petty TL (eds): Recent Advances in Respiratory Medicine. New York: Churchill Livingstone, 1983, pp 131–158
6. Rosenow EC III: The spectrum of drug-induced pulmonary disease. Ann Intern Med 1972;97:977–991
7. Rosenow EC III, Wilson WR, Cockerill RF III: Pulmonary disease in the immunocompromised host. Mayo Clin Proc 1985;60:473–487
8. Weiss RB, Muggia FM: Cytotoxic drug-induced pulmonary disease: Update 1980. Am J Med 1980;8:259–266

Gamut F-74-S

PULMONARY PATHOGENIC MICROORGANISMS

BACTERIAL, VIRAL, RICKETTSIAL

1. *Actinobacillus actinomycetemcomitans*
2. Actinomyces species*
3. Adenoviruses
4. Aerobacter species
5. Aeromonas species
6. *Bacillus anthracis*
7. Bacteroides species
8. *Bartonella henselae*
9. *Bordetella pertussis*
10. Brucella species
11. *Burkholderia (Pseudomonas) cepacia, mallei, pseudomallei*
12. *Chlamydia pneumoniae, trachomatis,* and *psittaci*
13. *Chromobacterium violaceum*
14. Clostridium species
15. *Corynebacterium pseudodiphtheriticum*
16. *Coxiella burnetii*
17. Coxsackie virus
18. Cytomegalovirus
19. ECHO viruses
20. *Eikenella corrodens*
21. Enterobacter-serratia species
22. Epstein-Barr virus
23. *Escherichia coli*
24. Eubacterium species
25. *Francisella tularensis*
26. *Haemophilus influenzae, parainfluenza*
27. Hanta virus
28. Herpes simplex
29. Herpes zoster
30. Influenza viruses
31. *Klebsiella pneumoniae, oxytoca*
32. Legionella species
33. Leptospira organisms
34. *Listeria monocytogenes*
35. Morganella species
36. *Mycobacterium tuberculosis* (also atypical mycobacteria)
37. *Mycoplasma pneumoniae*
38. *Neisseria meningitides*
39. Parainfluenza virus
40. Nocardia species*
41. *Pasteurella multocida*
42. *Peptococcus*
43. *Peptostreptococcus*
44. Proteus species
45. *Pseudomonas aeruginosa; Ps. cepacia*
46. Respiratory syncytial virus
47. *Rhodococcus (corynebacterium) equi*
48. *Rickettsia tsutsugamushi*
49. Rubeola virus
50. Salmonella species
51. *Staphylococcus aureus* and *epidermidis*
52. *Streptococcus (Diplococcus) pneumoniae* and *pyogenes*
53. *Treponema pallidum*
54. *Tropheryma whippleii*
55. Viellonella species
56. *Yersinia pestis (Pasteurella pestis)*

PARASITIC

1. *Ancylostoma duodenale*
2. Armillifer species
3. *Ascaris lumbricoides*

(continued)

4. Babesia species
5. *Cysticercus cellulosae*
6. Dirofilaria species (esp. *Dirofilaria immitis*)
7. *Echinococcus granulosus; E. multilocularis*
8. *Entamoeba histolytica*
9. Filaria species
10. Hartmanella-Acanthamoeba species
11. Microsporidia species
12. *Necator americanus*
13. Paragonimus species (esp. *P. westermani*)
14. *Pneumocystis carinii*
15. *Schistosoma mansoni, haematobium, japonicum*
16. *Strongyloides stercoralis*
17. Toxocara species (esp. *T. cani, T. cati*)
18. *Toxoplasma gondii*

MYCOTIC (FUNGAL)

1. Aspergillus species
2. *Blastomyces dermatitidis*
3. Candida species (moniliasis)
4. *Chrysosporium parvum (Emmonsia crescens)*
5. *Coccidioides immitis*
6. *Cryptococcus neoformans*
7. Geotrichum species
8. *Histoplasma capsulatum*
9. *Paracoccidioides brasiliensis*
10. *Penicillium marneffei*
11. Phycomycetes (zygomycosis)
12. *Pseudoallescheria boydii*
13. *Sporothrix schenckii*
14. *Torulopsis glabrata*

* Actinomyces and Nocardia species, formerly listed as fungal organisms, have been reclassified as bacteria.

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-75-S

COMMON PULMONARY OPPORTUNISTIC ORGANISMS

1. Chickenpox (varicella) virus
2. Cytomegalovirus
3. Fungus (esp. *Aspergillus; Mucormycetes; Candida; Cryptococcus*)
4. Herpes
5. *Mycobacterium tuberculosis* (incl. atypical mycobacterial infection)
6. Nocardia species
7. Parasites (esp. *Strongyloides stercoralis; Toxoplasma; Cryptosporidium*) (See F-74-S)
8. *Pneumocystis carinii*
9. Pseudomonas species; other pyogens (esp. *Staphylococcus aureus; Streptococcus; Legionella*)

Reference

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-76-S

CONDITIONS THAT PREDISPOSE TO OPPORTUNISTIC PULMONARY INFECTION

COMMON

1. Antibiotic therapy
2. Debilitating disease (eg, lymphoma$_g$; leukemia; carcinoma; myeloma; other malignant neoplasm; parasitic disease; renal failure; tuberculosis; cystic fibrosis)
3. Diabetes
4. Drug therapy (eg, steroids; chemotherapeutic agents)
5. Immune deficiency disorder$_g$ (incl. AIDS; granulomatous disease of childhood)

6. Malnutrition; alcoholism; senility
7. Organ transplantation
8. Prematurity
9. Radiation therapy

UNCOMMON

1. Connective tissue disease (collagen vascular disease)$_g$
2. Foreign material (eg, catheter; prosthesis)
3. Myeloid metaplasia; severe anemia$_g$

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Pagani JJ, Libshitz HI: Opportunistic fungal pneumonia in cancer patients. AJR 1981;137:1033–1039
3. Roberts SR Jr: Immunology and the lung: An overview. Semin Roentgenol 1975;10:7–19
4. Rosenow EC III, Wilson WR, Cockerill FR III: Pulmonary disease in the immunocompromised host (Part I). Mayo Clinic Proc 1985;60:473–487

Gamut F-77

PULMONARY DISEASE IN AIDS OR OTHER IMMUNOCOMPROMISED PATIENTS

COMMON

1. ARDS
2. Drug-induced lung disease (See F-73-S)
3. Infantile respiratory distress syndrome; oxygen toxicity
4. Neoplasm, malignant (eg, bronchogenic carcinoma; metastasis; recurrent; Kaposi sarcoma; lymphoma$_g$
5. Opportunistic infection (esp. *Pneumocystis carinii* pneumonia; strongyloidiasis; toxoplasmosis; cytomegalovirus infection; fungus disease; *Rhodococcus equi;* bacillary angiomatosis) (See F-75-S)
6. Pulmonary thromboembolism and infarction
7. Tuberculosis and atypical mycobacterial infections
8. Unrelated disease

UNCOMMON

1. Alveolar proteinosis
2. Aspiration pneumonia
3. Graft-versus-host disease
4. Lymphangiography reaction
5. Lymphocytic interstitial pneumonitis (LIP)
6. Nonspecific interstitial pneumonitis (NSIP)
7. Primary pulmonary hypertension
8. Pulmonary edema due to heart failure or noncardiogenic (eg, leukoagglutination)
9. Pulmonary hemorrhage
10. Radiation injury

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Pagani JJ, Libshitz HI: Opportunistic fungal pneumonia in cancer patients. AJR 1981;137:1033–1039
3. Rosenow EC III, Wilson WR, Cockerill FR III: Pulmonary disease in the immunocompromised host (Part I). Mayo Clinic Proc 1985;62:473–487

Gamut F-78

BRONCHIAL LESION

COMMON

1. Absent bronchus (congenital; surgical)
2. Bronchiectasis (See F-80)
3. Bronchogenic carcinoma
4. Broncholith
5. Carcinoid
6. Extrinsic pressure (eg, lymphadenopathy; mediastinal mass; pulmonary sling; other vascular anomaly; enlarged left atrium)
7. Foreign body
8. Metastasis, endobronchial (esp. renal cell or breast carcinoma; melanoma)

(continued)

9. Mucoid impaction; mucus plug (eg, aspergillosis; obstructing neoplasm) (See F-79)
10. Stricture, inflammatory (incl. tuberculosis; fungus disease)

UNCOMMON

1. Adenoid cystic carcinoma (cylindroma)
2. Amyloidosis
3. Bronchopleural fistula
4. Cyst (retention or other)
5. Fracture or laceration of bronchus
6. Hematoma
7. Iatrogenic (eg, misdirected endotracheal tube)
8. Inflammatory pseudotumor$_g$
9. Neoplasm, other (eg, hamartoma; lipoma; spindle cell tumor$_g$; angioma; granular cell myoblastoma; osteoma; chondrosarcoma; lymphoma$_g$)
10. Parasite (*Ascaris; Paragonimus*)
11. Pneumoconiosis (conglomerate mass) (See F-70-S)
12. Polyp; papilloma
13. Sarcoidosis
14. Scleroma (rhinoscleroma)
15. Tracheopathia osteoplastica
16. Wegener granulomatosis$_g$

References

1. Caldarola VT, Harrison EG Jr, Clagett OT, et al: Benign tumors and tumorlike conditions of the trachea and bronchi. Ann Oto Rhino Laryngol 1964;73:1042–1061
2. Felson B: Neoplasms of the trachea and main stem bronchus. Semin Roentgenol 1983;18:23–37
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-79

MUCOID IMPACTION IN A BRONCHUS

COMMON

1. *Aspergillus* sensitivity
2. Asthma; other allergic states
3. Bronchogenic carcinoma
4. Carcinoid; metastasis; other endobronchial neoplasm
5. Idiopathic (esp. elderly female)
6. Stricture or granuloma (incl. tuberculosis; fungus disease)

UNCOMMON

1. Bronchial atresia
2. Bronchial cyst
3. Broncholith
4. Cystic fibrosis (mucoviscidosis)

References

1. Felson B: Mucoid impaction in segmental bronchial obstruction. Radiology 1979;133:9–16
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Laforet EG: Mucoid impaction of a stem bronchus. J Thorac Cardiovasc Surg 1974;68:309–312

Gamut F-80

CAUSES OF BRONCHIECTASIS

COMMON

1. Chronic aspiration
2. Chronic bronchitis
3. Cystic fibrosis (mucoviscidosis)
4. Foreign body
5. Idiopathic
6. Obstructing bronchial lesion (eg, carcinoma; carcinoid; stricture; broncholithiasis) (See F-78)
7. Postinfection (eg, pneumonia; whooping cough; measles; Swyer-James S.; allergic bronchopulmonary aspergillosis; paragonimiasis)
8. Pulmonary fibrosis (traction bronchiectasis) (eg, idiopathic {IPF}; radiation therapy; sarcoidosis)
9. Tuberculosis

UNCOMMON

1. Bronchial compression (eg, lymphadenopathy) or poststenotic constriction
2. Bronchiolitis obliterans
3. Connective tissue disease$_g$ (esp. rheumatoid disease)
4. Dyskinetic cilia S.; Kartagener S.
5. Fungus disease (See F-74-S)
6. Immunologic disorder$_g$ (eg, agammaglobulinemia; chronic granulomatous disease of childhood; AIDS; alpha1-antitrypsin deficiency; Chédiak-Higashi S.; Wiskott-Aldrich S.)
7. Inhalation of noxious fumes, smoke, chemicals
8. Mucoid impaction, mucus plugs (eg, obstructing neoplasm; aspergillosis; asthma; postoperative) (See F-79)
9. Riley-Day S. (familial dysautonomia)
10. Tracheobronchomegaly (Mounier-Kuhn S.)
11. Williams-Campbell S. (bronchial cartilage deficiency)
12. Yellow nail S.
13. Young S.

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Taybi H, Lachman RS: Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. (ed 4) St. Louis: Mosby-Year Book, 1996, p 1020

Gamut F-80-S

TYPES OF BRONCHIECTASIS

1. Bronchiolectasis
2. Central
3. Cylindrical, fusiform, tubular
4. Cystic, saccular
5. Reversible (pseudobronchiectasis)
6. Traction
7. Varicose, ampullary

Gamut F-81-1

INTRATRACHEAL MASS OR NODULE, SOLITARY OR MULTIPLE

COMMON

1. [Endotracheal tube; tracheostomy; foreign body]
2. [Extrinsic mass (eg, esophageal lesion; pulmonary or mediastinal mass; anomalous vessel)]
3. Neoplasm, malignant, primary (incl. squamous cell carcinoma; adenoid cystic carcinoma {cylindroma}; mucoepidermoid carcinoma; pleomorphic adenoma; carcinoid; sarcoma)

*4. Neoplasm, malignant, secondary (esp. invasive from thyroid, larynx, esophagus, or lung malignancy; metastatic from carcinoma of kidney, colon or breast, or melanoma)

5. [Stricture or stenosis (eg, congenital; inflammatory; burn; posttraumatic; postoperative; intubation)]

UNCOMMON

*1. Amyloidosis
2. Cyst; mucocele
3. Ectopic endotracheal thymus
*4. Granuloma (idiopathic; tuberculosis; fungus disease)
*5. Inspissated mucus (eg, asthma)
6. Lymphoma$_g$ (esp. chloroma)
7. Neoplasm, benign (eg, spindle cell tumor$_g$ {esp. fibroma; leiomyoma}; chondroma; hamartoma; hemangioma; granular cell myoblastoma; histiocytoma; lipoma; angioma; schwannoma; xanthoma)
*8. Papilloma (esp. laryngotracheal papillomatosis)
9. Plasmacytoma; extramedullary myeloma
10. Polyp; pseudopolyp
*11. Relapsing polychondritis
12. Sarcoidosis
13. Scleroma (rhinoscleroma)
14. Storage diseases
15. Thyroid tissue, ectopic, normal or neoplastic (intratracheal)

(continued)

16. Tracheomalacia
*17. Tracheopathia osteoplastica
18. Trauma (eg, laceration; fracture; hematoma)
19. [Web]
20. Wegener granulomatosis$_g$

* May be multiple.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Neoplasms of the trachea and main stem bronchi. Semin Roentgenol 1983;18:23–37
2. Fleming RJ, Medina J, Seaman WB: Roentgenographic aspects of tracheal tumors. Radiology 1962;79:628–636
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Kushner DC, Harris GBC: Obstructing lesions of the larynx and trachea in infants and children. Radiol Clin North Am 1978;16:181–194
5. Weber AL, Grillo HC: Tracheal tumors: A radiological, clinical, and pathological evaluation of 84 cases. Radiol Clin North Am 1978;16:227–246

Gamut F-81-2

PEDUNCULATED INTRATRACHEAL MASS

1. Benign tumor (eg, hamartoma; chrondroma; lipoma)
2. Hemangioma
3. Inspissated mucus
4. Metastasis to tracheal mucosa (esp. from renal cell carcinoma; melanoma)
5. Polyp (eg, inflammatory; antrochoanal); papilloma
6. Postintubation tracheal granuloma in neonate

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. MacMahon H, O'Connell DJ, Cimochowski GE: Pedunculated endotracheal metastasis. AJR 1978;131:713–714

Gamut F-82

TRACHEAL ENLARGEMENT*

COMMON

1. Cystic fibrosis (mucoviscidosis)
2. Pulmonary fibrosis (esp. post-radiation therapy)

UNCOMMON

1. Immunoglobulin deficiency
2. Ehlers-Danlos S.
3. Relapsing polychondritis
4. Tracheobronchomegaly (Mounier-Kuhn S.)
5. Tracheocele

*Trachea > 26mm in men and > 23mm in women.

Reference

1. Slone RM, Fisher AJ: Pocket Guide to Body CT Differential Diagnosis. New York, McGraw-Hill, 1999, p 26

Gamut F-83

DIFFUSE TRACHEAL NARROWING (See B-122)

COMMON

1. Croup
2. Extrinsic mass in superior or middle mediastinum (eg, intrathoracic goiter; carcinoma of esophagus; hematoma; bronchogenic cyst; lymphadenopathy; lymphoma$_g$; metastasis) (See F-86, 89)
3. [Normal in infants (expiratory collapse—"floppy trachea")]
4. Saber-sheath trachea (advanced emphysema)
5. Stricture, stenosis (eg, congenital; inflammatory; burn; chemical; traumatic; radiation; postoperative; post-tracheostomy; postintubation)

UNCOMMON

1. Amyloidosis
2. Bronchogenic carcinoma (squamous cell; small cell)
3. Cartilage deficiency (eg, tracheomalacia; traumatic; congenital)
4. Congenital (primary) tracheal stenosis
5. Inflammation, other (tuberculosis; sarcoidosis; epidermolysis bullosa)
6. Juvenile xanthogranuloma
7. Mediastinitis, chronic fibrosing
8. Neoplasm, benign (eg, hemangioma)
9. Neoplasm, malignant (eg, squamous cell carcinoma; adenoid cystic carcinoma {cylindroma}; lymphoma$_g$)
10. Papillomatosis
11. Relapsing polychondritis
12. Scleroma (rhinoscleroma—*Klebsiella rhinoscleromatis* infection)
13. Tracheomalacia (eg, congenital; postoperative; postintubation; post-tracheostomy)
14. Tracheopathia osteoplastica
15. Vascular ring$_g$ (eg, right aortic arch with aberrant left subclavian artery; double aortic arch)
16. Wegener granulomatosis$_g$

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Ebel K-D, Blickman H, Willich E, Richter E: Differential Diagnosis in Pediatric Radiology. Stuttgart: Thieme, 1999, p 9
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Hemmingsson A, Lindgren PG: Roentgenologic examination of tracheal stenosis. Acta Radiol 1978;19:753–765
4. Slone RM, Fisher AJ: Pocket Guide to Body CT Differential Diagnosis. New York: McGraw-Hill, 1999, pp 23–25

Gamut F-84

ANTERIOR DISPLACEMENT OF THE TRACHEA

COMMON

1. Aortic aneurysm
2. Duplication cyst$_g$ (eg, bronchogenic; tracheal; enteric; neurenteric)
3. Lymphadenopathy
4. Middle mediastinal mass, other (eg, hematoma; abscess; neurinoma) (See F-89)
5. Neoplasm of esophagus, malignant (esp. carcinoma)
6. [Normal in infants (buckling in expiration)]
7. Thyroid mass (eg, adenoma; goiter; carcinoma; thyroiditis; cyst)
8. [Tracheal lesion] (See F-81-1)
9. Vascular ring$_g$; anomalous vessels (eg, right aortic arch; double aortic arch; aberrant right subclavian artery)

UNCOMMON

1. Achalasia or other esophageal dilatation
2. Lymphangioma (cystic hygroma)
3. Neoplasm of esophagus, benign (eg, gastrointestinal stromal tumor$_g$, esp. leiomyoma)
4. Posterior mediastinal mass (esp. neurogenic tumor) (See F-90)
5. Zenker's diverticulum

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Berkmen YM: The trachea: The blind spot in the chest. Radiol Clin North Am 1984;22:539–562
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Gamut F-85

WIDENING OF THE RIGHT TRACHEAL STRIPE (5 MM OR OVER)

COMMON

1. Carcinoma of the lung or esophagus
2. Diffuse tracheal narrowing (eg, tracheostomy; postintubation; edema; posttraumatic stenosis; relapsing polychondritis) (See F-83)
3. Hemorrhage (eg, trauma; bleeding disorder$_g$)
4. Lymph node enlargement (eg, sarcoidosis; metastasis; lymphoma$_g$; tuberculosis; histoplasmosis)
5. Normal variant
6. Pleural effusion (free or encapsulated); pleural fibrosis
7. Postoperative (eg, mediastinal or cardiac surgery; mediastinoscopy; right radical neck dissection)
8. Radiation edema or fibrosis
9. Thyroid mass (eg, intrathoracic goiter or carcinoma)
10. Tracheal mass (eg, squamous cell carcinoma; adenoid cystic carcinoma {cylindroma}; fibroma; hemangioma) (See F-81-1)

UNCOMMON

1. Atelectasis of right upper lobe
2. Mediastinitis$_g$; mediastinal abscess
3. Mesothelioma
4. Schwannoma of right vagus or phrenic nerve
5. Tracheobronchitis, viral or other
6. Wegener granulomatosis$_g$

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3. Savoca CJ, Austin JHM, Goldberg HI: The right paratracheal stripe. Radiology 1977;122:295–301
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Gamut F-86

SUPERIOR MEDIASTINAL OR THORACIC INLET MASS

COMMON

1. Aortic dilatation or aneurysm of arch; cervical aorta or high arch
2. [Artifact (eg, hair braid)]
3. [Atelectasis of upper lobe]
4. Brachiocephalic vessel ectasia or elongation
5. Esophageal dilatation
6. Hemorrhage, traumatic or spontaneous (eg, bleeding disorder$_g$)
7. Lymphadenopathy, inflammatory or metastatic (eg, carcinoma of lung, breast, or head and neck) (See F-103)
8. Lymphoma$_g$ (esp. nodular sclerosing Hodgkins); leukemia
9. Right aortic arch, other arch anomaly or vascular ring (See E-21-S)
10. Superior vena cava obstruction (See E-70)
11. Thymic lesion (eg, normal ("rebound hyperplasia") or enlarged—benign or invasive thymoma; thymic cyst; thymic carcinoma) (See F-95)
12. Thyroid mass (eg, intrathoracic goiter, adenoma, carcinoma)
13. Zenker's diverticulum

UNCOMMON

1. Anomalous left superior vena cava
2. APVR, total
3. Arteriovenous fistula of head, neck, or thorax, with dilated great vessels
4. Cyst, mediastinal (eg, thymic; duplication {bronchogenic; enteric; neurenteric}; hydatid)
5. Lymphangioma (cystic hygroma)
6. Fat deposition (eg, obesity; steroid therapy; Cushing S.) (See F-91-1)
7. Germ cell tumor (esp. teratoma)

8. Mediastinitis$_g$
9. Parathyroid adenoma or carcinoma

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that stimulate it.

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1. Baron RL, Levitt RG, Sagel SS, et al: Computed tomography in the evaluation of mediastinal widening. Radiology 1981; 13:107–113.
2. Siegel MJ, Sagel SS, Reed K: The value of computed tomography in the diagnosis and management of pediatric mediastinal abnormalities. Radiology 1986; 142:149–155.
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Gamut F-87

SUPERIOR MEDIASTINAL WIDENING IN INFANTS AND CHILDREN

COMMON

1. [Artifact (eg, hair braids)]
2. [Atelectasis of upper lobe]
3. Cyst, mediastinal (eg, thymic; teratoma; hydatid; duplication$_g$—bronchogenic; enteric; neurenteric)
4. Esophageal dilatation
5. Fat deposition; lipomatosis (eg, obesity; steroid therapy; Cushing S.) (See F-91-1)
6. Hemorrhage, traumatic or spontaneous (eg, bleeding disorder$_g$)
7. Lymphadenopathy (See F-103)
8. Lymphoma$_g$; leukemia
9. Mediastinitis, acute$_g$; mediastinal abscess (See F-102)
10. Mediastinal tumor (eg, teratoma; mixed germ cell tumor; thymoma; neuroblastoma)
11. Right aortic arch; other arch anomaly or vascular ring (See E-21-S); aortic dilatation
12. Thymus, normal (“hyperplasia”) or enlarged; thymic rebound, posttreatment (See F-95)

UNCOMMON

1. Anomalous left superior vena cava
2. Aortic elongation (eg, pseudocoarction)—cervical aorta or high arch
3. APVR, total, above the diaphragm (“snowman” or “figure 8”)
4. Arteriovenous fistula of head, neck, or thorax—with dilated great vessels
5. Azygos vein dilatation (See E-69)
6. Lymphangioma (cystic hygroma)
7. Superior vena cava enlargement (eg, obstruction; normal variant) (See E-70)
8. Thyroid mass (eg, thyroiditis; intrathoracic goiter; thyroid carcinoma) (See B-103-1)
9. Zenker’s diverticulum

[ ] This condition does not actually cause the gamuted imaging finding but can produce imaging changes that stimulate it.

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Gamut F-88

ANTERIOR MEDIASTINAL LESION

Anterior to a curved vertical line along posterior border of heart and anterior margin of trachea; on CT or MRI, alongside and anterior to heart and great vessels

COMMON

*1. Aneurysm of ascending aorta or sinus of Valsalva
2. [Bone lesion, esp. sternum (eg, metastasis; myeloma; sarcoma; osteomyelitis)]

(continued)

3. [Cardiac enlargement]
4. [Diaphragmatic lump, mogul, or eventration]
5. Fat deposition (eg, normal epicardial fat pad; Cushing S.; obesity; steroid therapy; hibernoma; lipomatosis)
*6. Germ cell tumor (eg, teratoma; seminoma; choriocarcinoma; embryonal cell carcinoma; endodermal sinus {yolk sac} tumor; mixed germ cell tumors)
7. Hematoma, hemorrhage (eg, traumatic; bleeding disorder$_g$)
8. Hernia (eg, Morgagni; hepatic; intrapericardial)
9. Innominate or brachiocephalic artery dilatation, buckling or aneurysm
10. Lymphoma$_g$ (esp. nodular sclerosing Hodgkin's); leukemia
11. Pericardial cyst
12. Pericardial disease (eg, effusion; neoplasm; defect)
13. Superior vena cava dilatation (See E-)
*14. Thymic lesion (eg, benign thymoma; invasive thymoma; thymic carcinoma; thymic carcinoid; thymic cyst; lymphoid hyperplasia; thymolipoma; lymphoma or leukemia arising in thymus)
15. Thymus, normal ("hyperplasia")
*16. Thyroid mass (intrathoracic adenomatous goiter; carcinoma)

UNCOMMON

1. Anomalous left superior vena cava
*2. Bronchogenic cyst
*3. Cardiac lesion (eg, tumor; aneurysm)
4. Fluid collection (eg, postoperative; perforated central venous catheter)
*5. Lymphadenopathy (eg, sarcoidosis; tuberculosis; histoplasmosis; giant lymph node hyperplasia {Castleman disease})
6. Lymphangioma (cystic hygroma)
7. Hydatid cyst
8. Lymphangiomatosis
9. Mediastinitis$_g$, acute; mediastinal abscess (See F-102)
*10. Mediastinitis, fibrosing (esp. histoplasmosis; idiopathic)
11. Metastasis
*12. Neoplasm, other (eg, gastrointestinal stromal tumor$_g$, fibroma, schwannoma, lipoma, and their sarcomatous counterparts; hemangioma; epithelioid hemangioendothelioma; hemangiopericytoma; angiosarcoma; benign and malignant fibrous histiocytoma; mesothelioma)
13. Parathyroid adenoma or carcinoma

* May show calcification.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

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2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
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Gamut F-89

MIDDLE MEDIASTINAL LESION

Between anterior and posterior mediastinum on plain film, CT, or MRI (See F-88, F-90–93)

COMMON

*1. Aneurysm$_g$ of aorta or major artery (incl. traumatic; infectious); aortic dissection; pseudocoarctation of aorta
2. Azygos vein or SVC dilatation (See E-69, E-70)
3. Bronchogenic carcinoma (squamous cell; small cell; large cell; adenocarcinoma)
*4. Duplication cyst$_g$ (eg, bronchogenic; tracheal; enteric)

5. Esophageal lesion (eg, Zenker or other diverticulum; carcinoma; gastrointestinal stromal tumor$_g$, esp. leiomyoma)
6. Hiatal hernia
7. Innominate or brachiocephalic artery tortuosity or buckling
*8. Lymphadenopathy (eg, metastasis—esp. bronchogenic carcinoma; lymphoma$_g$; leukemia; tuberculosis; histoplasmosis; sarcoidosis; pneumoconiosis—esp. silicosis; giant lymph node hyperplasia {Castleman disease}) (See F-103)
9. Mediastinitis, fibrosing (esp. histoplasmosis; idiopathic)
10. Megaesophagus (eg, achalasia; scleroderma; Chagas' disease; stricture; neoplasm)
11. Pulmonary artery dilatation (See E-53)
12. Right-sided or double aortic arch; vascular ring$_g$ (See E-21-S)
*13. Thyroid mass (intrathoracic goiter; thyroid carcinoma)
14. Varices, mediastinal or esophageal

UNCOMMON

1. Extramedullary hematopoiesis
2. Fluid collection (eg, postoperative; perforated central venous catheter; ascites extending through esophageal hiatus)
3. Lymphangioma (cystic hygroma)
4. Mediastinal hematoma or hemorrhage
5. Mediastinitis$_g$, acute; mediastinal abscess (See F-102)
6. Neoplasm, mediastinal (eg, gastrointestinal stromal tumor$_g$, lipoma, and their sarcomatous counterparts; hemangioma; mesothelioma)
7. Schwannoma of vagus or phrenic nerve
8. Pancreatic pseudocyst
9. Paraganglioma, aorticopulmonary (chemodectoma)
10. Parathyroid adenoma or carcinoma
11. Thymic neoplasm
12. Tracheal tumor (eg, squamous cell carcinoma; adenoid cystic carcinoma {cylindroma}; chondrosarcoma; plasmacytoma; metastasis) (See F-81-1)
13. Tracheobronchomegaly (Mounier-Kuhn S.)
14. Vascular lesion, other (eg, azygos continuation of IVC; left superior vena cava; aberrant right subclavian artery; left superior intercostal vein dilatation; angiosarcoma of pulmonary artery; partial APVR; aberrant left pulmonary artery)

* May show calcification.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

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Gamut F-90

POSTERIOR MEDIASTINAL LESION

In paravertebral region on plain film, CT, or MRI (See F-89, 91, 92)

COMMON

*1. Aneurysm of descending aorta (incl. traumatic; infectious); aortic dissection
*2. Neurogenic neoplasm$_g$ arising from cord, nerve root, or sympathetic ganglia
   a. Peripheral nerve tumor, benign or malignant (neurofibroma; schwannoma; malignant tumor of nerve sheath origin)

(continued)

b. Autonomic ganglia tumor (ganglioneuroma; ganglioneuroblastoma; neuroblastoma)
*3. Spinal disease; paraspinal lesion, other (eg, tuberculosis; suppurative spondylitis; abscess; osteomyelitis; fracture)
4. Spinal neoplasm (osteosarcoma*; Ewing sarcoma; hemangioma; aneurysmal bone cyst; giant cell tumor; metastasis)

UNCOMMON

*1. Duplication cyst$_g$ (eg, enteric; neurenteric; bronchogenic)
2. Extramedullary hematopoiesis (esp. sickle cell disease; thalassemia)
*3. Hematoma or hemorrhage, mediastinal or paraspinal (eg, vertebral fracture); loculated hemothorax
4. Hernia (eg, Bochdalek; traumatic)
5. Hydatid cyst
*6. Lymphadenopathy (eg, lymphoma$_g$; metastatic bronchogenic carcinoma; sarcoidosis; tuberculosis; giant lymph node hyperplasia {Castleman disease})
7. Mediastinal varices
8. Mediastinitis$_g$, acute; mediastinal abscess (See F-102)
9. Mediastinitis, fibrosing (esp. histoplasmosis; idiopathic)
10. Meningomyelocele or meningocele (lateral or anterior)
11. Neoplasm, other (eg, fibroma; leiomyoma; lipoma; hemangioma; mesothelioma; plasmacytoma; thymoma)
12. Pancreatic pseudocyst
13. Paraganglioma (eg, pheochromocytoma; chemodectoma; glomus tumor)
*14. Pleural thickening or loculated fluid; empyema
15. Pulmonary sequestration (extralobar)
16. Retroperitoneal mass extending into posterior mediastinum (eg, metastasis; teratoma; sarcoma)
*17. Teratoma (occasionally occur here)
18. Thoracic duct cyst or neoplasm
19. Thoracic kidney (high in retroperitoneum)
*20. Thyroid tumor or goiter (intrathoracic)

* May show calcification.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
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5. Strollo DC, Rosado de Christenson M, Jett JR: Primary mediastinal tumors. Part II. Tumors of the middle and posterior mediastinum. Chest 1997; 112:1344-1357

Gamut F-91-1

CT OF MEDIASTINAL LESIONS—WITH FAT ATTENUATION (–20 TO –130 HU)

COMMON

1. Hernia (eg, omental; mesenteric)
*2. Lipoma
3. Lipomatosis (Cushing S.; steroid therapy; obesity; diabetes)
4. Normal fat (epicardial fat pad; intrapericardial fat)

UNCOMMON

1. Angiomyolipoma
2. Extramedullary hematopoiesis
3. Liposarcoma
*4. Teratoma (mature)
*5. Thymolipoma

* May show calcification.

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2. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
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Gamut F-91-2

CT OF MEDIASTINAL LESIONS—WITH WATER ATTENUATION (0–15 HU)

COMMON

*1. Cyst (eg, pericardial; bronchogenic; enteric; neurenteric; thymic; hydatid)
*2. Cystic neoplasm (thymoma; teratoma; lymphoma$_g$; neurogenic tumor)
3. Esophageal dilatation, fluid-filled (eg, achalasia; scleroderma; obstruction from tumor or stricture; post-vagotomy S.; Chagas' disease; diverticulum)
4. Hiatal hernia
*5. Paraspinal abscess
6. Pericardial effusion

UNCOMMON

1. Esophagectomy with gastric or colon interposition
2. Fluid collection; other (eg, seroma from trauma or surgery; perforated central venous catheter; loculated paramediastinal pleural effusion; ascites extending through esophageal hiatus)
3. Lymphangioma (cystic hygroma)
4. Lymphocele
5. Meningocele; myelomeningocele
6. Pancreatic pseudocyst

* May show calcification.

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
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Gamut F-91-3

CT OF MEDIASTINAL LESIONS—WITH SOFT TISSUE ATTENUATION (15–40 HU)

COMMON

*1. Cyst (bronchogenic; enteric; mature hydatid; other)
2. Esophageal neoplasm (eg, leiomyoma; carcinoma)

(continued)

*3. Hematoma; hemorrhage (mediastinal or paraspinal)
4. Hernia, solid organ or bowel (eg, hepatic; Morgagni; hiatal; Bochdalek)
*5. Lymphadenopathy (metastatic; granulomatous; Castleman disease) (See F-103)
6. Lymphoma$_g$
*7. Mediastinal (substernal) goiter; thyroid neoplasm (esp. carcinoma)
8. Mediastinitis, acute; mediastinal abscess (See F-102); fibrosing mediastinitis
9. Metastasis
*10. Neurogenic tumor$_g$
*11. Spinal lesion (eg, infectious spondylitis; neoplasm; fracture with hematoma; paraspinal abscess)
12. Thoracic kidney
13. Thymic enlargement (normal; hyperplasia; thymitis)
*14. Thymic lesion (eg, thymoma, benign or invasive; carcinoid; carcinoma)
*15. Vascular lesion or abnormality (eg, aortic aneurysm, dilatation, or tortuosity (See F-92)

UNCOMMON

*1. Cardiac neoplasm (eg, fibroma; sarcoma)
2. Extramedullary hematopoiesis
*3. Germ cell neoplasm (teratoma; seminoma; nonseminomatous malignant germ cell neoplasm)
*4. Hemangioma
5. Lymphangioma (cystic hygroma)
6. Mesothelioma; localized fibrous tumor of pleura
7. Paraganglioma
8. Parathyroid adenoma or carcinoma
9. Pulmonary sequestration (extralobar)
10. Sarcoma
11. Spindle cell tumor$_g$

* May show calcification.

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Gamut F-91-4

CT OF MEDIASTINAL LESIONS—WITH CALCIFICATION

COMMON

1. Aneurysm; atherosclerosis; other vascular lesion
2. Lymphadenopathy (eg, tuberculosis; histoplasmosis; sarcoidosis; silicosis; amyloidosis; Castleman disease)
3. Mediastinal (substernal) goiter

UNCOMMON

1. Abscess, old
2. Cyst (bronchogenic; foregut; thymic)
3. Hemangioma (phleboliths)
4. Hematoma, old
5. Lipoma
6. Lymphoma$_g$ (post-radiation therapy)
7. Neurogenic tumor$_g$ (eg, neurilemmoma; ganglioneuroma; neuroblastoma)
8. Teratoma
9. Thymic lesion (eg, thymoma; thymolipoma)

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Gamut F-91-5

CT OF MEDIASTINAL LESIONS—VASCULAR OR ENHANCING LESIONS

COMMON

*1. Aneurysm, aortic or other vessel; aortic dissection
2. Anomalies of aortic arch and subclavian artery; pulmonary sling (See E-21-S)
3. Azygos vein dilatation
4. Mediastinal goiter; thyroid neoplasm
5. Vessels (varices; collaterals; ectatic or dilated vessels; vascular anomalies)

UNCOMMON

1. Carcinoid tumor
*2. Hemangioma
3. Localized fibrous tumor of pleura
*4. Lymphadenopathy (tuberculous; metastatic; Castleman disease)
*5. Mediastinal tumor; other
*6. Paraganglioma; pheochromocytoma
7. Parathyroid adenoma

* May show calcification.

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1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
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Gamut F-92

AORTIC AND VENOUS ABNORMALITIES IN THE MEDIASTINUM (Esp. on CT, MRI or Angiography) (See E-21-S, E-61–65, E-69–70, F-91-S)

COMMON

1. Aneurysm of aorta$_g$ (eg, atherosclerotic; traumatic; infectious)
2. Atherosclerosis of aorta and brachiocephalic vessels
3. Coarctation of aorta
4. Dissection of aorta
5. High aortic arch
6. Right anterior aortic arch (Type I) with mirror-image branching
7. Superior vena cava dilatation or obstruction (See E-70)

UNCOMMON

1. Aneurysm or fistula of coronary artery
2. Aneurysm of sinus of Valsalva (incl. rupture into heart)
3. Anomalous artery arising from aorta to supply a lung segment
   a. Pulmonary sequestration
   b. Venolobar S. (scimitar S.)
4. Aortic diverticulum or nipple
5. Aortomegaly (idiopathic)
6. Aortopulmonary window
7. APVR, total ("snow man")
8. Azygos continuation of interrupted inferior vena cava
9. Circumflex or cervical left aortic arch with right descending aorta
10. Circumflex right aortic arch with left descending aorta
11. Corrected transposition of great vessels
12. Cystic medial necrosis of aorta (eg, Marfan S.)
13. Double aortic arch
14. Left aortic arch with aberrant right subclavian artery
15. Necrotizing vasculitis, arteritis (eg, polyarteritis nodosa; lupus erythematosus; Wegener granulomatosis; syphilis; drug abuse—esp. metamphetamine)
16. Patent ductus arteriosus (ligamentum arteriosus)
17. Persistent left superior vena cava
18. Postoperative shunt (eg, Blalock-Taussig; Waterston; Potts)
19. Pseudocoarctation of aortic arch
20. Right posterior aortic arch (Type II) with aberrant left subclavian artery
21. Subvalvular aortic aneurysm (African)
22. Takayasu arteritis
23. Transposition of great vessels
24. Truncus arteriosus

Reference

1. Burgener FA, Kormano M: Differential Diagnosis in Computed Tomography. New York: Thieme, 1996, pp 236–237

Gamut F-93

CYSTIC MEDIASTINAL LESION (Plain Film, CT, or MRI)

COMMON

1. Duplication cyst$_g$ (eg, bronchogenic; tracheal; enteric; neurenteric)
2. [Hernia, diaphragmatic (containing fluid-filled viscus), esp. hiatal]
3. Pericardial cyst
4. [Pericardial effusion, loculated)

UNCOMMON

1. Cyst, indeterminate or idiopathic
2. [Esophageal diverticulum (fluid-filled)]
3. Granulomatous lymphadenitis (esp. histoplasmic)
4. Hydatid cyst
5. Lymphangioma (cystic hygroma)
6. Lymphocele

7. Mediastinal goiter (intrathoracic thyroid)
8. Mediastinal tumor with cystic degeneration (eg, cystic thymoma; lymphoma$_g$; neurogenic tumor)
9. Meningocele (lateral or anterior); myelomeningocele
10. Pancreatic pseudocyst
11. Teratoma (mature)
12. Thymic cyst (acquired, congenital)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Feigin DS, Fenoglio JJ, McAllister HA, et al: Pericardial cysts. A radiologic-pathologic correlation and review. Radiology 1977;125:15–20
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Kirejczyk WM, McAdams HP, Rosado de Christenson ML, Matsumoto S: Bronchogenic cysts: Imaging features in 53 cases (Abs). Radiology 1995;197(P) Suppl: 366
4. Moeller KH, Rosado de Christenson ML, Templeton PA: Mediastinal mature teratoma: Imaging features. AJR 1997; 169:985–990
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6. Ochsner JL, Ochsner SF: Congenital cysts of the mediastinum: 20-year experience with 42 cases. Ann Surg 1966; 163:909–920
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10. Strollo DC, Rosado de Christenson ML, Jett JR: Primary mediastinal tumors. Part II. Tumors of the middle and posterior mediastinum. Chest 1997;112:1344–1357
11. Sullivan MA: Case of the day. Case 5: Mediastinal cyst. AJR 1982;138:1202–1203

Gamut F-94

RETROSTERNAL MASS OR SWELLING

COMMON

1. Anterior mediastinal lesion (eg, thymoma; thymic cyst; thymolipoma; mature teratoma; malignant germ cell neoplasm; pericardial cyst or lipoma; hematoma; Morgagni hernia) (See F-88)
2. Bone lesion (eg, osteomyelitis; neoplasm, primary or secondary)
3. Fat; lipomatosis (eg, pericardial fat pad; adiposity; Cushing S.; steroid therapy)
4. Hemorrhage, traumatic (esp. sternal fracture) or bleeding disorder$_g$
5. Lymphoma$_g$ (esp. nodular sclerosing Hodgkin's)
6. Metastasis to sternum, soft tissues, or lymph nodes (esp. from breast carcinoma)
7. Normal (eg, prominent costal cartilage junction; slight obliquity; internal thoracis muscle; retrosternal line; interface of anterior margin of left lung)
8. Pleural fluid loculation
9. Postoperative (esp. median sternotomy; mediastinal surgery)
10. Thymus, normal (infant) or enlarged (hyperplasia; thymitis; thymic rebound following treatment or stress) (See F-95)

UNCOMMON

1. [Atelectasis of upper lobe]
2. Chest wall lesion with mediastinal involvement, inflammatory or neoplastic (eg, spindle cell tumor$_g$; lipoma; soft tissue myeloma)
3. Clavicle dislocation, posterior (sternal end)
4. Collateral blood vessels (eg, coarctation of aorta; inferior or superior vena cava obstruction; portal hypertension with internal mammary varices)
5. Lymphadenopathy, neoplastic or granulomatous (eg, tuberculosis; histoplasmosis) (See F-103)
6. Mediastinitis, acute$_g$; mediastinal abscess (See F-102)
7. Mesothelioma; localized fibrous tumor of pleura

(continued)

8. [Pericardial fibrosis (constrictive pericarditis)]
9. Venolobar S. (scimitar S.)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Jemelin C, Candardjis G: Retrosternal soft tissue: Quantitative evaluation and clinical interest. Landmarks between normal and pathological aspects. Radiology 1973;109:7–11
2. Pfister RC, Oh KS, Ferrucci JT Jr: Retrosternal density: A radiological evaluation of the retrosternal mediastinal space. Radiology 1970;96:317–324
3. Silverman FN (ed): Caffey's Pediatric X-ray Diagnosis. (ed 9) Chicago: Year Book Medical Publ, 1992
4. Whalen JP, Meyers MA, Oliphant M, et al: The retrosternal line: A new sign of an anterior mediastinal mass. AJR 1973; 117:861–872

Gamut F-95

THYMIC ENLARGEMENT

COMMON

1. Lymphoma$_g$ (esp. nodular sclerosing Hodgkin's disease); leukemia
2. Normal newborn or infant thymus
3. Thymic hyperplasia; thymitis
4. Thymic rebound following treatment or stress
5. Thymoma, benign or invasive

UNCOMMON

1. Germ cell neoplasm
2. Hyperthyroidism
3. Progeria
4. Thymic carcinoid
5. Thymic carcinoma
6. Thymic cyst
7. Thymolipoma

Reference

1. Baron RL, Lee JKT, Sagel SS, et al: Computed tomography of the abnormal thymus. Radiology 1982;142:127–134

Gamut F-96

SMALL OR ABSENT THYMUS IN AN INFANT

COMMON

1. Immunologic disorder$_g$ (eg, agammaglobulinemia; dysgammaglobulinemia; AIDS)
2. Stress from serious illness (eg, burn; birth trauma; sepsis; debilitation; anemia)

UNCOMMON

1. Adrenal hyperplasia, congenital
2. Chemotherapy (eg, nitrogen mustard; Cytoxan)
3. Congenital heart disease, esp. cyanotic (eg, complete transposition of great vessels)
4. Graft-versus-host disease
5. Radiation therapy
6. Steroid therapy
7. Thymic agenesis (DiGeorge S.)
8. Trisomy 8q S.
9. Trisomy 18 S.
10. Zellweger S. (cerebrohepatorenal S.)

References

1. Rose JS, Levin DC, Goldstein S: Congenital absence of the pulmonary valve associated with congenital aplasia of the thymus (DiGeorge's syndrome). AJR 1974;122:97–102
2. Taybi H, Lachman RS: Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. (ed 4) St. Louis: Mosby-Year Book, 1996

Gamut F-97

RIGHT ANTERIOR CARDIOPHRENIC ANGLE LESION

COMMON

1. Epicardial fat pad
2. Hiatal hernia; esophagectomy with gastric or colon interposition

3. [Localized paralysis of right hemidiaphragm ("partial eventration")] (See F-136–137)
4. Morgagni hernia (gut or omentum)
5. Pericardial cyst or diverticulum
6. Pleural effusion (loculated); pleural adhesions
7. [Right atrial dilatation] (See E-27)
8. Right middle lobe disease (eg, neoplasm, esp. bronchogenic carcinoma; pneumonia; atelectasis)

UNCOMMON

1. Cardiac aneurysm or neoplasm
2. [Congenital absence of pericardium]
3. Diaphragmatic neoplasm or rupture (See F-138)
4. Herniation of liver, traumatic or congenital ("ectopic lobe")
5. Hydatid cyst (cardiac, pericardial, or pulmonary)
6. Localized fibrous tumor of pleura
7. Lymphadenopathy, juxtapericardial (esp. $lymphoma_g$)
8. Mediastinal tumor, anterior (eg, thymoma; thymic carcinoma; thymic cyst; thymolipoma; mature teratoma; malignant germ cell neoplasm) (See F-88)
9. Mesothelioma (pleural or pericardial)
10. Metastasis
11. Pericardial effusion (encapsulated)
12. Pulmonary sequestration (extralobar)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Castellino RA, Blank N: Adenopathy of the cardiophrenic angle (diaphragmatic) lymph nodes. AJR 1972;114:509–515
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders,1973
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-98

ABNORMALITY OF THE AZYGOESOPHAGEAL RECESS (ESP. ON CT)

COMMON

1. Azygos vein dilatation (eg, obstruction of SVC or IVC; azygos continuation of IVC)
2. Carcinoma of esophagus
3. Descending aorta dilatation
4. Duplication $cyst_g$ (esp. bronchogenic; enteric)
5. Esophageal dilatation, any cause (esp. achalasia; obstructing neoplasm)
6. Left atrial enlargement
7. Lymphadenopathy, esp. subcarinal and paraesophageal nodes (eg, carcinoma of lung; metastatic disease; $lymphoma_g$; AIDS; tuberculosis; histoplasmosis; sarcoidosis; Castleman disease) (See F-103)

UNCOMMON

1. Esophageal varices
2. Pleural effusion or thickening
3. Pleural tumor (mesothelioma or metastasis; localized fibrous tumor of pleura)
4. Pulmonary lesion (eg, consolidation; atelectasis)

References

1. Eisenberg RL: Clinical imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 134–137
2. Heitzman ER: The Mediastinum: Radiologic Correlation with Anatomy and Pathology. St. Louis: CV Mosby, 1977
3. Lund G, Lien HH: Abnormalities of the azygo-esophageal recess at computed tomography. Acta Radiol (Diagn) 1983:24:3–10

Gamut F-99

DISPLACEMENT OF THE THORACIC PARASPINAL LINE (See F-90)

COMMON

1. Aortic disease (eg, aneurysm; ectasia; laceration)
2. [Left atrial enlargement]
3. Neoplasm of spine, primary (See C-38-S, C-39) or metastatic
4. Osteophytes
5. Paraspinal hemorrhage or hematoma (eg, spine fracture; bleeding or clotting disorder$_g$)
6. [Pleural effusion, encapsulated, but may be free on supine film]
7. Posterior mediastinal mass (See F-90)
8. Tuberculous or other infectious spondylitis

UNCOMMON

1. Azygos vein dilatation
2. Esophageal dilatation or neoplasm
3. Extramedullary hematopoiesis
4. Lymphoma$_g$; other lymphadenopathy
5. Mediastinal edema or hemorrhage (eg, cirrhosis; nephrosis; trauma; bleeding disorder$_g$)
6. Neurogenic tumor$_g$ (eg, schwannoma; neurofibroma; ganglioneuroma; ganglioneuroblastoma; neuroblastoma)
7. Spinal disease, other
8. Varices (mediastinal; esophageal)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Gamut F-100-S

INTRATHORACIC EXTRAMEDULLARY HEMATOPOIESIS

COMMON

1. Anemia$_g$, primary hemolytic (esp. thalassemia)

UNCOMMON

1. Aplastic anemia; bone marrow injury (eg, benzene; radiation)
2. Carcinomatosis
3. Cyanotic congenital heart disease
4. Erythroblastosis fetalis
5. Erythroleukemia (Di Guglielmo syndrome)
6. Iron deficiency anemia
7. Leukemia; lymphoma$_g$
8. Myelofibrosis; myelosclerosis
9. Paget's disease
10. Pernicious anemia
11. Polycythemia vera
12. Thrombocythemia
13. Thrombocytopenic purpura

References

1. Bree RL, Neiman HL, Hodak JA, et al: Extramedullary hematopoiesis in the spinal epidural space. J Can Assoc Radiol 1974; 25:297–299
2. Samuels MA, Schiller AL, Richardson EP Jr: Paget's disease of bone, paraparesis, and a paravertebral mass. N Engl J Med 1981;304:1411–1421

Gamut F-101-1

MEDIASTINAL WIDENING (See F-101-2, F-102)

COMMON

1. Achalasia; Chagas' disease
2. Fibrosing mediastinitis (esp. histoplasmosis; idiopathic)

3. Hematoma or hemorrhage (eg, sternal or vertebral fractures; venous and arterial tears; aortic transection; penetrating trauma from knife or gunshot wound; postoperative; malposition of vascular catheter with vessel injury)
4. Hiatal hernia (large); pericardial hernia
5. Lymphadenopathy (eg, metastatic disease—esp. from carcinoma of lung or esophagus); lymphoma; tuberculosis; histoplasmosis; giant lymph node hyperplasia (Castleman disease) (See F-103)
6. Mediastinal cyst (eg, thymic, bronchogenic, enteric or neurenteric cyst; hydatid cyst)
7. Mediastinal tumor (eg, thymoma; thymic carcinoma; thymolipoma; teratoma; lymphoma$_g$; intrathoracic goiter; neurogenic tumor)
8. Mediastinitis, acute; mediastinal abscess (See F-102)
9. [Technical factors (eg, expiration or poor inspiration; rotation; AP supine or lordotic film)]
10. Vascular abnormality (eg, dilated or tortuous aorta; aneurysm, dissection or coarctation of aorta; left superior vena cava; dilated superior vena cava)

UNCOMMON

1. Allergic edema of mediastinum
2. Chylomediastinum (eg, thoracic duct obstruction or laceration)
3. Extension of extrathoracic lesion (eg, pharyngeal or abdominal abscess; pancreatitis; pancreatic pseudocyst)
4. Extramedullary hematopoiesis
5. Lipomatosis (eg, obesity; steroid therapy; Cushing S.; normal variant)
6. Pleural disease adjacent to mediastinum (eg, effusion; metastatic disease; mesothelioma)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Reference

1. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997

Gamut F-102-1

ACUTE DIFFUSE MEDIASTINAL WIDENING

TECHNICAL

1. [Radiograph obtained in expiration or poor inspiration, with patient rotated or in supine or lordotic position, or with short target-film distance]

HEMORRHAGE

1. Aneurysm (ruptured)
2. Aortic dissection
3. Bleeding or clotting disorder$_g$
4. Idiopathic
5. Postoperative
6. Trauma to heart, aorta, or other great vessel; sternal or vertebral fracture

LYMPH ACCUMULATION

1. Lymphangioma with rupture
2. Postthoracotomy lymphocele
3. Thoracic duct obstruction or laceration

EDEMA

1. Heart failure
2. Leakage from clysis (catheter malposition)
3. Postoperative
4. Superior vena cava obstruction

INFLAMMATION, SUPPURATION (EG, ACUTE MEDIASTINITIS) (See F-102)

1. Drug abuse
2. Esophageal perforation
3. Opportunistic infection (esp. in AIDS)
4. Osteomyelitis
5. Pancreatitis; subphrenic abscess (upward extension)
6. Pharyngitis; tonsillitis; parotitis; dental infection (downward extension)
7. Pulmonary or pleural infection

(continued)

LYMPHADENOPATHY

1. Acute leukemia; lymphoma$_g$
2. Anthrax
3. Bacterial infection, other
4. Fungus disease (esp. histoplasmosis; coccidioidomycosis)
5. Infectious mononucleosis
6. Lymphadenitis, acute
7. Plague
8. Sarcoidosis
9. Tuberculosis
10. Tularemia

PNEUMOMEDIASTINUM

1. Spontaneous
2. Traumatic
3. Other (See F-110)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Enquist RW, Blanck RR, Butler RH: Nontraumatic mediastinitis. JAMA 1976;236:1048–1049
2. Forrest JV, Shackelford GD, Bramson RT, et al: Acute mediastinal widening. AJR 1973;117:881–885

Gamut F-102-2

ACUTE MEDIASTINITIS OR MEDIASTINAL ABSCESS

COMMON

1. Esophageal perforation (eg, carcinoma; trauma; Boerhaave S.)
2. Histoplasmosis or other fungus disease (eg, coccidioidomycosis); actinomycosis (See F-74-S)
3. Iatrogenic (eg, postoperative; endoscopic trauma; dilatation of esophageal stricture)
4. [Sclerosing or fibrosing mediastinitis, chronic (esp. histoplasmosis; idiopathic)]
5. Tuberculosis

UNCOMMON

1. Drug abuse
2. Opportunistic infection (eg, atypical mycobacterial infection), esp. in AIDS
3. Osteomyelitis of sternum or spine
4. Pancreatitis; pancreatic pseudocyst; subphrenic abscess (upward extension)
5. Pharyngeal abscess; tonsillitis; dental infection (downward extension)
6. Pleural infection; empyema
7. Pneumonia; lung abscess
8. Trauma with tracheal or bronchial rupture

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

Reference

1. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997

Gamut F-103

MEDIASTINAL AND/OR HILAR LYMPH NODE ENLARGEMENT

COMMON

1. AIDS (eg, *Pneumocystis carinii, Mycoplasma pneumoniae;* cytomegalovirus, or atypical mycobacterial infection; bacillary angiomatosis; Kaposi sarcoma; lymphoma)
2. Bronchogenic carcinoma
3. [Expiratory or supine film]
4. Fungus disease (esp. histoplasmosis; coccidioidomycosis; blastomycosis) (See F-74-S)
5. [Heart disease with pulmonary artery enlargement (eg, left to right shunt, heart failure; high output heart disease; pulmonary arterial or venous hypertension; cor pulmonale; valvular pulmonary stenosis; absent pulmonary valve; transposition of great vessels; truncus arteriosus; TAPVR below diaphragm; left atrial myxoma; aortic aneurysm]
6. Lymphoma$_g$; leukemia

7. Metastatic disease (esp. bronchogenic squamous or small cell carcinoma; carcinoma of head and neck, breast, kidney, testis; carcinoid; invasive thymoma; malignant teratoma; lymphangitic carcinomatosis; mesothelioma)
8. Pneumoconiosis (esp. coal-worker's pneumoconiosis; silicosis; berylliosis) (See F-70-S)
9. Sarcoidosis
10. Tuberculosis, primary

UNCOMMON

1. Amyloidosis; plasma cell dyscrasia (eg, Waldenström macroglobulinemia; heavy chain disease)
2. Aspiration, chronic (eg, tracheo-esophageal fistula; achalasia; neurologic disorders$_g$)
3. Connective tissue disease (collagen vascular disease)$_g$ (esp. rheumatoid arthritis; lupus erythematosus; mixed—MCTD)
4. Cystic fibrosis (mucoviscidosis)
5. Drug reaction (eg, hydantoin {Dilantin}; trimethadione; methotrexate)
6. Erythema nodosum
7. Giant lymph node hyperplasia (Castleman disease)
8. Hypersensitivity pneumonitis (extrinsic allergic alveolitis, esp. mushroom-worker's lung—rare in other entities) (See F-69)
9. Langerhans cell histiocytosis$_g$
10. Lymphadenitis, idiopathic or other infectious (eg, tularemia; pertussis; plague; anthrax; brucellosis; lung abscess)
11. [Mediastinal mass; prominent right or persistent left superior vena cava]
12. Parasitic disease (eg, occasionally in tropical eosinophilia {filarial}; acute schistosomiasis)
13. [Polycythemia vera]
14. Pulmonary lymphangioleiomyomatosis (rarely)
15. [Pulmonary thromboembolism]
16. Reactive airways disease in children
17. Recurrent childhood pneumonia
18. Sinus histiocytosis
19. Viral infection (eg, psittacosis; infectious mononucleosis; chickenpox; rubeola; cat-scratch fever; ECHO virus; mycoplasma) (See F-74-S)
20. Wegener granulomatosis$_g$

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Ebel K-D, Blickman H, Willich E, Richter E: Differential Diagnosis in Pediatric Radiology. Stuttgart: Thieme, 1999, pp 98–99
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
4. Heitzman ER: The Mediastinum: Radiologic Correlation with Anatomy and Pathology. St. Louis: CV Mosby, 1977
5. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
6. Teplick JG, Haskin ME: Roentgenologic Diagnosis. (ed 3) Philadelphia: WB Saunders, 1976

Gamut F-104

MARKED HILAR LYMPHADENOPATHY

COMMON

1. Lymphadenitis, infectious (incl. AIDS; tuberculosis; histoplasmosis; plague; tularemia; idiopathic)
2. Lymphoma$_g$; lymphosarcoma
3. Metastatic disease (esp. undifferentiated or small cell carcinoma of lung)
4. Sarcoidosis

UNCOMMON

1. Drug reaction (esp. hydantoin {Dilantin})
2. Erythema nodosum
3. Giant lymph node hyperplasia (Castleman disease)

Gamut F-105

BILATERAL HILAR ENLARGEMENT (See F-103)

COMMON

1. Congenital heart disease (eg, left to right shunts—ASD, VSD, PDA; cyanotic admixture lesions; truncus arteriosus, type I)
2. Lymphadenopathy (esp. tuberculosis; histoplasmosis; bronchogenic carcinoma; lymphoma$_g$; sarcoidosis; silicosis; Castleman disease) (See F-103)
3. Pulmonary arterial hypertension, primary or secondary (eg, COPD; Eisenmenger S.; multiple pulmonary artery stenoses or coarctations; schistosomiasis)
4. Pulmonary thromboembolism
5. Pulmonary venous hypertension (eg, heart failure; mitral stenosis)

UNCOMMON

1. Polycythemia

Reference

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 70–71

Gamut F-106

UNILATERAL HILAR ENLARGEMENT

COMMON

1. Bronchogenic carcinoma (squamous cell; small cell)
2. Carcinoid
3. Fungus disease (esp. histoplasmosis; coccidioidomycosis; blastomycosis; sporotrichosis) (See F-74-S)
4. Lymphadenopathy, other infectious (eg, bacterial or viral pneumonia; lung abscess; tularemia; plague; actinomycosis; pertussis; mycoplasma; psittacosis; infectious mononucleosis; AIDS) (See F-103)
5. Lymphoma$_g$; leukemia
6. Metastatic disease (eg, from carcinoma of lung, breast, head and neck, kidney, or testis)
7. [Normal prominence of main pulmonary artery under age 25, esp. in women]
8. [Pneumonia in superior segment of a lower lobe; atelectasis in RUL or RML]
9. [Pulmonary stenosis, valvular (poststenotic dilatation of left pulmonary artery)]
10. [Rotation of patient during radiography; scoliosis]
11. Tuberculosis, primary

UNCOMMON

1. Aneurysm of pulmonary artery
2. Arteriovenous malformation
3. Bronchioloalveolar carcinoma
4. Coarctation of a central pulmonary artery (poststenotic dilatation)
5. Cystic fibrosis (mucoviscidosis)
6. [Mediastinal mass superimposed on hilum (eg, thymoma; thymic cyst; bronchogenic cyst; germ cell neoplasm; neurogenic tumor$_g$)]
7. Obstructed, hypoplastic, or absent contralateral pulmonary artery (eg, neoplasm; histoplasmosis; embolus; Swyer-James S.; congenital absence of pulmonary artery or valve)
8. Pericardial defect
9. Postoperative systemic-pulmonary shunt in CHD (Blalock-Taussig; Waterston-Cooley; Potts-Smith procedures)
10. Pulmonary thromboembolus lodged in a main pulmonary artery
11. Sarcoidosis (usually bilateral)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

3. Heitzman ER: The Mediastinum: Radiologic Correlation with Anatomy and Pathology. St. Louis: CV Mosby, 1977

Gamut F-107

UNILATERAL SMALL HILAR SHADOW

COMMON

1. Air trapping, unilateral (eg, bronchial foreign body, neoplasm, stricture)
2. Hyperaeration, unilateral
3. Lobar atelectasis with hilum displaced behind heart
4. Normal variant (esp. left side)
5. Postoperative (eg, lobectomy)
6. Rotation of patient (scoliosis; poor positioning)

UNCOMMON

1. Central pulmonary artery obstruction, unilateral (eg, neoplasm; thromboembolism; fibrosing mediastinitis)
2. Congenital absence (proximal interruption), hypoplasia, or coarctation of pulmonary artery
3. Congenital lobar emphysema (neonatal lobar hyperinflation) (See F-54)
4. Pulmonary agenesis, aplasia or hypoplasia
5. Swyer-James syndrome

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. White RI Jr, Kaufman SL, Donner MW: Angiographic diagnosis of venous thromboembolism revisited. Ann Radiol 1980;23:312–315

Gamut F-108

UNILATERAL OR BILATERAL HILAR DISPLACEMENT

COMMON

1. Atelectasis
2. Bronchiectasis (See F-80)
3. Bronchogenic carcinoma
4. Emphysema
5. Lobectomy
6. Mediastinal mass
7. Pneumoconiosis, esp. with conglomerate mass (eg, silicosis; coal-worker's pneumoconiosis; asbestosis) (See F-70-S)
8. Pneumothorax (See F-111)
9. Tuberculosis, fungus disease, or other chronic pulmonary inflammatory process

UNCOMMON

1. Absent or anomalous pulmonary artery
2. Bronchial atresia
3. Congenital lobar emphysema
4. Cystic adenomatoid malformation
5. Diaphragmatic hernia
6. Lobar agenesis
7. Lobar torsion
8. Radiation fibrosis
9. Sarcoidosis (fibrotic)
10. Sequestration of lung (intralobar)
11. Swyer-James syndrome

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999

Gamut F-109

MEDIASTINAL SHIFT

COMMON

1. Atelectasis
2. Emphysema, unilateral (esp. bullous)
3. Mediastinal, pleural or pulmonary mass, large unilateral (eg, invasive thymoma; teratoma; thymolipoma; mesothelioma; bronchogenic carcinoma)
4. Pectus excavatum
5. Pleural effusion, large unilateral
6. Pneumothorax with tension
7. Postoperative (eg, lobectomy; pneumonectomy)
8. [Scoliosis]

UNCOMMON

1. Bronchiolitis obliterans (incl. Swyer-James S.)
2. Bronchogenic cyst (air-filled in children)
3. Congenital lobar emphysema (infants)
4. Cystic adenomatoid malformation (infants)
5. Diaphragmatic hernia, large
6. Foreign body (eg, peanut) occluding a large bronchus (esp. in a child on expiratory film)
7. Hypoplasia or agenesis of one lung
8. Partial absence of pericardium (cardiac shift)
9. Pulmonary interstitial emphysema (eg, PEEP)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
2. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997

Gamut F-110

PNEUMOMEDIASTINUM

COMMON

1. Asthma
2. Barotrauma (overinflation during anesthesia or respiratory therapy, including ARDS; intermittent positive pressure ventilation (PEEP), esp. in newborns)
3. Birth trauma (newborn)
4. [Esophageal air in normal or dilated esophagus]
5. [Hiatal hernia]
6. Iatrogenic (eg, surgical procedure; sternotomy; esophagectomy; tracheostomy; endoscopy; intubation; needle biopsy of lung or kidney; pericardial drainage; retroperitoneal or other gas insufflation)
7. [Pneumopericardium; pneumothorax]
8. Respiratory distress syndrome, infantile or adult
9. Sudden increase in intrathoracic pressure associated with tear of lung parenchyma (eg, cough paroxysm; pertussis; vomiting; resuscitation; Heimlich maneuver; marijuana smoking enhancement; cocaine abuse; convulsion)
10. Trauma to upper or lower respiratory tract or chest wall (incl. blunt or penetrating trauma; stab or gunshot wound; foreign body; rib fracture with pulmonary laceration; fractured bronchus)

UNCOMMON

1. [Abscess, mediastinal]
2. Anorexia nervosa
3. Bronchial dehiscence after lung transplant
4. Caisson disease
5. [Colon interposition, postesophagectomy]
6. Cystic fibrosis (mucoviscidosis)
7. Diabetic ketoacidosis
8. [Esophageal diverticulum; communicating duplication cyst$_g$]
9. Esophageal perforation (eg, carcinoma; dilatation; Boerhaave S.; endoscopy; prolonged vomiting with Mallory-Weiss S.)

10. Extension of air from the neck; subcutaneous emphysema (eg, facial fracture; dental drilling; surgical procedure—neck dissection)
11. High altitude exercise
12. Infection with gas-forming organism (esp. in diabetic)
13. Parturition
14. Pneumoperitoneum; pneumoretroperitoneum (retroperitoneal perforation of gastrointestinal tract with upward extension of gas)
15. Rupture of trachea or main bronchus following bronchoscopy or blunt chest trauma
16. "Spontaneous" (eg, ruptured bulla)
17. Tracheal or esophageal fistula (eg, neoplasm; infection)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
2. Felson B: The mediastinum. Semin Roentgenol 1969;4: 41–58
3. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999.
4. Gray JM, Hanson GC: Mediastinal emphysema; Aetiology, diagnosis, and treatment. Thorax 1966;21:325–332
5. Munsell WP: Pneumomediastinum: A report of 28 cases and review of the literature. JAMA 1967;202:129–133
6. Sutton D: Textbook of Radiology and Imaging. (ed 6) New York: Churchill Livingstone, 1998, p 373

Gamut F-111

PNEUMOTHORAX

COMMON

1. ARDS
2. [Artifact (eg, skin fold)]
3. Bronchopleural fistula (eg, postoperative; tuberculosis; fungus disease; amebiasis; suppurative pneumonia; lung abscess; empyema; radiation therapy) (See F-112)
4. Cystic fibrosis (mucoviscidosis)
5. [Giant bulla]
6. Iatrogenic (eg, surgical procedure; thoracotomy; endoscopy; thoracentesis; percutaneous or transbronchial biopsy; resuscitation; tracheotomy; subclavian puncture; central line or pacemaker insertion; barotrauma—overinflation with positive pressure ventilation during anesthesia or respirator therapy)
7. Mediastinal emphysema with pleural leak
8. Obstructive emphysema (eg. foreign body; neoplasm)
9. Pneumonia (esp. *Pneumocystis carinii* in AIDS or necrotizing staphylococcal pneumonia)
10. Respiratory distress syndrome (esp. after PEEP therapy); pulmonary interstitial emphysema; meconium aspiration (neonates)
11. Primary "spontaneous" (eg, ruptured bulla)
12. Trauma (eg, rib fracture; blunt or penetrating chest injury; tracheobronchial injury)
13. Wilson-Mikity S.

UNCOMMON

1. Asthma
2. Drug therapy (esp. cytotoxic chemotherapy)
3. Endometriosis (catamenial)
4. Esophageal rupture (eg, endoscopy; carcinoma; Boerhaave S.)
5. Honeycomb lung, interstitial pulmonary fibrosis (esp. sarcoidosis; Langerhans cell histiocytosis$_g$—eosinophilic granuloma; pneumoconiosis—bauxite {Shaver's disease}; familial fibrocystic dysplasia—familial form of IPF) (See F-22)
6. Idiopathic pulmonary hemosiderosis
7. Marfan S.; Ehlers-Danlos S.; cutis laxa
8. Metastasis (esp. osteosarcoma or other sarcomas; carcinoma of pancreas or adrenals; Wilms' tumor)
9. Neoplasm, malignant (eg, bronchogenic carcinoma)
10. Noxious gases (See F-72-S)
11. Parasitic disease (esp. paragonimiasis; ruptured pulmonary hydatid cyst or amebic abscess)
12. Parturition

(continued)

13. Pneumatocele or cyst rupture (eg, staphylococcal pneumonia)
14. Pneumoperitoneum with extension through diaphragm
15. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis
16. Pulmonary thromboembolism with infarction
17. Renal agenesis (Potter S.); intrauterine anuria
18. Tuberculosis (cavitary)
19. Whooping cough (pertussis)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Lee CY, DiLoreto PC, Beaudoin J: Catamenial pneumothorax. Obstet Gynecol 1974; 44:407–411
4. Lote K, Dahl O, Vigander T: Pneumothorax during combination chemotherapy. Cancer 1981;47:1743–1745

Gamut F-112

BRONCHOPLEURAL FISTULA

COMMON

1. Empyema
2. Iatrogenic (eg, intubation; therapeutic pneumothorax; needle, brush or other biopsy)
3. Lung abscess; suppurative or necrotizing pneumonia
4. Neoplasm, malignant (esp. carcinoma of lung or esophagus)
5. Postoperative (eg, lobectomy; pneumonectomy; local resection; thoracoplasty; intubation)
6. Trauma to lung, pleura, or chest wall
7. Tuberculosis

UNCOMMON

1. Fungus disease (see F-74-S)
2. Metastatic disease (esp. sarcoma)
3. Parasitic disease (esp. ameblasis)
4. Pneumothorax (spontaneous)
5. Pulmonary infarct
6. Radiation pneumonitis

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Friedman PJ, Hellekant CAG: Radiologic recognition of bronchopleural fistula. Radiology 1977;124:289–295
3. Lams P: Radiographic signs in post-pneumonectomy bronchopleural fistula. J Can Assoc Radiol 1980;31:178–180

Gamut F-113

PLEURAL EFFUSION WITH NORMAL LUNGS (See F-114)

COMMON

1. Abscess, subphrenic or hepatic (eg, amebic; pyogenic)
2. Asbestos-related pleural disease
3. Ascites with permeation through diaphragm (eg, cirrhosis; Meigs S.; peritoneal metastases; extension of retroperitoneal urine collection; peritoneal dialysis)
4. Connective tissue disease (collagen vascular disease)$_g$ (esp. lupus erythematosus; rheumatoid disease)
5. Heart failure (esp. posttreatment)
6. Idiopathic
7. Infection (eg, bacterial; rheumatic fever; viral; infectious mononucleosis; mycoplasma; fungal; actinomycosis; nocardiosis) (See F-74-S)
8. Lymphoma$_g$, mediastinal or retroperitoneal; leukemia
9. Metastasis to pleura (esp. from breast, pancreas, GI tract, ovary, kidney)
10. Normal, physiologic (up to 5 cc); pregnancy
11. Postmyocardial infarction S. (Dressler S.); postpericardiotomy S.

12. Postoperative, following thoracic, cardiac, abdominal, or retroperitoneal surgery (eg, splenectomy; renal surgery)
13. Pulmonary thromboembolism
14. Trauma to chest wall (eg, rib fracture; blunt or penetrating injury) or great vessels (hemothorax)
15. Tuberculosis

UNCOMMON

1. Bleeding or clotting disorder$_g$
2. Chest wall neoplasm (eg, Ewing sarcoma; osteosarcoma; chondrosarcoma)
3. Chylothorax (eg, lymphedema; Milroy's disease; trauma to thoracic duct) (See F-120)
4. Drug reaction (eg, methysergide; nitrofurantoin, busulfan; methotrexate; bromcriptine, procarbazine; also lupus reaction from hydantoin {Dilantin}, hydralazine, isoniazid, procainamide, propylthiouracil)
5. Empyema from retropharyngeal or neck abscess, or in postpneumonectomy space
6. Esophageal rupture or fistula
7. Familial Mediterranean fever (familial recurrent polyscrositis)
8. Hypoproteinemia (incl. hepatic failure)
9. Iatrogenic (eg, fluid overload; ventriculopleural or other shunt; improperly inserted intravenous catheter; instillation of medication)
10. Mesothelioma
11. Multiple myeloma
12. Myxedema
13. Pancreatitis; pancreatic pseudocyst, abscess, or neoplasm
14. Parasitic disease (eg, amebiasis; filariasis; malaria; paragonimiasis)
15. Pericarditis (eg, viral; tuberculous; metastatic; idiopathic; constrictive)
16. Pleural fistula (eg, gastric; esophageal; bronchopleural)
17. Radiation therapy
18. Renal disease (eg, renal failure; nephrosis; pyelonephritis; acute glomerulonephritis; hydronephrosis; uremic pleuritis; hemolytic-uremic S.)

References

1. Baron RL, Stark DD, McClennan BL: Intrathoracic extension of retroperitoneal urine collection. AJR 1981;137: 37–41
2. Bierman SM, Reuter KL, Hunter RE: Meigs syndrome and ovarian fibroma: CT findings. J Comput Assist Tomogr 1990;144:833–834
3. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
4. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
5. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
6. Rosenow EC III: The spectrum of drug-induced pulmonary disease. Ann Intern Med 1972;97:977–991
7. Storey DD, Dines DE, Coles DT: Pleural effusion: A diagnostic dilemma. JAMA 1976;236:2183–2186
8. Teplick JG, Haskin ME: Roentgenologic Diagnosis. (ed 3) Philadelphia: WB Saunders, 1976

Gamut F-114

PLEURAL EFFUSION WITH ASSOCIATED PULMONARY, CARDIAC, OR MEDIASTINAL DISEASE

COMMON

1. Abscess, lung or subphrenic
2. ARDS; shock lung; ventilator lung
3. Bronchogenic carcinoma
4. Heart failure
5. Infection, other (eg, rheumatic fever; fungal; actinomycosis; nocardiosis; bacillary angiomatosis; mycoplasma; viral)
6. Lymphoma$_g$; leukemia
7. Metastatic disease, hematogenous or lymphangitic (esp. from carcinoma of lung, breast, pancreas, GI tract, or kidney; osteosarcoma and other sarcomas; Wilms' tumor)
8. Parasitic disease (eg, malaria; amebiasis; hydatid disease; paragonimiasis) (See F-74-S)
9. Pneumonia (esp. bacterial, usually with empyema—staphylococcal; streptococcal; *Klebsiella;* plague; tularemia) (See F-74-S)

(continued)

10. Postoperative (eg, pneumonectomy; left effusion post-cardiac surgery)
11. Pulmonary thromboembolism and infarction
12. Trauma with hemothorax or chylothorax (esp. laceration of lung; rib fracture; knife or gunshot wound; pulmonary or mediastinal hematoma; aortic rupture; esophageal perforation)
13. Tuberculosis

UNCOMMON

1. Asbestos exposure (usually with asbestos-related pleural disease and/or asbestosis)
2. Bronchopleural fistula
3. Churg-Strauss S.
4. Connective tissue disease (collagen vascular disease)$_g$ (esp. lupus erythematosus; rheumatoid disease)
5. Dressler S. (recent myocardial infarction or cardiac surgery)
6. Drug-induced pulmonary disease, usually diffuse interstitial (eg, nitrofurantoin; hydralazine; procainamide) (See F-73-S)
7. Eosinophilic lung disease$_g$ (eg, Löffler S.)
8. Esophageal rupture or fistula
9. Iatrogenic (eg, fluid overload; ventriculopleural or other shunt; improperly inserted intravenous catheter; instillation of medication)
10. Lymphomatoid granulomatosis
11. Malignant neoplasm, other (eg, bronchioloalveolar carcinoma; mesothelioma; multiple myeloma; rib or chest wall sarcoma; Askin tumor)
12. Obstruction of superior vena cava or azygos vein
13. Pericarditis (eg, viral; tuberculous; metastatic; idiopathic; constrictive)
14. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis
15. Pulmonary lymphangiomatosis
16. Radiation therapy
17. Sarcoidosis
18. Uremia (with pulmonary edema)
19. Waldenström macroglobulinemia
20. Wegener granulomatosis$_g$

References

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997
2. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
3. Frazier AA, Rosado de Christenson ML, Galvin JR, Fleming MV: Pulmonary angiitis and granulomatosis. RadioGraphics 1998;18:687–710
4. Miller BH, Rosado de Christenson ML, Mason AC, et al: Malignant pleural mesothelioma: Radiologic-Pathologic Correlation. RadioGraphics 1996;16:613–644
5. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
6. Storey DD, Dines DE, Coles DT: Pleural effusion. A diagnostic dilemma. JAMA 1976;236:2183–2186
7. Teplick JG, Haskin ME: Roentgenologic Diagnosis. (ed 3) Philadelphia: WB Saunders, 1976

Gamut F-115

SMALL PLEURAL EFFUSION WITH SUBSEGMENTAL ATELECTASIS

1. Abdominal disease (eg, subphrenic abscess; amebiasis; pancreatitis; neoplasm)
2. Ascites
3. Postoperative (eg, thoracotomy—esp. CABG; splenectomy; renal surgery)
4. Pulmonary infarct
5. Trauma (eg, rib fractures)

Reference

1. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997

Gamut F-116

PLEURAL EFFUSION WITH ENLARGED HEART

1. Connective tissue disease (collagen vascular disease)$_g$ (esp. lupus erythematosus; rheumatoid disease)
2. Heart failure
3. Malignant neoplasm with direct or metastatic extension to pleura, pericardium and/or heart (eg, mesothelioma; invasive thymoma; malignant germ cell neoplasm; carcinoma of lung, breast or esophagus; lymphoma$_g$)
4. Myocardiopathy
5. Myocarditis or pericarditis with pleuritis (eg, tuberculosis; rheumatic fever, viral infection)
6. Postpericardiotomy S. (esp. CABG); Dressler S.
7. Pulmonary thromboembolism, usually with infarction

Reference

1. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997

Gamut F-117

PLEURAL EFFUSION ASSOCIATED WITH ABDOMINAL DISEASE

COMMON

1. Abdominal neoplasm, primary or secondary (eg, peritoneal metastases)
2. Ascites with permeation through diaphragm (eg, cirrhosis)
3. Meigs S.
4. Pancreatitis
5. Renal disease (eg, nephrotic S.; acute glomerulonephritis; uremia; dialysis; urinoma)
6. Subphrenic abscess; perinephric abscess
7. Trauma, abdominal (eg, knife or gunshot wound; ruptured diaphragm)

UNCOMMON

1. Amebic liver abscess
2. Aneurysm$_g$, thoracoabdominal, with rupture
3. Diaphragmatic hernia, incarcerated
4. Hemolytic-uremic S.
5. Lipoma or liposarcoma, thoracoabdominal
6. Lymphoma$_g$
7. Ovarian hyperstimulation S.

References

1. Fraser RS, Müller NL, Coleman N, Paré PD (eds): Fraser & Paré: Diagnosis of Diseases of the Chest. (ed 4) Philadelphia: WB Saunders, 1999
2. Lieberman FL, Peters RL: Cirrhotic hydrothorax: Further evidence that an acquired diaphragmatic defect is at fault. Arch Intern Med 1970;125:114–117

Gamut F-118-S1

PLEURAL EFFUSION CONTAINING EOSINOPHILS

COMMON

1. Eosinophilic lung disease$_g$ (esp. Löffler S.)
2. Hodgkin's lymphoma
3. Idiopathic
4. Parasitic disease (eg, paragonimiasis; amebiasis; strongyloidiasis) (See F-74-S)

UNCOMMON

1. Asthma
2. Churg-Strauss S.
3. Cirrhosis
4. Connective tissue disease (collagen vascular disease)$_g$ (eg, rheumatoid disease; lupus erythematosus; polyarteritis nodosa)
5. Drug reaction (See F-73-S); pulmonary granulomatosis in addicts

(continued)

6. Foreign material injection (oil; iodine; protein)
7. Infection (eg, fungus) (See F-74-S)
8. Leukemia (eosinophilic)
9. Malignant neoplasm
10. Pulmonary infarct
11. Trauma (blood, lymph)
12. Wegener granulomatosis$_g$

References

1. Frazier AA, Rosado de Christenson ML, Galvin JR, Fleming MV: Pulmonary angiitis and granulomatosis. RadioGraphics 1998;18:687–710
2. Light RW, Erozan YS, Ball WC Jr: Cells in pleural fluid: Their value in differential diagnosis. Arch Intern Med 1973;132:854–860

Gamut F-118-S2

TYPE OF PLEURAL FLUID—TRANSUDATE (Protein < 3 g/dl)

COMMON

1. Cirrhosis
2. Fluid overload
3. Heart failure
4. Renal failure; uremia

UNCOMMON

1. Ascites
2. Constrictive pericarditis
3. Hypoproteinemia
4. Myxedema
5. Nephrotic syndrome
6. Peritoneal dialysis
7. Superior vena cava obstruction (eg, bronchogenic carcinoma; fibrosing mediastinitis) (See E-70)

Reference

1. Slone RM, Fisher AJ: Pocket Guide to Body CT Differential Diagnosis. New York, McGraw-Hill, 1999, pp 131–132

Gamut F-118-S3

TYPE OF PLEURAL FLUID—EXUDATE (Protein > 3 g/dl)

COMMON

1. Lymphoma$_g$; leukemia
2. Metastases to pleura (esp. bronchogenic carcinoma)
3. Pneumonia (esp. bacterial); lung abscess
4. Pulmonary thromboembolism
5. Tuberculosis

UNCOMMON

1. Connective tissue disorder (collagen vascular disease)$_g$, esp. lupus erythematosus
2. Dressler S. (recent cardiac surgery or myocardial infarction)
3. Drug reaction
4. Fungus disease
5. Meigs' S. (benign ovarian fibroma)
6. Mesothelioma
7. Pericardial disease
8. Postpartum
9. Subphrenic abscess

Reference

1. Slone RM, Fisher AJ: Pocket Guide to Body CT Differential Diagnosis. New York: McGraw-Hill, 1999, p 132

Gamut F-119

HEMOTHORAX

COMMON

1. Iatrogenic (eg, thoracentesis; lung biopsy; chest tube or central venous catheter placement)
2. Malignancy (eg, bronchogenic carcinoma; pleural metastases; mesothelioma)
3. Trauma to chest (eg, rib fracture; lacerated intercostal vessel; contusion)

UNCOMMON

1. Catamenial (eg, endometriosis)
2. Bleeding or clotting disorder$_g$ (eg, anticoagulation therapy; hemophilia)
3. Dissecting aortic aneurysm
4. Extramedullary hematopoiesis
5. Pleural adhesion tear

Reference

1. Slone RM, Fisher AJ: Pocket Guide to Body CT Differential Diagnosis. New York: McGraw-Hill, 1999, p 133

Gamut F-120

CHYLOTHORAX (LYMPHOTHORAX)*

COMMON

1. Iatrogenic (esp. surgical or catheter injury to thoracic duct; surgery for congenital heart disease)
2. Idiopathic; spontaneous
3. Neoplasm involving thoracic duct or mediastinum (eg, metastatic disease; lymphoma$_g$; carcinoma of esophagus or lung; intrathoracic thyroid)
4. Trauma to thoracic duct

UNCOMMON

1. Aneurysm of thoracic duct with rupture
2. Cirrhosis
3. Congenital anomaly (eg, atresia or fistula of thoracic duct; yellow nail S.; Noonan S.; congenital lymphangiectasia)
4. Fibrosing mediastinitis
5. Filariasis; elephantiasis
6. Lymphadenopathy (eg, tuberculous; fungal; other infection) (See F-103)
7. Lymphangioma (cystic hygroma)
8. Neonatal
9. Nephrosis
10. Nonneoplastic mass compressing the thoracic duct (eg, aortic aneurysm$_g$; spinal disease)
11. Pulmonary lymphangioleiomyomatosis; tuberous sclerosis
12. Pulmonary lymphangiomatosis
13. Thromboembolism of left subclavian or innominate vein, or superior vena cava (central venous obstruction)

* Effusion with high lipid content—may be less dense than water on CT.

References

1. Bower GC: Chylothorax: Observations in 20 cases. Chest 1964; 46:464–468
2. Freundlich IM: The role of lymphangiography in chylothorax. A report of six nontraumatic cases. AJR 1975;125: 617–627
3. Hesseling PG, Hoffman H: Chylothorax: A review of the literature and report of 3 cases. S Afr Med J 1981;60:675–678
4. Hughes RL, Mintzer RA, Hidvagi DF, et al: The management of chylothorax. Chest 1979;76:212–218
5. Swensen SJ, Hartman TE, Mayo JR, et al: Diffuse pulmonary lymphangiomatosis: CT findings. J Comput Assist Tomogr 1995;19:348–352

Gamut F-121

MASSIVE PLEURAL EFFUSION

COMMON

1. Ascites (leaky diaphragm)
2. Empyema
3. Heart failure
4. Hemothorax (eg, traumatic; bleeding disorder$_g$; catamenial)
5. Malignant intrathoracic neoplasm (eg, carcinoma, blastoma or sarcoma of lung; lymphoma$_g$; mesothelioma; neuroblastoma; teratoma)
6. Metastatic disease (eg, carcinoma of lung, esp. adenocarcinoma)
7. Nephrosis; acute glomerulonephritis
8. Postoperative
9. Subphrenic or liver abscess or neoplasm
10. Tuberculosis

(continued)

UNCOMMON

1. Actinomycosis; nocardiosis (empyema)
2. Amebiasis
3. Chylothorax (See F-120)
4. Fungus disease (See F-74-S)
5. Iatrogenic (eg, perforation by venous catheter)
6. Idiopathic
7. Pancreatitis
8. Perforation of esophagus or stomach
9. Polyserositis
10. Pulmonary thromboembolism with infarction

References

1. Liberson M: Diagnostic significance of the mediastinal profile in massive unilateral pleural effusions. Am Rev Resp Dis 1963;88:176–180
2. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 11–15

Gamut F-122

OPACIFICATION OF ONE HEMITHORAX

COMMON

1. Atelectasis of one lung
2. Consolidation of one lung (eg, pneumonia)
3. Pleural effusion, massive hydrothorax; empyema; hemothorax; chylothorax (See F-119–121)
4. Postpneumonectomy fibrothorax; thoracoplasty
5. [Rotoscoliosis, advanced]

UNCOMMON

1. Agenesis of one lung
2. [Artifact due to faulty radiographic technique (eg, malpositioned filter)]
3. Cardiomegaly, massive
4. Cystic adenomatoid malformation (type III)
5. Diaphragmatic hernia (congenital or traumatic)
6. Eventration of diaphragm
7. Fibrosis of lung or pleura
8. Hematoma of chest wall
9. Mediastinal or pulmonary mass, huge
10. Mesothelioma
11. Metastatic disease to pleura (esp. from adenocarcinoma of ipsilateral lung or from osteosarcoma)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Liberson M: Diagnostic significance of the mediastinal profile in massive unilateral pleural effusions. Am Rev Resp Dis 1963;88:176–180
2. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 11–15

Gamut F-123-1

PLEURAL THICKENING

COMMON

1. Asbestos-related pleural disease: pleural plaque; talcosis
2. Bronchogenic carcinoma (esp. Pancoast tumor)
3. Empyema, prior
4. [Extrathoracic musculature; lateral pleural stripe; apical pleural capping; extrapleural fat deposition]
5. Metastatic disease
6. Pleural effusion, organized; pleural fibrosis; prior pleuritis or localized effusion, incl. prior interlobar fluid
7. Postoperative; prior drainage via catheter tubes
8. Rib lesion (eg, fracture; osteomyelitis; neoplasm; metastasis)
9. Trauma (old hemothorax)
10. Tuberculosis; atypical mycobacterial infection

UNCOMMON

1. Actinomycosis; nocardiosis
2. Chylothorax, prior
3. Connective tissue disease (collagen vascular disease)$_g$ (esp. rheumatoid disease)
4. Fungus disease (See F-74-S)

5. Invasive thymoma with pleural involvement
6. Lymphoma$_g$; leukemia
7. Melioidosis
8. Mesothelioma
9. Parasitic disease (eg, paragonimiasis; amebiasis; ruptured hydatid cyst)
10. Pulmonary lymphangiomatosis
11. Pulmonary or mediastinal fibrosis, advanced
12. Rounded atelectasis
13. Sarcoidosis
14. Splenosis
15. Subpleural collaterals in pulmonary venous or arterial atresia

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Ebel K-D, Blickman H, Willich E, Richter E: Differential Diagnosis in Pediatric Radiology. Stuttgart: Thieme, 1999, pp 113–115
2. Miller BH, Rosado de Christenson ML, McAdams HP, Fishback NF: Thoracic sarcoidosis: Radiologic-Pathologic Correlation. RadioGraphics 1995;15:421–437
3. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997

Gamut F-123-2

NODULAR OR TUMOR-LIKE PLEURAL THICKENING

COMMON

1. Mesothelioma, malignant pleural
2. Metastatic disease (usually from adenocarcinoma of ipsilateral lung; occasionally from carcinoma of breast, ovary, prostate, gastrointestinal tract, or kidney)

UNCOMMON

1. Invasive thymoma with pleural involvement
2. Lymphoma$_g$

Gamut F-124

PLEURAL CALCIFICATION

COMMON

1. Asbestos-related pleural disease with plaques
2. Empyema, prior
3. Hemothorax, old
4. Idiopathic
5. Tuberculosis (esp. tuberculous empyema)

UNCOMMON

1. [Alveolar microlithiasis]
2. Calcifying fibrous pseudotumor of pleura
3. Histoplasmosis
4. Hyperparathyroidism, primary or secondary (renal osteodystrophy); chronic hemodialysis
5. [Mineral oil aspiration]
6. Neoplasm (eg, osteosarcoma; rarely mesothelioma)
7. Oleothorax (extrapleural plombage); pleurodesis with talc
8. Parasitic disease (esp. pentastomiasis—*Armillifer* infection); cysticercosis
9. Pleural effusion, chronic
10. Pneumoconiosis, other (mica; talc; other silicates; tin; barium)
11. Pulmonary lymphangiomatosis

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Nichols DM, Johnson MA: Calcification in a pleural mesothelioma. J Can Assoc Radiol 1983;34:311–313
2. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
3. Watanabe T, Kobayashi T: Pleural calcification: A type of "metastatic calcification" in chronic renal failure. Br J Radiol 1983;56:93–98

Gamut F-125-1

PLEURAL MASS (See also F-126)

COMMON

1. Empyema
2. [Extrapleural tumor (eg, lipoma; liposarcoma; desmoid; neurofibroma; schwannoma)] (See F-126)
3. Hematoma
4. Lymphoma$_g$

*5. Mesothelioma

*6. Metastatic disease (esp. from adenocarcinoma of lung; also carcinoma of breast, prostate, ovary, pancreas, GI tract)

7. [Pancoast or superior sulcus tumor]

*8. Pleural fluid (loculated or interlobar)

*9. Pleural plaque (asbestos-related pleural disease)

10. Pleural thickening, localized (eg, prior infection, hemorrhage, or surgery)
11. [Rib or chest wall lesion (eg, callus; bone sarcoma; myeloma; metastasis)]

UNCOMMON

1. Cyst (eg, mesothelial; hydatid)
2. Fibrin ball

*3. Invasive thymoma with pleural involvement

4. Localized fibrous tumor of pleura
5. [Mediastinal mass (along mediastinal pleura)]

*6. Splenosis

* Often multiple lesions.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Berne AS, Heitzman ER: The roentgenologic signs of pedunculated pleural tumors. AJR 1962;87:892–895
2. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
3. Reeder MM: Gamut: Pleural-based lesion arising from the lung, pleura or chest wall. Semin Roentgenol 1977;12: 261–262

Gamut F-125-2

MULTIPLE PLEURAL MASSES

COMMON

1. Loculated pleural effusions (eg, postoperative; tuberculosis)
2. Metastases to pleura (eg, from ipsilateral carcinoma of lung; breast; prostate)
3. Pleural plaques (asbestos-related pleural disease)

UNCOMMON

1. Endometriosis
2. Invasive thymoma
3. Localized fibrous tumor of pleura (usually solitary)
4. Lymphoma$_g$
5. Mesothelioma
6. Parasitic disease (eg, paragonimiasis or amebiasis with loculated effusions; pentastomiasis or cysticercosis with calcifications; hydatid disease)
7. Splenosis (thoracic)

Reference

1. Slone RM, Fisher AJ: Pocket Guide to Body CT Differential Diagnosis. New York: McGraw-Hill, 1999, pp 146–147

Gamut F-126

EXTRAPLEURAL OR CHEST WALL LESION (ESP. ON CT, MRI) (INCL. THOSE ASSOCIATED WITH RIB DESTRUCTION) (See F-125-1)

COMMON

*1. Abscess; osteomyelitis of rib, sternum, or spine (eg, pyogenic infection; tuberculosis; actinomycosis; nocardiosis; blastomycosis; aspergillosis)

2. [Asbestos-related pleural disease]

*3. Benign bone lesion (eg, cyst; aneurysmal bone cyst; fibrous dysplasia; enchondroma; osteochon-

droma; angioma; giant cell tumor; chondromyxoid fibroma; brown tumor of hyperparathyroidism)
*4. Bone sarcoma (eg, Ewing sarcoma; osteosarcoma; chondrosarcoma; fibrosarcoma)
*5. Chest wall invasion by bronchogenic carcinoma (eg, Pancoast tumor) or breast carcinoma
*6. Fracture of rib, sternum or spine (esp. with callus or hematoma)
*7. Hematoma
8. Lipoma (subcutaneous, extrapleural intrathoracic, transmural)
*9. Lymphoma$_g$
10. [Mediastinal mass]
*11. Metastasis to rib, chest wall, soft tissue, or spine (esp. from carcinoma of prostate, breast, lung)
*12. Multiple myeloma
13. [Superimposed density, esp. breast or breast implant; nipple; hair braids; artifact; skin lesion (eg, mole; neurofibroma); extrathoracic muscles; retrosternal soft tissue band]
*14. Postoperative (eg, soft tissue deformity; pleurectomy; plombage)

UNCOMMON

*1. Chronic empyema with associated malignancy (eg, lymphoma; sarcoma; mesothelioma)
2. Desmoid tumor, extraabdominal (aggressive fibromatosis)
*3. Empyema necessitatis (esp. tuberculous)
*4. Extramedullary hematopoiesis (esp. thalassemia)
*5. Hydatid disease
*6. Langerhans cell histiocytosis$_g$ (esp. eosinophilic granuloma)
7. Liposarcoma
8. [Lobar agenesis with extrapleural tissue plane anteriorly on lateral view]
9. Lymphangioma (cystic hygroma)
*10. Malignant fibrous histiocytoma
*11. Massive osteolysis (Gorham's vanishing bone disease)
*12. Mesenchymal hamartoma of chest wall
*13. Mesothelioma
14. Muscle tumor (esp. rhabdomyosarcoma)
*15. Neurogenic tumor (eg, schwannoma; neurofibroma; malignant peripheral nerve sheath tumor; neuroblastoma; Askin tumor)
*16. Pleural-based lesion eroding rib (See F-125-1)
17. Spindle cell tumor$_g$; fibroma
*18. Vascular tumor (eg, hemangioma; arteriovenous malformation; hemangiopericytoma; angiosarcoma)

* May be associated with erosion or destruction of rib, sternum, or spine.
[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Hachiya J (Tokyo): Lecture at Eleventh Masters Diagnostic Radiology Conference, Kauai, Hawaii, 1992
3. Omell GH, Anderson LS, Bramson RT: Chest wall tumors. Radiol Clin North Am 1973;11:197–214
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
5. Reeder MM: Gamut: Pleural-based lesion arising from lung, pleura, or chest wall. Semin Roentgenol 1977;12:261–262

Gamut F-127

AXILLARY MASS (CT, MRI)

COMMON

1. Lymphoma$_g$; leukemia
2. Metastatic disease (esp. from carcinoma of breast; also lung, kidney and head and neck tumors)

UNCOMMON

1. Desmoid tumor
2. Empyema necessitans
3. Lipoma
4. Lymphadenopathy, other (eg, sarcoidosis; tuberculosis; plague; toxoplasmosis; cat-scratch fever)
5. Lymphangioma
6. Primary malignancy of axilla

Reference

1. Eisenberg RL: Clinical Imaging: An Atlas of Differential Diagnosis. (ed 3) Philadelphia: Lippincott-Raven, 1997, pp 202–204

Gamut F-128

PEDIATRIC CHEST WALL OR RIB CAGE LESION, OSSEOUS OR SOFT TISSUE (ESP. ON CT, MRI)

CHEST WALL (RIB CAGE)—Benign Bone Tumors

COMMON
1. Aneurysmal bone cyst
2. Enchondroma
3. [Fibrous dysplasia]

UNCOMMON
1. Chondroblastoma (Codman tumor)
2. Mesenchymal hamartoma
3. Osteoblastoma
4. Osteochondroma

CHEST WALL (RIB CAGE)—Malignant Bone Tumors

COMMON
1. Ewing sarcoma
2. Metastasis (eg, neuroblastoma; leukemia)
3. Osteosarcoma

UNCOMMON
1. Askin tumor (primitive neuroectodermal tumor{PNET})
2. Chondrosarcoma
3. Lymphoma$_g$ (primary)
4. Metastases, other (eg, Ewing sarcoma; Wilms' tumor; rhabdomyosarcoma; retinoblastoma; osteosaraoma; lymphoma; medulloblastoma)

CHEST WALL—Benign Soft Tissue Tumors

COMMON
1. Hemangioma; lymphangioma

UNCOMMON
1. Desmoid
2. Hamartoma
3. Neurofibroma
4. Venous malformation

CHEST WALL—Malignant Soft Tissue Tumors

COMMON
1. Rhabdomyosarcoma

UNCOMMON
1. Askin tumor (primitive neuroectodermal tumor {PNET}); may be same as extraosseous Ewing sarcoma
2. Lymphoma
3. Pleuropulmonary blastoma

References

1. Hartman GE, Shochat SJ: Primary pulmonary neoplasms of childhood: a review. Ann Thorac Surg 1983;36:108–119
2. Meyer JS, Nicotra JJ: Tumors of the pediatric chest. Semin Roentgenol 1998;33:187–198

Gamut F-129

CONGENITAL SYNDROMES WITH PECTUS CARINATUM (PIGEON BREAST) (Same as D-209-2)

COMMON
1. Congenital heart disease (esp. cyanotic)
2. Ehlers-Danlos S.
3. Fetal alcohol S.

4. Homocystinuria
5. Idiopathic; isolated finding
6. Marfan S.
7. Mucopolysaccharidoses (esp. Morquio S.)
8. Osteogenesis imperfecta
9. [Rickets]
10. Undersegmentation or hypoplasia of sternum (See D-209-1)

UNCOMMON

1. Asphyxiating thoracic dysplasia (Jeune S.)
2. Coffin-Lowry S.
3. Currarino-Silverman S.
4. Dyggve-Melchior-Clausen dysplasia (Smith-McCort S.)
5. Hyperphosphatasia
6. LEOPARD S. (multiple lentigenes S.)
7. Noonan S.
8. Prune-belly S. (Eagle-Barrett S.)
9. Schwartz-Jampel S. (osteochondromuscular dystrophy)
10. Spondyloepimetaphyseal dysplasia (Strudwick type)
11. Spondyloepiphyseal dysplasia congenita
12. 3-M syndrome

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B (ed): Dwarfs and other little people. Semin Roentgenol 1973;8:133–263
2. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995
3. Taybi H, Lachman RS: Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. (ed 4) St. Louis: Mosby-Year Book, 1996, p 1049

Gamut F-130

CONGENITAL SYNDROMES WITH PECTUS EXCAVATUM (FUNNEL CHEST) (Same as D-209-3)

COMMON

1. Congenital heart disease
2. Ehlers-Danlos S.
3. Fetal alcohol S.
4. Homocystinuria
5. Idiopathic; isolated finding
6. Marfan S.
7. [Mitral valve prolapse syndrome (MVPS)]
8. Myotonic dystrophy
9. [Newborn with respiratory distress]
10. Osteogenesis imperfecta
11. Turner S.

UNCOMMON

1. Aarskog S.
2. Coffin-Lowry S.
3. Cowden S. (multiple hamartoma S.)
4. Cutis laxa
5. F syndrome
6. Freeman-Sheldon S. (whistling face S.)
7. Gorlin S. (nevoid basal cell carcinoma S.)
8. LEOPARD S. (multiple lentigenes S.)
9. Noonan S.
10. Osteodysplasty (Melnick-Needles S.)
11. Prune-belly S. (Eagle-Barrett S.)
12. 3-M syndrome

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Ebel K-D, BlickmanH, Willich E, Richter E: Differential Diagnosis in Pediatric Radiology. Stuttgart: Thieme, 1999, p 118
2. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995
3. Taybi H, Lachman RS: Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. (ed 4) St. Louis: Mosby-Year Book, 1996, p 1049

Gamut F-131

CONGENITAL SYNDROMES WITH A SHORT, NARROW THORACIC CAGE

COMMON

1. Achondroplasia (esp. homozygous)
2. Asphyxiating thoracic dysplasia (Jeune S.)

(continued)

3. Chondroectodermal dysplasia (Ellis-van Creveld S.)
4. Cleidocranial dysplasia
5. Metaphyseal chondrodysplasia (Jansen type)
6. Pulmonary hypoplasia, unilateral or bilateral; venolobar S. (scimitar S.)
7. Short rib-polydactyly syndromes (types I {Saldino-Noonan} and II {Majewski})
8. Thanatophoric dysplasia; thanatophoric variants
9. Trisomy 21 S. (Down S.) (bell-shaped thorax)

UNCOMMON

1. Achondrogenesis; hypochondrogenesis
2. Antley-Bixler S.
3. Atelosteogenesis
4. Barnes S.
5. Campomelic dysplasia
6. Cerebro-costo-mandibular S.
7. Diastrophic dysplasia
8. Dyssegmental dysplasia
9. Fibrochondrogenesis
10. Hypophosphatasia
11. Lethal osteosclerotic skeletal dysplasias (many types)
12. Metatropic dysplasia
13. Noonan S.
14. Osteodysplasty (Melnick-Needles S.)
15. Osteogenesis imperfecta
16. Progeria
17. Pseudoachondroplasia
18. Shwachman-Diamond S.
19. Spondylocostal dysostosis (Jarcho-Levin S.)
20. Spondyloepimetaphyseal dysplasia with joint laxity
21. Spondyloepiphyseal dysplasia congenita

References

1. Felson B (ed): Dwarfs and other little people. Semin Roentgenol 1973;8:133–263
2. Taybi H, Lachman RS: Radiology of Syndromes, Metabolic Disorders, and Skeletal Dysplasias. (ed 4) St. Louis: Mosby-Year Book, 1996, p 1051

Gamut F-132

FETAL OR NEONATAL CHEST ANOMALIES OR MALFORMATIONS (US, PLAIN FILM)

1. Congenital heart defects
2. Congenital lobar emphysema
3. Congenital syndromes with thoracic malformation (eg, asphyxiating thoracic dysplasia {Jeune S.}; thanatophoric dysplasia; achondrogenesis; spondylocostal dysostoses {Jarcho-Levin S.}; chondroectodermal dysplasia (Ellis-van Creveld S.)
(See F-129–131)
4. Cystic adenomatoid malformation
5. Developmental (duplication) cyst (eg, bronchogenic; enteric; neurenteric)
6. Diaphragmatic hernia (congenital)
7. Esophageal atresia; tracheoesophageal fistula
8. Fetal hydrothorax
9. Laryngotracheal or bronchial atresia
10. Lymphangioma (cystic hygroma)
11. Pulmonary lymphangiectasia
12. Pulmonary hypoplasia
13. Pulmonary sequestration
14. Tracheal bronchus

Reference

1. Hubbard AM, Crombleholme TM: Anomalies and malformations affecting the fetal/neonatal chest. Semin Roentgenol 1998;33:117–125.

Gamut F-133

FLAT OR DEPRESSED DIAPHRAGM (UNILATERAL OR BILATERAL)

UNILATERAL

1. Intrathoracic mass (large unilateral)
2. Pleural effusion, hemothorax, chylothorax, empyema

3. Obstructive emphysema (COPD)
4. Tension pneumothorax

BILATERAL

COMMON

1. Asthma
2. COPD
3. Viral infection (incl. bronchiolitis in infants)

UNCOMMON

1. Air hunger (eg, severe congenital heart disease)
2. Hyperaeration with acidosis and dehydration
3. Obstructive emphysema, other causes (eg, cystic fibrosis {mucoviscidosis}; alpha-1 antitrypsin deficiency; cutis laxa; central or bilateral foreign bodies; vascular rings and anomalies; intratracheal lesions; paratracheal masses and cysts)
4. Pleural effusion, hemothorax, chylothorax (bilateral)
5. Tension pneumothorax (bilateral)

Reference

1. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 109–111

Gamut F-134

BILATERAL ELEVATED DIAPHRAGM

COMMON

1. Abdominal neoplasm or cyst (eg, huge ovarian)
2. Ascites; peritoneal hemorrhage or lavage; peritonitis
3. Expiratory or poor inspiratory film
4. Hepatomegaly and splenomegaly
5. Obesity
6. Pneumoperitoneum
7. Postmyocardial infarction S. (Dressler S.); postpericardiotomy S.
8. Pregnancy
9. [Subpulmonic pleural effusion, bilateral]
10. Trauma (incl. bilateral rib fractures with guarding)

UNCOMMON

1. [Diaphragmatic hernia, large]
2. Eventration, bilateral
3. Foreign body (laryngotracheal)
4. Lobar atelectasis, bilateral
5. Lupus erythematosus
6. Neuromuscular disease$_g$ (eg, poliomyelitis; myotonic dystrophy)
7. Pleural disease, bilateral
8. Pulmonary thromboembolism with infarction, bilateral
9. Subphrenic abscess, bilateral

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
2. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 109–111
3. Wexler HA, Poole CA: Neonatal diaphragmatic dysfunction. AJR 1976;127:617–622

Gamut F-135

UNILATERAL ELEVATED HEMIDIAPHRAGM

COMMON

1. Atelectasis
2. Distended stomach or splenic flexure of colon
3. Eventration
4. Idiopathic; normal variant
5. Inflammatory disease in abdomen (eg, subphrenic, perinephric, hepatic, or splenic abscess; pancreatitis; cholecystitis; perforated ulcer)
6. Interposition of colon between liver and right hemidiaphragm (Chilaiditi S.)

(continued)

7. [Normal lateral decubitus view (dependent side)]
8. Paralysis (eg, phrenic nerve palsy or paralysis, esp. from bronchogenic carcinoma; primary or metastatic mediastinal malignancy; extrinsic pressure from intrathoracic goiter or aortic aneurysm; trauma; iatrogenic-surgical transection) (See F-136)
9. Pleural disease (eg, acute pleurisy; fibrosis; old empyema, hemothorax or pleural tuberculosis; mesothelioma)
10. Postoperative (eg, lobectomy; pneumonectomy); postpericardiotomy S. (post-CABG)
11. Ruptured spleen or liver (esp. subphrenic hematoma)
12. Scoliosis (on side of concavity)
13. Splinting of diaphragm or guarding from acute process (eg, fractured rib; chest wall trauma; pulmonary infarct; pneumonia)
14. Subphrenic mass (eg, enlargement, tumor, cyst, or abscess of liver or spleen; carcinoma of stomach)
15. [Subpulmonic pleural effusion]
16. Trauma to phrenic nerve, thorax, cervical spine, or brachial plexus

UNCOMMON

1. [Diaphragmatic cyst or tumor, intrinsic or adjacent (eg, mesothelioma; metastasis; localized fibrous tumor of pleura; lipoma)]
2. [Diaphragmatic hernia (Morgagni; Bochdalek; traumatic; large hiatal)]
3. [Emphysema of contralateral lung]
4. Hydatid cyst of liver or spleen
5. Hypoplasia or agenesis of one lung
6. Neurologic or neuromuscular disease$_g$ (eg, polio; Erb's palsy; hemiplegia)
7. Retroperitoneal neoplasm
8. Thoracic kidney
9. Traumatic rupture of diaphragm
10. Venolobar S. (scimitar S.) (incl. accessory diaphragm)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Anderson LS, Forrest JV: Tumors of the diaphragm. AJR 1973;119:259–265
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Guenter CA, Whitelaw WA: The role of diaphragm function in disease. Arch Intern Med 1979;139:806–808
4. Reed JC: Chest Radiology. Plain Film Patterns and Differential Diagnoses. (ed 4) St. Louis: Mosby-Year Book, 1997
5. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, p 109

Gamut F-136

PARALYZED OR FIXED HEMIDIAPHRAGM

COMMON

1. Eventration
2. Phrenic nerve paralysis (See F-137)
3. Pleural disease, chronic (eg, tuberculosis; empyema; hemothorax)
4. Subphrenic inflammatory disease (eg, subphrenic, perinephric, hepatic, or splenic abscess; pancreatitis; cholecystitis; perforated ulcer)

UNCOMMON

1. Birth trauma (Erb's palsy)
2. Diaphragmatic hernia (esp. traumatic)
3. Fibrosing mediastinitis (esp. histoplasmosis; idiopathic)
4. Gastric dilatation, severe
5. Idiopathic
6. Muscle disease$_g$ (eg, amyotonia congenita)
7. Neoplasm of diaphragm, primary or secondary (incl. mesothelioma)
8. Neuromuscular disorder$_g$ (eg, poliomyelitis; Guillain-Barré S.; hemiplegia)
9. Pneumonia
10. Pulmonary infarct
11. Radiation therapy

References
1. Alexander G: Diaphragm movements and the diagnosis of diaphragmatic paralysis. Clin Radiol 1966;17:79–83
2. Simon G, Bonnell J, Kazantzis G, et al: Some radiological observations on the range of movement of the diaphragm. Clin Radiol 1969;20:231–233

Gamut F-137

PHRENIC NERVE PARALYSIS OR DYSFUNCTION

COMMON
1. Iatrogenic (eg, surgical injury; chest tube; therapeutic avulsion or injection; subclavian vein puncture)
2. Infection (eg, tuberculosis; fungus disease; abscess)
3. Neoplastic invasion or compression (esp. carcinoma of lung)

UNCOMMON
1. Aneurysm$_g$, aortic or other
2. Birth trauma (Erb's palsy)
3. Herpes zoster
4. Neuritis, peripheral (eg, diabetic neuropathy)
5. Neurologic disease$_g$ (eg, hemiplegia; encephalitis; polio; Guillain-Barré S.)
6. Pneumonia
7. Trauma

Reference
1. Prasad S, Athreya BH: Transient paralysis of the phrenic nerve associated with head injury. JAMA 1976;236:2532–2533

Gamut F-138

SEGMENTAL OR LOCALIZED ELEVATION (SCALLOPING), MOGUL OR MASS OF A HEMIDIAPHRAGM

COMMON
1. Abscess of liver, lung, or pleura (esp. amebic)
2. Asbestos-related pleural disease (pleural plaque)
3. Atelectasis of an upper lobe
4. Eventration (localized)
5. Hernia (eg, hepatic; Morgagni; Bochdalek; traumatic)
6. Normal scalloping
7. Pleural mass adjacent to diaphragm, other (eg, mesothelioma; localized fibrous tumor of pleura; lipoma; liposarcoma)
8. Subphrenic, hepatic or splenic abscess, neoplasm or cyst
9. Thoracic kidney

UNCOMMON
1. Cyst (eg, hydatid; bronchogenic)
2. Neoplasm of diaphragm (eg, fibroma; myoma; cystic teratoma)
3. Pulmonary sequestration (extralobar)
4. Segmental paralysis of phrenic nerve (See F-137)
5. Venolobar syndrome (scimitar S.) (pulmonary hypoplasia)

References
1. Kattan KR, Eyler WR, Felson B: The juxtaphrenic peak in upper lobe collapse. Semin Roentgenol 1980;15:187–193
2. Rivero HJ, Bowen AD, Bender TM, et al: Radiological evaluation of diaphragm and juxtadiaphragmatic lesions. Scientific exhibit, American Roentgen Ray Society, Boston, 1985
3. Yen HC, Halton KP, Gray CE: Anatomic variations and abnormalities in the diaphragm seen with US. RadioGraphics 1990;10:1019–1030

Gamut F-139

JUXTADIAPHRAGMATIC LESIONS IN CHILDREN

COMMON

1. Lymphoma$_g$; other lymphadenopathy
2. Neurogenic neoplasm$_g$ (eg, neurofibroma; ganglioneuroma; ganglioneuroblastoma; neuroblastoma)
3. Pleural effusion, free or loculated, benign or malignant; empyema
4. Pleural thickening

UNCOMMON

1. Diaphragmatic hernia (hiatal; Morgagni; Bochdalek; traumatic)
2. Cyst (pericardial; bronchogenic; hydatid)
3. Germ cell neoplasm, benign or malignant (esp. teratoma)
4. Hemangiopericytoma
5. Sarcoma (esp. Ewing sarcoma; also liposarcoma; osteosarcoma; rhabdomyosarcoma)

Reference

1. Rivero HJ, Bowen AD, Bender TM, et al: Radiological evaluation of diaphragm and juxtadiaphragmatic lesions. Scientific exhibit, American Roentgen Ray Society Meeting, Boston, 1985

Gamut F-140

SOLITARY THORACIC CALCIFICATION

COMMON

1. Asbestos related pleural disease; asbestos pleural plaque
2. Cardiovascular (eg, arteriosclerosis; aneurysm$_g$; mitral or aortic valve; coronary artery; intracardiac myxoma or thrombus; ligamentum arteriosum; old myocardial infarct) (See E-44)
3. Chest wall (esp. rib callus; costal cartilage calcification)
4. Granuloma (eg, tuberculosis; histoplasmosis, other fungus disease; nonspecific)
5. Lymphadenopathy (eg, tuberculosis; histoplasmosis; sarcoidosis; silicosis)
6. Mediastinal neoplasm or cyst (eg, mature teratoma; bronchogenic cyst; hemangioma; thymoma, intrathoracic thyroid; neurogenic neoplasm—schwannoma; ganglioneuroma; neuroblastoma)
7. Pericardial (eg, calcific pericarditis) (See E-45)
8. Pleural, other (eg, old empyema or hemothorax; tuberculosis) (See F-124)

UNCOMMON

1. Abscess of lung, chronic
2. Amyloidoma
3. Bronchogenic carcinoma engulfing a granuloma
4. Broncholith
5. Carcinoid.
6. Chest wall, other (eg, myositis ossificans; neoplasm of rib, breast, or chest wall; parasitic infection—guinea worm)
7. [Foreign body]
8. Fungus ball (mycetoma)
9. Hamartoma
10. Hematoma, old
11. Idiopathic
12. Lymphoma, treated; other necrotic or treated neoplasm
13. Measles pneumonia, atypical with nodular complex
14. Metastasis (See F-142)
15. Mucoid impaction
16. Neoplasm of lung, other rare (eg, leiomyosarcoma; intrapulmonary teratoma)
17. Pneumonia, organized; inflammatory pseudotumor (plasma cell granuloma—rarely)
18. Pulmonary artery aneurysm or hypertension
19. Pulmonary thromboembolism
20. Thrombus in IVC or SVC
21. Varix or hemangioma of lung (phleboliths)

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

References

1. Agrons GA, Rosado de Christenson ML, Kirejczyk WM, et al: Pulmonary inflammatory pseudotumor. Radiologic features. Radiology 1998;206:511–518
2. Felson B: Chest Roentgenology. Philadelphia: WB Saunders, 1973
3. Felson B: Thoracic calcifications. Chest 1969;56:330–343
4. Salzman E: Lung Calcifications in X-ray Diagnosis. Springfield: CC Thomas, 1968
5. Swischuk LE, John SD: Differential Diagnosis in Pediatric Radiology. (ed 2) Baltimore: Williams & Wilkins, 1995, pp 47–50

Gamut F-141

MULTIFOCAL OR WIDESPREAD THORACIC CALCIFICATIONS

COMMON

1. Chest wall (eg, costal cartilages; rib fractures with callus)
2. Fungus disease, nodal and parenchymal (esp. histoplasmosis; coccidioidomycosis; candidiasis—late)
3. Lymphadenopathy (eg, tuberculosis; histoplasmosis; sarcoidosis; silicosis)
4. Pleural (eg, asbestos-related pleural disease; talcosis; tuberculosis; old empyema or hemothorax)) (See F-124)
5. Silicosis; coal-worker's pneumoconiosis
6. Tracheobronchial cartilage (physiologic)
7. Tuberculosis (not miliary)
8. Vascular (diffuse/extensive atherosclerosis)

UNCOMMON

1. Alveolar microlithiasis
2. Amyloidosis
3. [Bronchography; lymphangiography]
4. Broncholithiasis
5. Chickenpox pneumonia, healed
6. [Foreign bodies]
7. Hamartomas of lung, multiple (incl. Carney's triad)
8. Idiopathic pulmonary ossification (osteopathia)
9. Lymphoma$_g$ after radiation therapy
10. Metastases (See F-142)
11. Metastatic calcification (metabolic calcinosis) (eg, hyperparathyroidism, primary or secondary {renal osteodystrophy with renal failure; uremia; hemodialysis}; hypervitaminosis D; milk-alkali syndrome; excessive calcium administration)
12. Parasitic disease in lung, pleura, thoracic muscles, or subcutaneous tissues (eg, paragonimiasis; pentastomiasis—*Armillifer* infection; dracunculiasis—guinea worm infection; cysticercosis)
13. Pseudoxanthoma elasticum
14. Pulmonary artery atherosclerosis (eg, pulmonary hypertension; Eisenmenger complex)
15. Pulmonary hemosiderosis (mitral stenosis; idiopathic {Ceelen S.}, esp. on CT)
16. Rheumatoid nodules
17. Sarcoidosis
18. [Tin, barium, or antimony pneumoconiosis]
19. Tracheopathia osteoplastica

[ ] This condition does not actually cause the gamuted imaging finding, but can produce imaging changes that simulate it.

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Gamut F-142

CALCIFIED PULMONARY METASTASES

COMMON

1. Chondrosarcoma
2. Mucinous (colloid) adenocarcinoma (eg, colon; breast)
3. Osteosarcoma
4. Papillary (psammomatous) adenocarcinoma (eg, ovary; thyroid)

UNCOMMON

1. Cystosarcoma phylloides
2. Dystrophic calcification in metastatic foci (esp. post-radiation or chemotherapy)
3. Epithelioid hemangioendothelioma
4. Germ cell neoplasm
5. Leiomyomatosis (benign metastasizing leiomyomas)
6. Medullary carcinoma of thyroid
7. Mesenchymoma, malignant
8. Synovial sarcoma

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Gamut F-143

EGGSHELL CALCIFICATIONS IN THE CHEST (ESP. MEDIASTINAL LYMPH NODES)

COMMON

1. Aneurysm of great vessels
*2. Idiopathic
*3. Silicosis; coal-worker's pneumoconiosis

UNCOMMON

*1. Amyloidosis
*2. Fungus disease (esp. histoplasmosis) (See F-74-S)
*3. Hodgkin's lymphoma, treated
4. Pulmonary artery calcification in chronic pulmonary hypertension (eg, atrial septal defect (ASD); cor pulmonale)
*5. Sarcoidosis
*6. Tuberculosis

* Primarily in mediastinal or hilar lymph nodes.

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