The Intercostal Chest Drain—the ‘C S’ Way...!

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The Intercostal Chest Drain (ICD) is a CRUCIAL SAVIOUR for All Thoracic Surgical Pathology

ICDs need safe insertion and proper management. This is done by 14 CORRECT STEPS (7 for insertion and 7 of management) that can be denoted by the use of the two letters of ‘C’ and ‘S’ [1]

1. Cautious Siting (INSERTION) [2]

- i. Corroborate Side of insertion, by clinical examination and a recently done chest X-ray, available at the bedside of the patient
- ii. Choose Site for insertion on chest wall. The preferred site is the Triangle of Safety. Other sites will need image guided marking to localize area of need of ICD.
- iii. Copious Soother, the use of large amounts of local anaesthesia, (preferred is 1% lidocaine with adrenaline) at site for insertion and along area of track dissection
- iv. Create Shaft by a 2.5-cm incision, with blunt dissection through chest wall with final split of the intercostal muscles, and using the finger to confirm entry into the chest cavity
- v. Controlled, Soft entry into the chest. The stylet of the tube is to be used as a guide for positioning and NOT as a penetrating instrument (NO FORCE to be USED)

- vi. Capable Sutures is the use of strong sutures (preferred is 2/0 Ethilon) to anchor tube to chest wall, after confirming a respiration related swing of the fluid level, in the tube going to the underwater seal
- vii. Check Snapshot, an immediate bedside, sitting chest X-ray, to confirm entry into chest, and desired effect.

2. Careful Scrutiny (MANAGEMENT) [3]

- i. Continuous Swing of respiration related oscillations in tube below water level, to be ensured, indicating tube patency
- ii. Connections Secure, between emerging drain from chest, tubing, and the underwater seal drainage bottle (or the commercially available, multi chamber, compact units, like Pleurovac)
- iii. Constant (under water) Seal is essential to recreate the negative pressure in the pleural cavity, which allows re-expansion of the lung. This should not be lost. The water seal bottle acts as a non-reflux valve and should be kept 1 m below the chest, to prevent siphoning of the water seal fluid into the chest.
- iv. Consider Suction, if needed. This is to be done under supervision, with a low pressure suction of between 5 and 20 cm of water.
- v. Commend Spirometry. Chest physiotherapy is a must and hourly incentive spirometry helps re-expansion of the lung.
- vi. Condition and Shadow improvement, noted by regular clinical examination and serial chest X-ray follow-up.
- vii. Co-ordinated Separation. The timing of the ICD removal is on complete clinical and radiological expansion of the lung, with no air leak (as evidenced by the absence of bubbling in the underwater seal when patient coughs). A 4–6 h ‘Trial of Clamping’ may be

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tried to be sure of this. The method of removal of the ICD is by two pairs of hands, with one pair cutting the tube retaining suture and gently easing the tube out (with the patient instructed to hold the breath), and the other pair simultaneously closing the track by a knot with the a preplaced ‘sealing stitch’

3. Complications and Solutions for ICDs [3]—(also 7..!)

- i. Central Structure injury (cardiac and mediastinal, during insertion), a true catastrophe, call for cardiothoracic help and react fast to treat the shock.
- ii. Crooked Stationing, reflecting a wrong position of tube [subcutaneous or abdominal]). This will need full re-insertion of tube under aseptic precaution.
- iii. Conduit Shuts down (tube gets blocked). This needs proper/frequent ‘milking’ and clearing of blood clots/fibrin plugs in the tube.
- iv. Chest (tube) Slippage (whole drain or just the side drain holes come out of chest wall). Reposition the chest tube into the chest under aseptic precaution.
- v. Crepitus Subcutaneous (surgical emphysema), usually settles with time, but if air leak around chest drain site, may need a deep skin suture at the site to make it air tight
- vi. Confusing Shift (paradoxical/re-expansion pulmonary oedema), especially in long standing effusions/empyema, avoided if drainage is controlled to empty out of the chest gradually, and not all at one time.
- vii. Channel (wall) Suppuration (chest wound/chest cavity infection). Both insertion and subsequent daily management need full aseptic technique at all times.

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