Neuroanesthesia and Intensive Care

Primary cutaneous mucormycosis complicating the use of adhesive tape to secure the endotracheal tube

[La mucormycose cutanée primaire nuit à l'usage de ruban adhésif utilisé pour assurer l'immobilité du tube endotrachéal]

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Purpose: To report a rare case of primary cutaneous mucormycosis (PCM), complicating securing of the endotracheal tube with adhesive tape.

Clinical features: A 39-yr-old woman with systemic lupus erythematosus (SLE) developed four annular, punched out ulcers with a necrotic centre and elevated border in a linear distribution over the left cheek, under the tape securing the endotracheal tube. A tissue biopsy revealed broad, branching, nonseptate hyphae found in epidermis and dermis consistent with mucormycosis, best demonstrated with silver staining. Cultures were positive for Rhizopus species. Treatment with *iv* amphotericin B was successful.

Conclusion: Because of the rarity of the disease and the difficulty of culturing the causative organism, diagnosis of mucormycosis is often elusive. Tissue biopsy and microscopic visualization of nonseptate hyphae with right-angled branching are the only methods for making the diagnosis. Skin biopsy of new ulcerative or plaque-like lesions should be obtained in immunocompromised patients. Early diagnosis and prompt treatment are critical for favourable outcomes in PCM.

Objectif : *Présenter un cas rare de mucormycose cutanée primaire (MCP) qui a compliqué l'application de ruban adhésif utilisé pour assurer l'immobilité du tube endotrachéal.*

Éléments cliniques : *Il s'est développé, chez une femme de 39 ans atteinte de lupus érythémateux disséminé (LED), quatre ulcérations annulaires à l'emporte-pièce avec centre nécrotique et bords surélevés selon une distribution linéaire au-dessus de la joue gauche, sous le ruban adhésif utilisé pour assurer la stabilité du tube endotrachéal. Une biopsie tissulaire a révélé de larges hyphes ramifiés et non cloisonnés, découverts dans l'épiderme et le derme et correspondant à une mucormycose, mieux démontrée avec de la coloration d'argent. Les cultures ont prouvé la présence de Rhizopus. Le traitement avec de l'amphotéricine B iv a été un succès.*

Conclusion : *Le diagnostic de mucormycose est souvent difficile à poser étant donné la rareté de sa manifestation et la difficulté de culture de l'organisme responsable de la maladie. La biopsie tissulaire et l'examen microscopique des hyphes non cloisonnés avec ramifications à angle droit sont les seules méthodes de diagnostic. La biopsie de nouvelles lésions de type ulcéreuses, ou du genre plaque, doit se faire chez des patients immuno-déprimés. Le diagnostic précoce et le traitement rapide sont essentiels dans l'évolution favorable de la MCP.*

MUCORACEAE are a class of fungi that can cause a variety of infections in humans. In contrast to the widespread distribution of mucoraceae, primary cutaneous mucormycosis (PCM) in humans is limited, in most cases, to patients with severe immunocompromise, diabetes mellitus, or trauma. Even so, PCM is rather rare in any of these patient groups. A previous case of PCM complicating the use of tape to secure the endotracheal tube has been reported.[1]

Case report

A 39-yr-old woman developed systemic lupus erythematosus (SLE) six months prior to admission. Subsequently, she developed proteinuria and mild

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renal impairment, and diffuse proliferative glomerulonephritis (type IV) was diagnosed based on kidney biopsy. She was treated with high dose prednisone (1 $mg \cdot kg^{-1} \cdot day^{-1}$) and cyclophosphamide (1000 $mg \cdot m^2 \cdot month^{-1}$). She came to the hospital with fever, rigor, cough, and shortness of breath and pneumonia was diagnosed. Shortly after hospital admission, her respiratory status worsened and necessitated endotracheal intubation. Culture of sputum and bronchoalveolar lavage were both negative. Because she was not responding to broad-spectrum antibiotics, an open lung biopsy was obtained, which showed pneumocystis carinii pneumonia. She was treated with trimethoprim-sulfamethoxazole (15 $mg \cdot kg^{-1} \cdot day^{-1}$) and prednisone (1 $mg \cdot kg^{-1} \cdot day^{-1}$). The patient developed adult respiratory distress syndrome requiring prolonged ventilation. The endotracheal tube was secured using adhesive tape. On the fourth week after admission, she developed four annular, punched out ulcers with a necrotic centre and elevated border in a linear distribution over the left cheek, under the tape securing the endotracheal tube (Figure).

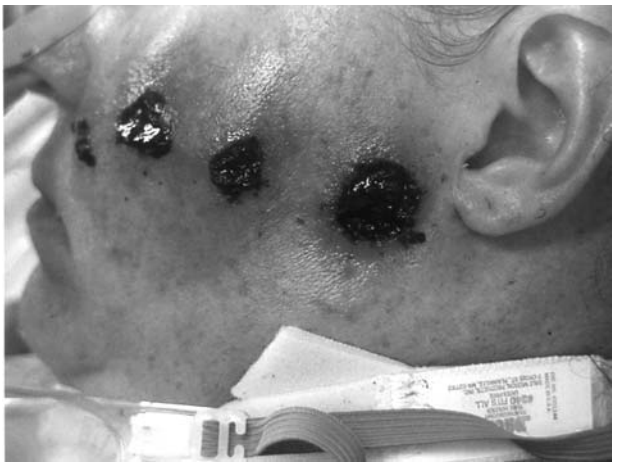

FIGURE Annular ulcerations with a necrotic centre (primary cutaneous mucormycosis) in a linear distribution under the tape securing the endotracheal tube.

Blood counts showed platelets of $169 \times 10^9 \cdot L^{-1}$, hemoglobin 87 $g \cdot L^{-1}$, and a leukocyte count $6.0 \times 10^9 \cdot L^{-1}$ with normal differential counts. A tissue biopsy revealed intense dermal inflammation with broad, branching, nonseptate hyphae found in epidermis and dermis consistent with mucormycosis best demonstrated with silver staining. Cultures were positive for Rhizopus species. Computed tomography of the head revealed no evidence of involvement of other maxillofacial sites. Translaryngeal intubation was converted to a tracheostomy. She was treated with amphotericin B (1 $mg \cdot kg^{-1} \cdot day^{-1}$) for a total cumulative dose of 3 g. Local debridement was not required. She recovered well with scarring over the skin lesions. Pneumonia and respiratory failure responded to treatments with trimethoprim-sulfamethoxazole and prednisone. After weaning from mechanical ventilation she had a tracheal decannulation.

Discussion

The development of PCM requires a disruption of both mechanical and immunological barriers. PCM has been reported with many conditions that disrupt skin integrity, surgical wound, burn, trauma, insect bite, *iv* catheter and, in this case, use of a wide elastic securing tape to immobilize the endotracheal tube.[2,3]

A skin biopsy of new ulcerative or plaque-like lesions should be obtained in immunocompromised patients. Specimens should be submitted for culture and histological examination using Gomori's methenamine silver staining. Diagnosis is dependent on demonstrating the organism in the tissue of a biopsy specimen. Typically, the mucorales appear as broad, nonseptate hyphae with branches occurring at right angles.

Management includes surgical debridement, antifungal treatment, and restoration of host immune defenses by stopping immunosuppressive drugs.

The standard therapy for cutaneous mucormycosis is amphotericin B. Doses typically range from 1.0 to 1.5 $mg \cdot kg^{-1} \cdot day^{-1}$. The duration of antifungal therapy depends on the response of infection to treatment. Our patient needed a total of 3.0 g of amphotericin B.

While a variety of methods exist for securing an endotracheal tube, there has been little research on their safety and efficacy. Patients are generally ventilated initially through an endotracheal tube; changing to a tracheostomy tube is usually considered when the need for mechanical ventilation is prolonged. In most patients optimal timing for conversion from endotracheal intubation to tracheostomy is controversial.

Prognosis depends on the underlying disease. Adam *et al.* reported ten cases of cutaneous mucormycosis where surgical debridement and *iv* amphotericin B completely eradicated the infection.[4] As with aspergillosis, cutaneous infection with mucoraceae is associated with an excellent prognosis in comparison to that of deeply invasive disease.[3,5]

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