

Fibrillar - a novel antifungal delivery method: Most unusual case of *Aspergillus fumigatus* empyema and bronchopleural fistulae after right sided pneumonectomy, treated successfully by innovative salvage therapy

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Background

- Despite the recent advances in medical technology, empyema thoracis (ET) remains a debilitating disease process with considerable morbidity and mortality.
- Optimal effective treatment for ET requires control of the infection with antibiotics, evacuation of the pus, and reexpansion of the lung [1].
- Conservative management is the first choice. Failed nonsurgical management or chronic, multiloculated ET are managed surgically [including decortication, video-assisted thoracoscopic surgery, rib resection, and open drainage with or without a musculoskeletal flap reconstruction] [2,3].
- In those debilitated patients with chronic empyema thoracis, extensive thoracoplasty and sophisticated muscle transfer techniques may be poorly tolerated. Among this patient population, the surgical technique first introduced by Leo Eloesser in 1935 [4] and later modified by Symbas and colleagues in 1971 [5] provides an alternative procedure for the evacuation of the empyema thoracis.
- We present a most unusual and challenging case of *Aspergillus fumigatus* [AF] empyema and bronchopleural fistulae after right sided pneumonectomy.
- The topography and expanse of fungal growth within the chest cavity made drug delivery and sustained exposure to antifungal agent a challenge.
- Literature search/consultation with experts was of limited benefit.
- An innovative and novel antifungal delivery method was planned as a salvage to treat the infection.

Case study

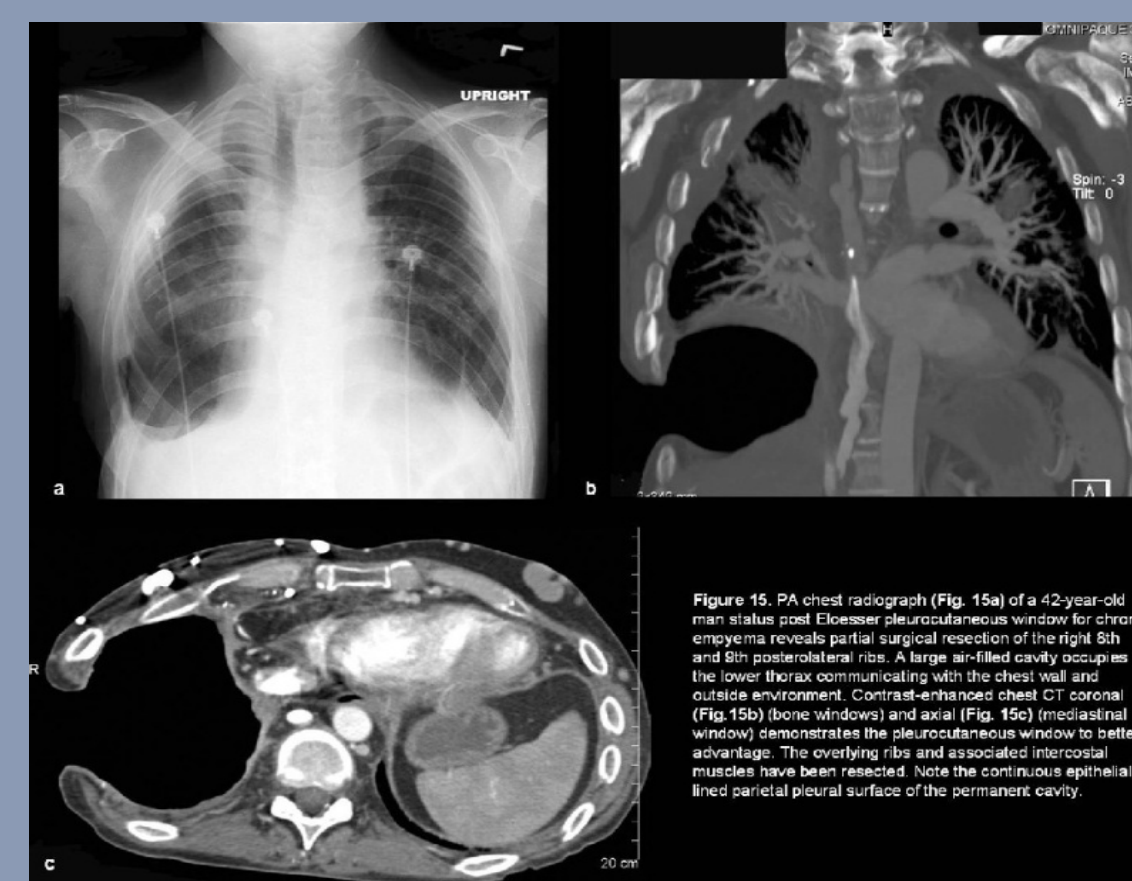
- A 52-year old gentleman, heavy smoker for 35 years, was hospitalised with chest symptoms and diagnosed with right upper lobe mass.
- He underwent an elective pneumonectomy in 2003.
 - Histology showed well differentiated squamous cell carcinoma, T3N1M0
 - His postoperative period was complicated by development of a bronchopleural fistula.
- An Eloesser flap (open stoma) was created to drain the space. This followed long term follow up review in outpatient clinic.
- In February 2010, review in clinic revealed the presence of thick layer of deposit with a green sheen visible through Eloesser flap on the inner wall of chest cavity.
- Tissue samples for culture isolated pure growth of *Aspergillus fumigatus*.
 - Systemic treatment with voriconazole did not clear the fungus.
 - Salvage therapy was planned, discussed with patient and consent obtained.

Procedure

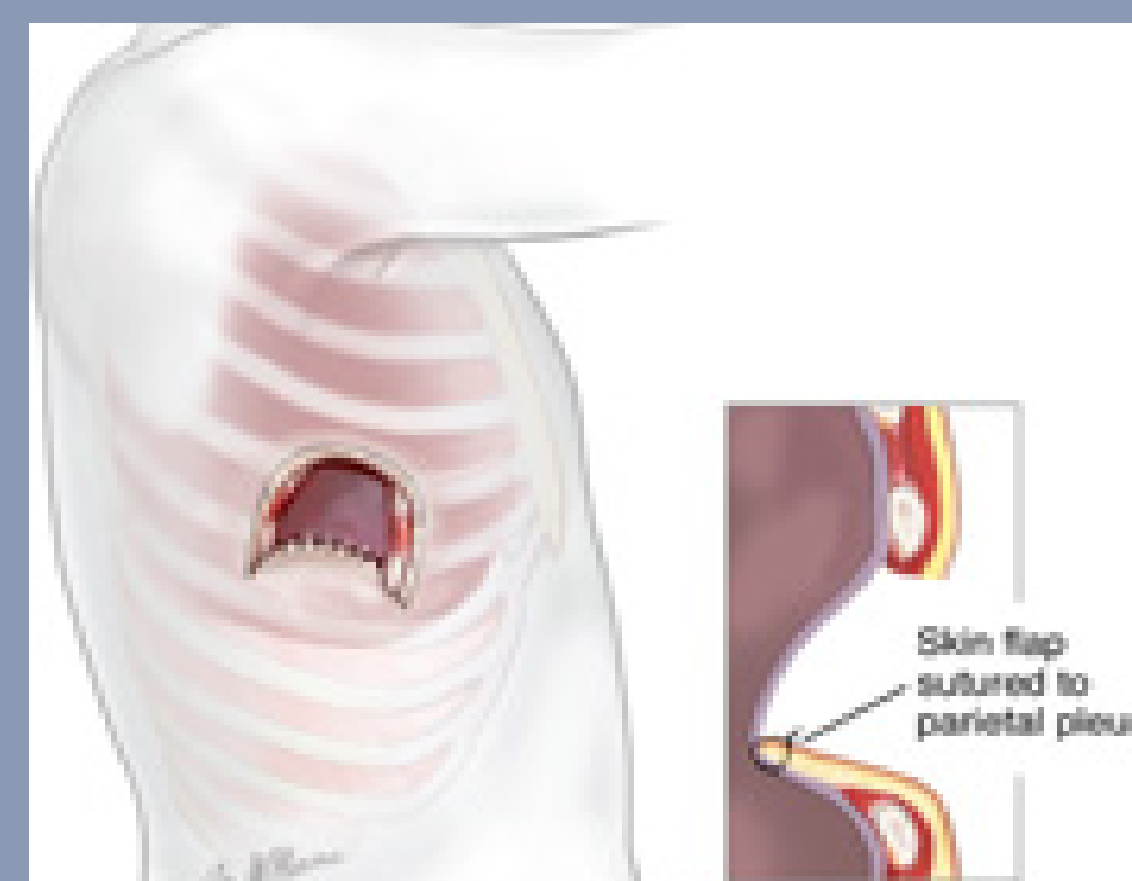
- Access to inside of chest cavity through Eloesser flap, debridement of thick layer of deposit and amphotericin powder insufflation to cover pleural surface.
- This was packed with Fibrillar [haemostat] to allow sustained exposure to amphotericin.
- The patient had four such procedures and systemic posaconazole 400mg q12h po was continued postoperatively.
- He made slow but good progress and increased some weight by April 2010.
- He was kept on long term posaconazole and clinic followup cultures were negative for fungus.

Surgical management

- Eloesser flap, a fenestration allowing allowing air and purulent material to exit and preventing the entry of air into the pleural space.



- CXR and CT thorax demonstrating Eloesser flap.



- Skin flap sutured to pleura.



- A real photo showing Fungal infection (white) and amphotericin powder soaked fibrillar layers.



- An absorbable haemostat, conforms, adheres and melts into bleeding tissue. Lightweight layers and tufts – peel off as little or as much as desired. Proven effective against a broad range of gram-positive and gram-negative organisms.

Discussion

- Fungal growth: Body temperature, humidity, nutrients, oxygen and access to environment provided perfect conditions for fungal growth.
- Systemic antifungals failed to clear the fungus possibly due to limited vascularity of the area.
- The challenge:
 - The topography of chest cavity and extensive spread of fungus along pleural surface of presented a challenge for choice of delivery method, choice of agent, dose, duration, and specially sustained exposure to the antifungal agent.
- Fibrillar, an absorbable hemostat was used as a novel delivery method for sustained exposure to amphotericin B.
- Followup: The patient continues to be infection free and in good health.

References

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