

Uniportal Vats and Decortication for Empyema Thoracis in a Premature 900 Gram Neonate

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Summary: Traditionally open thoracotomy has been the preferred access route for decortication in patients with empyema thoracis. With advancements in minimally invasive surgery, video assisted thoracoscopic surgery (VATS) has become widespread. Further advancements has seen a change from the standard 3 port VATS to the use of a single utility wound. We present the case of a premature 900 gram neonate successfully treated by uniportal VATS and decortication. VATS has many benefits over open thoracotomies in its dampened systemic response, disturbance of neonatal physiology and musculoskeletal development. Single port VATS adds an aesthetic value to this overall outcome.

Keywords: Empyema thoracis, Neonatal, VATS, Decortication

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I. Introduction

Empyema is a Greek word meant to denote the accumulation of pus within a pre-existing anatomical cavity. It was first described in the Hippocratic corpus occurring in the pleural space. The Greeks advocated surgical evacuation following failure of medical therapy for this condition. Today, management depends on the pathological stage of the disease and operative intervention is usually the last resort but should not be delayed if indicated. We present a case of empyema thoracis in a 900 gram premature neonate treated with uniportal VATS and decortication following failure of medical therapy and chest drainage.

II. Case Report

A day 24 of life, 900 gram premature girl was referred to the Department of Cardiothoracic Surgery following failed medical therapy and chest tube drainage for a right empyema thoracis. She was the 2nd twin delivered at 31 weeks and 4 days following an emergency Caesarian section for twin-to-twin transfusion syndrome. She required invasive mechanical ventilation for the first 48 hours of life and was re-intubated on day 8 for sepsis attributed to pneumonia. Blood cultures were positive for methicillin-resistant Staphylococcus aureus (MRSA). Despite intravenous antibiotics a chest x-ray on day 16 showed a parapneumonic effusion confirmed by ultrasonogram thorax with increased pleural thickness. A chest tube was inserted and drained 15mls of turbid fluid. She continued to deteriorate with multiple episodes of apnoea despite optimization of ventilatory strategies, chest drainage and antibiotics. After a week of failed medical therapy, operative intervention was sought. On day 27 of life a uniportal VATS and decortication was performed. Access was via a muscle-sparing posterolateral thoracotomy at the 5th intercostal space. Findings were suggestive of a grade 3 empyema with dense adhesions noted throughout the thoracic cavity, marked between the lower lobe and diaphragmatic surface. Post decortication 95% lung expansion was attained with minimal air leak. She was de-escalated to non-invasive mechanical ventilation on post-op day 8 with chest drain weaned off suction and subsequently removed after x-ray demonstrated satisfactory lung expansion. Subsequent clinical progress was stormy, requiring re-intubation for another episode of sepsis, which resolved with medical treatment. After multiple attempts at weaning to room air failed, she was diagnosed with chronic lung disease requiring domiciliary mechanical ventilation. She was discharged home after welfare assistance was obtained for her ventilator.

III. Discussion

Parapneumonic effusions are seen in up to 10% of children treated for pneumonia.¹ These effusions are usually free flowing and rarely require drainage. Progression from the initial exudative to fibroproliferative and finally the organized phase is influenced by a balance between host immune response, bacterial virulence and timing of medical treatment. Common causative organisms include Group A Streptococci and Staphylococcus aureus. In this child MRSA (Methicillin Resistant Staphylococcus aureus) was isolated from blood culture. The infection was likely acquired during hospitalization following prolonged mechanical ventilation. Despite

intravenous antibiotics and chest drainage, the child continued to deteriorate.² Intrapleural fibrinolysis was not attempted in this case due to lack of experience with its use in low birth weight neonates.³ Instead, surgical consultation was sought.

Therapeutic goals of empyema thoracis include eradication of pleural infection, resolution of pleural fluid and sufficient lung re-expansion.² The decision for decortication was made in view of failure of medical treatment. A minimally invasive approach was chosen as it generally reduces analgesic requirements, post-operative stay, wound infection rates while maintaining a better cosmetic outcome.⁴ VATS has been used successfully in low birth weight neonates for PDA ligation and decortication, but most cases necessitated insertion of 1-2 working ports in addition to a camera port.⁵ In this child, a single utility wound sufficed for introduction of a thoracoscope and forceps. Access was via a muscle sparing right postero-lateral thoracotomy. Muscle sparing access has shown to reduce the incidence of long-term thoracic deformities as it does not disrupt the integrity of the intercostal muscles nor require vigorous rib retraction.^{4,5} Additionally, VATS reduces the risk of intra-operative hypothermia compared to open thoracotomies.⁴

Despite the uncertainty of longterm outcome for this unfortunate girl, she generally recovered from her life threatening episode and underwent successful VATS and decortication at a corrected gestational age of 35 weeks and 3 days weighing just 900 grams. This proves that uniportal VATS is feasible in low birth weight neonates with pleural empyema if expertise and facilities are available.

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