The Management of Spontaneous Pyopneumothorax and Empyema in Young Children*

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The purpose of this communication is to present our experience of spontaneous pyopneumothorax and empyema in young children over a ten-year period (1953-1963), and in the light of this, to suggest a rational approach to the management of both conditions. Our unit serves a large population area, as a result of which the vast majority of patients who require chest surgery are referred to us.

Material
During the period under review, 23 children suffering from spontaneous pyopneumothorax and eight from empyema were encountered. As the treatment of each differs in our hands, it is proposed to deal with each separately.

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Spontaneous Pyopneumothorax
The age range in the 23 children was from one month to two years, and the sexes were equally affected. In all, there was a preceding history of acute chest illness, followed by sudden deterioration in the child’s condition coinciding with the onset of dyspnea. At this juncture, chest x-ray film showed the presence of air and fluid in one pleural cavity, with gross displacement of the heart and mediastinum to the contralateral side (Figs. 1 to 4). The diagnosis was confirmed in all by obtaining pus on paracentesis, and culture of this fluid yielded a growth of Staphylococcus aureus in most. All were then treated by inserting a rubber catheter through the second interspace anteriorly under a local

Figure 1: An infant with right sided pyopneumothorax and marked displacement of heart and mediastinum to the left. Figure 2: The same infant as in Fig. 1 following treatment.
anesthetic, and thereafter, the catheter was attached to water-seal drainage. The affect of this simple maneuver was both dramatic and gratifying, as without exception complete re-aeration of the lung was achieved within 24 to 48 hours, following which the catheter was removed after a further 24 hours. During this period, appropriate antibiotic cover was administered, comprising crystalline penicillin in the earlier cases and either tetracycline or chloramphenicol later in the series.

Only one complication was encountered, and this was a boy, aged three months. Despite apparent cure of the pyopneumothorax, he remained gravely ill and extremely toxic. Within a short space of time, signs of increasing intracranial tension became manifest, and he was transferred to a neurosurgical unit with a suspected cerebral abscess due to hematogenous spread.

The remainder progressed satisfactorily, and all were restored to full health on discharge from hospital. There was no death.

**Empyema**

Eight children were transferred from other centers with the diagnosis of empyema, and in all it followed an attack of pneumonia. As in spontaneous pyopneumothorax, the onset of empyema produced a worsening in the child's condition, with hectic fever, dyspnea, and intense toxemia. Clinical examination at this time revealed marked impairment of percussion and virtually absent breath sounds, and chest x-ray film demonstrated opacification of the affected side due to the presence of fluid. Examination of the pleural aspirate yielded *Staphylococcus aureus* in five, Pneumococcus in two, and no significant growth in the eighth.

After confirmation of the diagnosis, all were treated by formal rib resection and drainage. The tube was retained in position until drainage had ceased, the underlying lung had become fully re-expanded, and the empyema cavity had been totally obliterated (verified where indicated by a sinogram). No complications ensued, and all eight children so treated made a very satisfactory recovery (Figs. 5 and 6).

**Discussion**

Since the advent of antibiotics, empyema is much less frequently met with than pre-
Acute respiratory infections in infants and young children, however, are still commonplace, and whenever the offending organism is *Staphylococcus aureus*, the danger of local complications in the form of either empyema or pyopneumothorax is ever present. The onset of either is heralded by intense dyspnea and deterioration in the child's condition.

Before reaching the diagnosis, various other entities may have to be excluded. An inhaled foreign body in a young child may produce intense dyspnea and cyanosis, but the x-ray appearances show characteristically an area of atelectasis or consolidation, and the foreign body may be seen if it is radiopaque. In congenital obstructive lobar emphysema, (Fig. 7) the x-ray appearances may be strikingly similar to those of spontaneous pyopneumothorax. The clinical history is invaluable in distinguishing the two; however, as in congenital obstructive lobar emphysema the symptoms arise at, or shortly after, birth, and comprise recurrent attacks of cyanosis and dyspnea of increasing severity.

Pyopneumothorax in infants and young children resulting from primary staphylococcal pneumonia differs radically from pulmonary disease arising during the course of generalized staphylococcal pyemia. Such patients are much more gravely ill, and the prognosis is infinitely worse, depending on the site and extent of the metastatic pyemic abscesses.

In the management of children with tension lesions resulting from staphylococcal
pneumonia, there is still considerable controversy. Davidson\textsuperscript{1} recorded his experience with tension lesions in 24 children, and he advocated conservative measures in the form of antibiotic therapy, sedation, and occasionally tracheostomy where necessary. In many of his series the fluid and air were absorbed spontaneously within several days, but these were manifestly air cysts arising at the site of previous staphylococcal abscesses.\textsuperscript{1} When pyopneumothorax is present, however, a more active policy must be adopted, and we do not hesitate in the insertion of an intercostal catheter to permit prompt egress of both air under tension and infected fluid from the pleural cavity. Wynn-Williams\textsuperscript{8} recorded four infants treated successfully in this fashion, and it proved life-saving in a neonate with the condition.

In a comprehensive review of empyema in 125 children, Hoffman\textsuperscript{4} found \textit{Staphylococcus aureus} to be the cause in 28 cases, of whom seven presented as tension pyopneumothoraces, necessitating prompt drainage as already outlined.

Primary staphylococcal pneumonia is a suppurative infection with abscess formation, and pyopneumothorax complicates 25 to 33 per cent of all such cases demanding active treatment. The more innocuous air-containing cysts without pus (pneumatoceles) can be treated expectantly.

\textbf{SUMMARY}

Twenty-three young children suffering from spontaneous pyopneumothorax complicating staphylococcal pneumonia are presented, and a plea is made for active, prompt treatment in such cases in the form of intercostal drainage under local anesthesia. All made speedy and complete recovery.

Eight young children with empyema were encountered during the same ten-year period, and all were treated successfully by rib resection and drainage.

\textbf{RESUMEN}

En 23 casos de niños afectados de neumotórax espontáneo como complicación de la neumonía estafilocócica el autor practicó el drenaje intercostal bajo anestesia local. Este proceder fue seguido de rápida y completa curación en todos los casos.

Ocho niños pequeños con empiema fueron tratados con éxito por resección costal y drenaje.

El autor recomienda eficazmente este tipo de tratamiento en casos similares.

\textbf{RESUMÉ}

L’auteur présente 23 observations de jeunes enfants atteints de pyo pneumothorax compliquant une staphylococccie pulmonaire. Il insiste sur la nécessité d’opposer à de tels cas un traitement actif et rapide sous forme d’un drainage intercostal à l’anesthésie locale.

Tous guérirent rapidement et complètement. Pendant la même période de 10 ans, l’auteur a eu à s’occuper de 8 jeunes enfants atteints de pleurésie purulente. Tous furent traités avec par résection costale et drainage.

\textbf{ZUSAMMENFASSUNG}


Während der gleichen Zehnjahresperiode wurden 8 kleine Kinder mit Empyem beobachtet, und alle wurden 8 kleine Kinder mit Empyem behandelt, und alle wurden mit Erfolg durch Rippenresektion und Drainage behandelt.

\textbf{REFERENCES}


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