Thoracic empyema
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A role for primary video assisted thoracoscopic surgery?

As long ago as 300 BC, Hippocrates commented that a person “with an empyema ... shall die on the fourteenth day, unless something favourable supervene”. After identifying the affected side he would recommend drainage with a tin tube. However, in the ensuing years, great debate surrounded the benefits of opening the chest. When Napoleon’s surgeon, Dupuytren, developed an empyema in 1835, he was heard to comment that “he would rather die at the hands of God than of surgeons”. He lived 12 days. Over one and a half centuries later the role of the surgeon in the management of empyema remains controversial. This leading article will review the potential role for primary video assisted thoracoscopic surgery (VATS) in thoracic empyema in children.

TREATMENT AIMS IN EMPYEMA

The aim of empyema treatment is to return the lung to normal function. This is achieved by sterilising the pleural cavity with antibiotics, drainage of fluid, and expansion of the lung. There are three stages in empyema formation. The first is the exudative stage, during which fibrinous material forms on both pleural surfaces. As more fibrin is deposited, the pleural surfaces may be joined by fibrinous septae which cause the fluid to become loculated. This is the fibrino-purulent stage and may last several weeks. The final stage is the organisational stage, and is characterised by proliferation of fibroblasts on the pleural surfaces, which form an inelastic covering preventing adequate lung expansion (fibrothorax). Early intervention prevents this third stage from developing. Currently the primary treatment options are: antibiotics alone; recurrent thoracentesis; insertion of chest drain alone or in combination with fibrinolytics; open decortication; or VATS.

THE RATIONALE FOR VATS

Since the 1960s there has been a growing interest in the use of minimally invasive surgery in children. Initial procedures were diagnostic, but with the development of more sophisticated instruments and imaging systems, more procedures are being performed endoscopically, including thoracoscopic surgery. VATS is performed under general anaesthesia with either one or both lungs ventilated, depending on the size of the child. Two or three ports are made in the chest with the child in the lateral decubitus position (fig 1). One port is utilised for the camera and the others for grasping instruments, which can be rotated round the ports if required. Insufflation of the chest cavity with CO2 aids collapse of the lung for better visualisation. In empyema, the free fluid is evacuated and loculations drained under thoracoscopic visualisation. The fibrinous adhesions are separated and the pleural debris removed from the pleural lining using endoscopic grasping forceps or by extensive irrigation and suction. Following the procedure, one or two chest drains are then placed in the portholes.

VATS has the advantage over open surgery of limiting the morbidity to skin, muscles, nerves and supporting structures which occurs following a large surgical incision (fig 2). These include: pain, both acute and long term; infection; limitation of movement; and cosmetic scarring. Scoliosis can occur in children following open thoracotomy with a reported incidence of up to 15%. In addition to damaging the superficial structures, exposing the internal organs in small children may cause drying of tissues and impair healing. Furthermore, endoscopic surgery offers the advantage of better visualisation of internal structures compared to open surgery. In VATS, the scars are smaller (fig 1), and the decreased exposure of underlying structures theoretically leads to quicker healing and reduced morbidity.

Kern and Rodgers first used VATS for the treatment of empyema in children in 1993. It was initially used as rescue treatment following failure of therapy with antibiotics and closed chest drain insertion. Since then there have been various case series reports of its successful use in children, which has led to an increasing debate regarding its potential in the treatment of empyema. The question, therefore, is whether VATS offers any advantage over other established therapies in the primary treatment of empyema in children?

VATS VERSUS CHEST DRAIN ALONE

In this issue, Satish et al describe the outcome in 14 children treated with chest drain only. Chest tube drainage occurred for eight days with a median hospital stay of 14 days (maximum stay 28 days). No patient needed a further surgical intervention. We have recently reviewed our experience with 21 children undergoing primary VATS compared to 54 treated with chest drainage alone. All patients had at least stage II empyema. We showed a significant reduction in days in hospital (7.4 versus 15.4) and chest tube drainage (4.0 versus
CONCLUSIONS
It is likely that with improved instrumentation and increased training, VATS will become increasingly familiar to the pediatric surgeon. It is also foreseeable that with the development of new medications, surgery may be superseded. In the interim, however, there is a desperate need for properly controlled studies. Until this occurs, the treatment a child receives will continue to depend on local practice and bias, which is not necessarily the best for the child.

REFERENCES
Smallpox vaccination

It is known that Lady Mary Wortley Montagu occupies an important place in the medical history for her efforts in smallpox vaccination. While in Turkey with her British ambassador husband, she vaccinated her 5 year old son. After returning to her own country she performed the same thing on her daughter (in 1721) and subsequently caused the widespread increase of vaccination in England.

She contributed just one identified text to the war against smallpox, writing not under her own name, but as “a Turkey merchant” — a pseudonym that misrepresents her class as well as her gender, but makes no claim to medical qualification. No wonder: her essay, published in the Flying Post at the height of the controversy, is an outright attack on the medical profession.

The procedure was quite safe in the hands of Turkish women. According to her notes, the old woman in Turkey made a tiny scratch with a needle and inserted a tiny quantity of smallpox virus just under the skin.

Interestingly, the Royal Society heard a paper on Turkish inoculatus in 1714. As a result, although Jenner was shown to be the inventor of the vaccine, the efforts of Lady Mary Wortley Montagu, deserving more appreciation than Jenner, should not be forgotten.

The stamp, from Turkey in 1967, depicts the 250th anniversary of the first smallpox vaccination.

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