Intrapleural streptokinase for empyema thoracis in childhood

Streptokinase (SK), urokinase and alteplase are reported to be associated with resolution of empyema in a significant proportion of patients. The aim of this prospective, randomised, blinded, placebo-controlled trial was to compare intrapleural SK and placebo in paediatric empyema.

**Methods**
Children (1 month–12 years) with empyema greater than Light’s classification stage 5 received intrapleural SK (15,000 units·kg\(^{-1}\)·dose\(^{-1}\)) or normal saline along with intercostal drainage. The process was repeated on 3 consecutive days. Clinical and serial sonographic outcomes were compared.

**Results**
A total of 40 children (median age 6.6 years) were enrolled and randomised to receive intrapleural SK (n=19, group A) or placebo (n=21, group B). There was no significant difference between the groups with respect to persistence of fever, respiratory distress, volume of pleural fluid drained or duration of drainage. The pattern of decline in temperature and respiratory rate was also similar. There were no significant differences in the proportion of children who developed loculation 7 and 14 days after intrapleural instillation. Ultrasonography on day 30 showed that, among those with multiple loculations, five out of seven patients in group B had pleural thickening, while there were none in group A. There were no adverse effects of SK therapy in any child.

**Conclusion**
This study suggests that intrapleural SK has no additional benefit in children with empyema of stages 5 and 6; however, among those with stage 7, it restricts development of pleural thickening in the long term and, thus, avoidance of surgical intervention.

**Editorial comment**
Recent studies have noted an increase in the incidence of empyema in children worldwide. Multiple treatment modalities exist for pleural effusions and empyemas, including thoracentesis, chest tube drainage, instillation of fibrinolytic therapy, video-assisted thoracic surgery and decortication. A systematic review of the Cochrane database only identified three trials where marginal benefit could be demonstrated for fibrinolytic therapy; however, there was inconsistency in the results of the studies evaluated to support routine use of intrapleural fibrinolytic therapy in the treatment of parapneumonic empyemas in adults. There are some differences between empyema in adults and children. Therefore, clinicians should beware of extrapolating adult data to children: empyema is not associated with any mortality in children in the western world and the length of hospital stay in adults is influenced by comorbid conditions. Children are generally healthy and this permits the use of length of hospital stay as a primary outcome measure; some recent randomised trials conducted in England on 109 children demonstrated that the UK is an effective adjunct to the management of parapneumonic empyema. Duration of hospital stay is shortest when it is used in combination with a small percutaneously placed catheter. However, the optimal dosage, timing and method of intrapleural administration of fibrinolytics still remains to be defined. The efficacy is closely related to the stage of the effusion, because it is an evolving disease and treatment should be tailored to the disease stage. Although this is a well-designed study, the limited sample size, in particular for the substages of empyema, may have influenced the results. Moreover, long-term function would have been an interesting end-point to evaluate. In conclusion, more evidence-based investigations, with larger sample size and long-term follow-up, are necessary to investigate about the role of fibrinolytic therapy in children.

Original article

Keywords
- Children
- Empyema
- Streptokinase

**Message**
Routine use of intrapleural streptokinase in all cases of empyema thoracis in childhood is not recommended.