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Original Research Article

Surgical strategy of empyema thoracis in children: open thoracotomy v/s video assisted thoracoscopy

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ABSTRACT

Background: Empyema is the suppuration within the pleural cavity, most commonly a complication of acute bacterial pneumonia. It is one of the most common diseases in children in India. Prognosis is excellent, provided appropriate treatment is administered early in the course of the disease.
Methods: This study examines treatment of complex empyema thoracis between June 1, 2016, and April 30, 2018. Total number of patients were 30 cases in open thoracotomy and 30 in VATS in treatment of their disease. Effusion etiology was distributed as follows: infectious, neoplastic-associated, traumatic.
Results: A total of 30 patients underwent VATS debridement and open thoracotomy for treatment of empyema thoracis. The median postoperative hospital stay was 10.31±3.751 days in case of VATS and 4.41±1.593 days in case of open thoracotomy. Median estimated blood loss in case of VATS was 78±15.634 ml and in case of open thoracotomy was 15.97±5.871 ml. Mean operative time was 82.86±17.293 minutes in case VATS and 77.59±13.38 minutes in case of open thoracotomy.
Conclusions: VATS might be comparable or even better than open thoracotomy in terms of operative time, postoperative hospital stay, chest tube duration, prolonged air leak rate, morbidity and mortality. But referring to the relapse rate, there was no statistical significance.

Keywords: Open thoracotomy, Video Assisted Thoracoscopy (VATS)

INTRODUCTION

Empyema is the suppuration within the pleural cavity, most commonly a complication of acute bacterial pneumonia.[1] It is one of the most common diseases in children in India.[2]

Prognosis is excellent, provided appropriate treatment is administered early in the course of the disease. Different therapeutic options are available for the management of childhood empyema. Available expertise and resources determine the choice of a particular treatment modality at the appropriate stage of the disease. Empyema is classified according to the clinical stage of the disease by the American Thoracic Society staging; Stage I is exudative, Stage II is fibrinopurulent, and Stage III is organizing. We share our experience of 30 consecutive cases using two-port technique using video-assisted thoracoscopic surgery (VATS) and open thoracotomy in children.

VATS can be done as a primary procedure (without intercostal drainage [ICD] tube insertion) or as a secondary procedure (for inadequate lung expansion after ICD insertion). The technical considerations and results of the same are discussed in the study.

METHODS

This study examines treatment of complex empyema thoracis between June 1, 2016, and April 30, 2018 at Dr. D. Y. Patil Medical College, Pimri, Pune. All patients treated by the thorasic surgical service during this period were included in the study group. Total number of patients were 30 cases in open thoracotomy and 30 in VATS in treatment of their disease.

The open thoracotomy group consists 30 patients out of which 18 were male child and 12 were female child. In case of VATS, 22 were male child and 8 were female child. All children were below 16 years.

All the cases evaluated and managed preoperatively by general medical services like chest radiography and computed tomography. The time between hospital admission and surgical intervention was determined by when the medical service requested a surgical consultation. Once consulted, most patients underwent decortication the following day. Effusion etiology was distributed as follows: infectious, neoplastic-associated, traumatic.

Primary VATS decortication was performed; if the duration of symptoms is between 1 and 2 weeks with respiratory distress, then an ICD was inserted and the child reevaluated. The children with duration of history more than 2 weeks were subjected to open decortication, as the peel gets organized and thick, thus making it difficult to remove using VATS. Average preoperative hospital stay was 13.9 to 8.8 days for the VATS and for open thoracotomy 16.8 to 10.2 days.

Operative procedure: Open thoracotomy patients underwent a serratus muscle- sparing lateral thoracotomy. Patients undergoing VATS had placement of three 10-mm pots, most often one in the anterior, mid and posterior axillary line to form a triangle whose apex was directed towards the anterior superior iliac spine.

RESULTS

A total of 30 patients underwent VATS debridement and open thoracotomy for treatment of empyema thoracis. The open thoracotomy group consists 30 patients out of which 18 were male child and 12 were female child. In case of VATS, 22 were male child and 8 were female child. All children were below 16 years.

Table 1: Comparison of hospital stays in VATS and open thoracotomy.

Parameter	VATS (n=29)	Open thoracotomy (n=29)	Z value	P value
	Mean±SD	Mean±SD		
Hospital stay (days)	10.31±3.751	4.41±1.593	7.79	<0.0001

The median postoperative hospital stay was 10.31±3.751 days in case of VATS and 4.41±1.593 days in case of open thoracotomy with P value of <0.0001. Median estimated blood loss in case of VATS was 78±15.634 ml and in case of open thoracotomy was 15.97±5.871ml with P value <0.0001.

Table 2: Comparison of operative time in VATS and open thoracotomy.

Parameter	VATS (n=29)	Open thoracotomy (n=29)	Z value	P value
	Mean±SD	Mean±SD		
Operation time (min)	82.86±17.29	77.59±13.38	1.30	0.20

Mean operative time was 82.86±17.293 minutes in case VATS and 77.59±13.38 minutes in case of open thoracotomy. Eight of the 60 patients required prolong ventilator support (>24 hours).

Table 3: Comparison of estimated blood loss in VATS and open thoracotomy.

Parameter	VATS (n=29)	Open thoracotomy (n=29)	Z value	P value
	Mean±SD	Mean±SD		
Estimated Blood loss (ml)	78±15.634	15.97±5.871	20	<0.0001

Mortalits included one diaphragmatic laceration in the VATS group and one duct laceration in the thoracotomy group. 2 VATS procedures required conversion to open thoracotomy to facilitate through decortication.

DISCUSSION

Hospital stays

In our experience, the median postoperative hospital stay was 10.31±3.751 days in case of VATS and 4.41±1.593 days in case of open thoracotomy. Ashish k. Gupta et al reported a series of 60 paediatric thoracis empyema cases thoracotomy and decortication revealed a more rapid recovery with a decrease number of chest tube days and decreased length of hospital stay success rate 96.6%.[3,1] In similar study by Mackinlay et al compared formal thoracotomy and thoracoscopic techniques of treatment. Mean postoperative length of medical management (11.5 vs 17 days) and chest tube removal (4.3 vs 6.1 days) was significantly shorter in the VATS group In 2005, Luh et al compared VATS in treating complicated parapneumonic effusion (stage 2) (ns145) and loculated empyema (stage 3) (ns89).[4,1,5] There was also significant reductions in postoperative length of stay (effusion 9.1 vs. 18.5 days; P-0.05). In a similar study done by Scarci and his colleges have found that early VATS intervention

for children with empyema was associated with a lower aggregate in-hospital mortality rate, re-intervention rate, length of hospital stay, duration of tube thoracostomy inserted and duration of antibiotic therapy compared with patients who underwent non-operative therapy.[6]

Intraoperative time

In present study, mean operative time was 82.86±17.293 minutes in case VATS and 77.59±13.38 minutes in case of open thoracotomy. In a similar study, Chan et al compared 71 cases of empyema thoracis (75% stage 3), treated with either VATSD (ns41) or OD (ns36).[7] VATS had shorter operative time (2.5 vs. 3.8 h; P-0.001), less postoperative pain (Ps0.04), greater satisfaction with the wounds (P-0.0001), and greater satisfaction with the operation overall (Ps0.006). Cardillo et al report VATS (ns185) having significantly better results than OD (ns123) in terms of operative time (P-0.0001).[8]

In our experience, primary VATS showed better results compared to open thoracotomy in terms of blood loss, air leak, and conversion to open procedures. Single-port technique for the treatment of empyema in children is called single-port thoracoscopy and has been described by Martínez-Ferro et al in ten consecutive patients. It was found to be safe and effective in children with better cosmetic results.[9]

Cosmesis may indeed be improved with VATS, although in most cases a thoracotomy incision of as little as 4 to 5 cm is not much longer than the added length of the skin incisions needed for thoracoscopy. In any case, we believe that the safety and efficacy of each procedure are more important considerations than the cosmesis.

In response to the above study, one of the largest studies conducted in the United Kingdom by Bishay et al 114 children underwent VATS performed by pediatric surgeons experienced in thoracoscopic surgery.[10] They concluded that VATS have a very good outcome in childhood empyema and it has an important role in the management of this condition.

CONCLUSION

VATS might be comparable or even better than open thoracotomy in terms of operative time, postoperative hospital stay, chest tube duration, prolonged air leak rate, morbidity and mortality. But referring to the relapse rate, there was no statistical significance.

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REFERENCES

1. Krenke K, Urbankowska E, Urbankowski T, Lange J, Kulus M. Clinical characteristics of 323 children with parapneumonic pleural effusion and pleural empyema due to community acquired pneumonia. J Infect Chemother. 2016;22:292-7.
2. Singh M, Singh SK, Chowdhary SK. Management of empyema thoracic in children. Indian Pediatr. 2002;39:145-57.
3. Gupta AK, Lahoti BK, Singh S, Mathur RK, Mishra H, Wadhera S. A study on comprehensive management of acute and chronic empyema thoracis in the pediatric age group and their outcome. Internet J Surg. 2008;14:1.
4. Mackinlay TA, Lyons GA, Chimondeguy DJ, Piedras MA, Angaramo G, Emery J. VATS debridement versus thoracotomy in the treatment of loculated postpneumonia empyema. Ann Thorac Surg. 1996;61:1626-30.
5. Luh SP, Chou MC, Wang LS, Chen JY, Tsai TP. Video-assisted thoracoscopic surgery in the treatment of complicated parapneumonic effusions or empyemas: outcome of 234 patients. Chest. 2005;127:1427-32.
6. Scarci M, Zahid I, Billé A. Is video-assisted thoracoscopic surgery the best treatment for paediatric pleural empyema? Interact Cardiovasc Thorac Surg. 2011;13:70-6.
7. Chan DT, Sihoe AD, Chan S, Tsang DS, Fang B, Lee TW, et al. Surgical treatment for empyema thoracis: is video-assisted thoracic surgery ‘‘better’’ than thoracotomy? Ann Thorac Surg. 2007;84:225-31.
8. Cardillo G, Facciolo F, Giunti R, Gasparri R, Lopergolo M, Orsetti R, et al. Videothoracoscopic treatment of primary spontaneous pneumothorax: a 6-year experience. Ann Thoracic Surg. 2000;69(2):357-61.
9. Martínez-Ferro M, Duarte S, Laje P. Single-port thoracoscopy for the treatment of pleural empyema in children. J Pediatr Surg. 2004;39:1194-6.
10. Bishay M, Short M, Shah K, Nagraj S, Arul S, Parikh D, et al. Efficacy of video-assisted thoracoscopic surgery in managing childhood empyema: A large single-centre study. J Pediatr Surg. 2009;44:337-42.

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