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MANAGEMENT OF EMPYEMA THORACIS IN CHILDREN

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ABSTRACT

OBJECTIVE: To observe the various clinical presentations of empyema thoracis in children and evaluate its management and outcome

STUDY DESIGN: An observational descriptive.

STUDY PLACE AND DURATION: Department of Cardiothoracic Surgery, Postgraduate Medical Institute, Lady Reading Hospital from June 2002 to June 2006.

MATERIALS AND METHODS: Clinical record of 58 patients who underwent various surgical procedures during3 years were retrospectively analyzed. Detailed scrutiny of record was carried out to analyze the clinical presentation; various surgical procedures and outcome.

RESULTS: There were 38 boys and 20 girls. Common presentation was fever (62%); cough (26%) and chest pain (11%). The duration of symptoms was less than 8 weeks in 57% and more than 8 weeks in 42% cases. Common etiologies were Pneumonia (31%) post tuberculous (37.7%), traumatic (24%) and iatrogenic (6.6%). Tube thoracostomy was the initial line of management in patients. Decortication was required in 40 patients. The mean age of the patients was 8 years (Range 2- 2years). There were 9 children under age 6 years or less .The other 49 were older than 10 years. The mortality was 2.5 (1/40) and wound infection, 4(7%) air leak in 2 (4%) and wound dehiscence in 5 (2%).

CONCLUSION: Depending upon the stage, various surgical options exist for the treatment of thoracic empyema. Selection of the most appropriate procedure must be individualized but the basic principle is evacuation of pus from the pleural space, appropriate antibiotic therapy and obliteration of empymea cavity. Thoracoplasty is not indicated in Pediatric population and is seldom required.

Key words: Empymea thoracis, children, Management.

INTRODUCTION

Pleural empymea or empymea thoracis is an accumulation of pus in the pleural space. It has been recognized as a disease entity since the time of Hippocrates and has been associated with mortality. During World War I, the overall empyema mortality rate among US military forces was 61%. Before antibiotics were developed in the 1930s and 1940s, pleural empyema occurred in 10% of patients who survived pneumonia and reduced the incidence of post pneumonic empyema. However, the incidence of postoperative empyema increased.[2]

Treatment of an empyema depends on its course, whether it is acute or chronic, the state of the underlying lung, the presence of a bronchopleural fistula, the ability to obliterate the space and the patient's clinical condition and nutritional status.[3] In the exadative stage of parapneumonic, post resection and post traumatic empyema chest tube drainage and antibiotics according to culture and sensitivity is a safe, efficacious primary method of empyema management.[4] Failures are due to improperly placed tube, loculation, increased fluid viscosity and early peel on the lung.[5] Failures are managed with rib resection, intrapleural thrombolytics; Video assisted thorocoscopy (VATS) surgery presents less invasive approaches to the management of empyema VATS has been found to be particularly useful in multiple loculations that could be easily disrupted to allow adequate drainage.[6] Chronic empyema begins approximately 6 weeks after the onset of the acute illness. By then the wall of the empyema or the peel is organized by growth of capillaries and fibroblasts and expansion of the lung by simple evacuation of the cavity can no longer be expected. Decortication or thorocoplasty can be used to obliterate the persistent space. In

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decortication thick visceral peel encasing the lung is removed to allow expansion and obliterate the space. A thick rigid parietal peel that restricts the mobility of thoracic cage should be excised.[7,8]

Thorocoplasty is the last option to obliterate the pleural space resulting due to chronic empyema. It consists of the resection of a sufficient number of ribs to allow the chest wall to collapse and obliterate the space.[9]

MATERIALS AND METHODS

This is a retrospective analysis of patients with thoracis empyema who needed various surgical interventions over three years period (June 2002 to June 2006). All patients between 2 to 12 years of age were included while those with associated intraabdominal sepsis were excluded from study. The hospital records and operation reports of these patients were carefully analyzed for demographic features, operative procedures and outcome before surgery all patients were evaluated for fitness for general anesthesia by Anaesthetist Double lumen endotracheal tube was used with .one lung anesthesia during surgery. Routine monitoring of pulse, blood pressure, ECG, SPO2 and $ETCO^2$ was done during surgery and postoperatively. Surgical options included closed tube thoracostomy, decortications and thoracoplasty. Video-assisted thoracoscopic surgery (VATS) was not done due to non-availability of this facility at our department. Selection of appropriate treatment was chosen on the duration and extent of disease and the size and nature of collection.

Tube thoracostomy was used for drainage of acute cases. Fourth or fifth intercostal space in mid axillary line was the site of insertion. The skin; intercostal muscles and parietal pleura were infiltrated with 2% lignocane .Skin incision about 2 cm was done to make a tract. Chest tubes of different sizes (18-24) were used according to the age and built of the patient. Drainage was assessed both clinically and radiologically. The progress was monitored if there was clinical and radiological mprovement then suction was continued, otherwise, they were prepared for surgery.

Decortication was done for stage III empyema, clotted hemothorax and multiloculated empyema .Decortication was done through a standard posterolateral thoracotmy. Both parietal and visceral restricting peels were revomved taking care to avoid lung damage and to reduce postoperative air leak .All loculations were broken down with finger and debris evacuated-Postoperatively patient was given effective analgesics. Patients were given regular physiotherapy and encouraged to cough. Continuous low-pressure suction to chest drain was maintained for one week. Muscle flaps were not used because majority of our patients were weak and cachectic.

RESULT

A total of 58 patients admitted for treatment of empyema thoracis were studied. There were 38(65%) boys and 20(34%) girls. Their age range were 2-12 years The mean duration of symptoms was less than 8 weeks in 52% and more then 8 weeks in 28(48.2%) cases. The presenting symptoms were fever 68% cough in 31 % (Table-I).

An underlying cause for empyema was sought post tuberculosis 37.7% post pneumonic 31%, 110(24.4%) post firearm injury 24% and 6.6% iatrogenic .(Table-III).

Table III depicts various surgical procedures performed at our department . Tube thoracostomy was the intial procedure employed in 45 patients; decortication in 40 cases.

Mortality 2.5 (1.40). Most common postoperative complication was wound infection 7% followed by air leak 4% and wound dehiscence 2%.

Table-1
Preoperative data of patients(n=58)

Variable		
Sex	=n	%age
Male	38	65
Female	20	34
Age (year)		
2 —6	9	15.5
6 —12	49	84.5
Duration of Symptoms		
< 8 weeks	30	51.7
> 8weeks		28
48.2		
Symptoms		
Fever	40	68.9
Cough	18	31

Table-2
Etiology

Variable		
Post pneumonic	18	31
Post tuberculous	23	37.7
Traumatic	14	24
Iatrogenic	3	6.6

Table-3
Surgical procedures (n=58)

Procedure	=n
Group A	
Tube Thoractomy	45
Group B	
Decortication	40

DISCUSSION

The American Thoracic Society classified empyema into three phases. The exudative or acute phase characterized by fluid of low viscosity; the lung is expandabe[2] Eibrinopurulent or transitional phase characterized by more turbid fluid, the lung is progressively less expnadabe.[3] the chronic or organized phase is characterized by very viscous pleural fluid, organization of pleural.

Peel which traps and fixes the lung..These three phases exist as a continuum and the transition from exudative to fibrinopurulent phase is not always clear cut.[10,11] The basic principal of empyema thoracics management irrespective of stage is prompt drainage, appropriate antibiotics and reexpansion of the lung.[12] Of all empyemas currently diagnosed, 50% are secondary to complications of a primary pneumonic process in the lung.

Other causes are spontaneous pneumothorax, tuberculosis, chest trauma, subphrenic abscess, foreign bodies retained in the bronchial tree, esophageal perforation and operations involving lungs and mediastinum.[6,13]

.ithough it has been recognized for a longtime, the importance of timely intervaention in empyema has not been emphasized enough.[17] The Surgical approach to empyema has evolved over the years .During world war one empyema treated by thoracostomy was associated with mortality, this prompted the establishment of the empyema commission, which recommended chest tube drainage for treatment. Tube thoracostomy is usually the first step in the treatment of acute empyema. The success for tube thoracostomy is 70-85% but in our study initially 45 patients had adequate drainge with a succes rate of 46% more likely because most of our patients presented late with epyema in organizing stage. Intrapleural instillation of firbrinolytic agents is being increasingly used for management of empyema thoracis. Intrapleural streptokinase appears to be a useful strategy to preserve lung function and reduce need for surgery in patients with early stage empyema thoracis.[17] We did not use this modality it in our patients because patients we receive patients in very late stage.

Post pneumonic empyema was noted in 31% patients of our study. Tubercular etiology was found in patients 23(37%) patients. Massard et al[14] reported an incidence of 29% in 1989,but this was significantly lower than what had been reported in various earlier studies[15,16] where tuberculosis was responsible for majority patients with empyema thoracics. There are few conditions in which management depends as much on the timing, of treatment in the course of disease.decortiction is indicated for empyema with thick peel. Most empyemas that we see which have not responded to chest drain fall into this category. Decortication allows a more rapid recovery with a decreased length of hospital stay.[19] The success rate for decortication is 90-95%; in our series which is excellent.

The Successful application of VATS to debride and drain loculated empyemas and clotted hemothoraces patient has been described; by Hutter and Associates (1985), Ridley and Braimbridge (1991). Empyemas that are demonstrated,either on Ct scan or intraoperative evaluation to have a thick and fibrotic peel with lung entrapment should be decorticated by open technique.[18] VAT (Video Assisted Thoracoscopic) debridement was not used in any of our patients due to non-availability of this modality in our setting. Thoracoplasty is used primarily in the treatment of chronic thoracic empyema in case in which either insufficient or inefficient pulmonary tissue exists to obliterate the pleural space .Because of good pulmonary compliance thoracoplasty is not required in children and is not indicated be-

Table-4
Mortality and morbidity

Mortality	=n	%age
Decortication	1 (1/40)	2.5
	(Group B)	
	Complication	
Wound infection	4	7.0
Air leak	2	4.00
Wound dehiscence	5	2.00

cause it results in thoracic deformity. (Khyphoscoliosis)

CONCLUSION

Thoracic empyema remains a common problem in the world counter view. Early referred is advocated to prevent late complications of fibro thorax and reduced lung capacity. Timing of the surgical intervention is of paramount significance. First line of treatment is the chest drain and suction .Decortication being the second option should be considered early in any who have good surgical risk because it has high success rate, low mortality and morbidity. Thoracoplsty is not indicated in patients under 16 years age.

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