EMPYEMA THORACIS IN CHILDREN- EARLY SURGICAL TREATMENT IS BETTER

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ABSTRACT

BACKGROUND

Prolonged intercostal drainage for empyema thoracis in children is difficult to manage by parents at home and at the same time prolonged stay at hospital increases the financial burden on them. Hence, aim of this study is to get rid of intercostal drainage earliest by performing surgery thereby decreasing the morbidity and mortality.

This is a prospective study done in infant and children below age of 12 at Paediatric Surgery Department, National Institute of Medical Science, Jaipur-Delhi Highway, Jaipur, from May 2012 to April 2016. Total number of cases in which surgical intervention done were 13 out which 2 required lobectomy whereas in 11 cases decortication and removing of peel was done.

MATERIALS AND METHODS

Out of all thirteen patients, the age ranging from 6 months to 10 years, a proforma was made and kept in OPD and ward filling with investigation, symptomatology, treatment and follow up.

RESULTS

Out of all 13 cases, lung expansion was complete and all are symptom free, follow up 3 years to 1 month was there.

CONCLUSION

Early surgical intervention of empyema thoracis is beneficial in children as prolonged intercostal drainage increase the misery of the patients as well as their parents.

KEYWORDS

Empyema, Decortication, Lung Abscess.

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BACKGROUND

Empyema thoracis can produce significant morbidity in children.[1] Intercostal drainage is helpful only in few cases of acute empyema. If tube thoracostomy done by experienced surgeon, surgical decortication[2] becomes mandatory in neglected cases. It gives very gratifying results ameliorating the disease rapidly and is well tolerated by infants and children.[3,4] This is a prospective study done in an institution where is untrained staff dealing with adult as well as paediatric patients.

Empyema, an accumulation of infected fluid within the thoracic cavity is commonly secondary to post infectious pneumonia.[5] It can also occur after thoracic operation because of oesophageal leak. The American Thoracic Society has described 3 stages of empyema, namely exudative, fibrinopurulent and organised more or less based on the characteristics of the content of pleural cavity.

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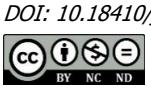


Apart from the fluid, organised fibrinous deposit appears early in the disease preventing complete drainage of fluid as well as penetration of antibiotics. An inflammatory peel of variable thickness soon forms preventing complete lung expansion.[6] This leads to a variable clinical course causing a lot of confusion about the method of management.[7] More over the paediatrician never refer such cases to a paediatric surgeon because of their private practice and ignorant about the surgical intervention needed in empyema at earlier stage. The aim of this study is to get physician and paediatrician to refer these cases to the paediatric surgeon and not to the chest surgeon who hardly do any cases of paediatric age group. I have also observed like others a definite discrepancy in the treatment modality advocated by nonsurgical and surgical specialists.[8] Surgeons themselves are reluctant to operate partly due to inexperience and also because of the fear of "postoperative morbidity" mentioned in paediatric literature. However, it is a condition, which if approached by the correct surgical technique gives excellent results with minimum morbidity.

MATERIALS AND METHODS

Out of all thirteen patients, the age ranging from 6 months to 10 years, a proforma was made and kept in OPD and ward filling with investigation, symptomatology, treatment and follow up.

Symptomatology

All patients present with high-grade fever, cough, tachypnoea/dyspnoea, irritability and in late cases with chest deformity, malnourishment and wasting are associated in all patients, multiple insertion of tube in 12 out of 13 patients, duration was of 3 to 6 weeks in all patients, various broad-spectrum antibiotics in all cases and antitubercular treatment in six patients. After an initial period of response, the drainage has usually ceased with no commensurate improvement in the clinical condition of the patient.[2]

Investigation

These patients came with multiple chest radiographs, haemograms and culture reports, but the most important investigation is a recent Contrast-Enhanced Computed Tomography (CECT) scan of the chest, which is done in all cases. This and clinical status of the child are the cornerstones for deciding the surgical intervention in these cases.

Besides CECT, ultrasound of the chest also helpful in grading system of empyema. Loculated pus and pulmonary entrapment are not easily made out. Ramnath et al[9] devised on ultrasound-based grading system subdividing patients into few grade or high grade categorised by presence or absence of septations fronds (like a leaf with many divisions) and levels. Those with higher grade, uniformly did better on surgical intervention with lesser hospital stay.[3]

Surgical Procedure Adopted

All the patients went surgical intervention (n=13).

Procedure	No. of Patients
1. Intercostal drainage finger sweep by paediatric surgeon under anaesthesia	2
2. Thoracotomy, decortication	10
3. Thoracotomy and lobectomy/removal of necrotic lung tissue	2

(Out of first group, one patient required thoracotomy and decortication).

Follow up x-ray done and found full lung expansion in all cases and patients remained symptoms free and gained weight. Those patients who have received antitubercular treatment were stopped because there were no evidence of tuberculosis in excised lung or pleural tissue.

DISCUSSION

Treatment plan and prognosis depend on the stage of empyema; hence a brief mention of staging is essential.

Empyema is divided into 3 stages

Stage 1- Exudative Phase

The fluid is usually thin with free communication in the thoracic cavity. It maybe serous or cloudy, but is generally sterile. There is good response to antibiotic therapy in most cases. Only few require thoracocentesis or a short period of intercostal drainage. No case presented in this stage. Few authors have good results either with thoracocentesis or tube thoracostomy.[10,11]

Stage 2- Fibrinopurulent Stage

This last for 7-10 days and is associated with fibrinous debris. The fluid is thicker, opaque and cultures are positive. Two cases were presented in this stage in which patient had fever before admission for 8 days. Chest tube were placed soon after admission under short general anaesthesia after ultrasound imaging, which included a finger sweep by the paediatric surgeon during insertion. Intravenous antibiotics at high doses were given for 10-21 days. Resolution of fever and constitutional symptoms were noted in 4 to 7 days after chest tube insertion. The same observation seen by a small study from Brighton U.K.[12] In this group, one patient did not respond to above treatment was subject for decortications after 3 weeks. Fibrinolytic agents were not tried in this series as suggested by Rosen H et al.[13] Video-assisted thoracoscopic surgery and decortication is the treatment of choice in stage 2, but I have not tried this method due to non-availability of thoracoscope.

Stage 3- Organised Stage

In this study, the organised stage in addition to loculated pus or air, there is marked thickening of the pleura with encasement of lung. These are better delineated on CT scan as opposed to a chest radiograph. The gold standard for surgical treatment at this stage remains thoracotomy and decortication. This was done in 12 cases.

Surgical treatment is essential in all patients who have referred late to paediatric surgeons. Child with pneumonia and pleural effusions are primarily treated by the paediatricians and family physicians. Awareness in the paediatricians about surgical treatment is lacking. All the cases who had surgical intervention came in the stage 2 and 3 where intercostal drainage failed to cure the child. Most of the children developed scoliosis due to fibrosis of lung or pleural thickening, which did not allow lung to expand. Intercostal drainage did not work because of loculi. After assessing the stage of empyema by contrast-enhanced CT scan, it was decided to do thoracotomy and excision of 'pleural peel', removal of fibrinous flakes, debris and pus, irrigation of pleural cavity with povidone-iodine and saline is all that required.[14] In late case, lobectomy was also needed in which lower lobe on right side was excised.

After excision of peel or lobectomy, one should meticulously secure the blood vessels and ligate the open bronchioles with Vicryl suture. Anaesthesiologist should ask for manual ventilation. All significant air leak are meticulously closed using Vicryl sutures. It is very important to thoroughly irrigate the chest cavity with large amount of

normal saline until all flakes are cleared. One or two chest tubes of large bore are inserted, which should be well fixed. An intercostal anaesthesia block is given and after approximating the ribs, the chest is closed.

Lung necrosis and lung abscesses should be dealt with during the same operative procedure[15] or else it will prolong the postoperative course considerably with persistent air leak and fever. After surgical procedure, it is often associated with bronchopleural fistula where there is a long history of persistent major air leak through the chest tube. Apart from thorough debridement with removal of pus, debris and visceral pleura, surgical treatment involves excision of necrotic lung and closure of involved airway in a meticulous manner in healthy area.[16]

Postoperative Care

This includes continued antibiotic coverage, good analgesia, care of intercostal drainage tube, chest physiotherapy and steam inhalation. A chest x-ray should be done in the evening of day of operation to confirm adequate lung expansion and correct position of the intercostal drainage tube. Removal of the intercostal tube should be done when drainage is nil and there is full expansion of lung on x-ray chest.

It usually takes 5-7 days for complete lung expansion. The chest tube should be milked frequently and care should be taken that it should not get blocked.

A few authors have gone for early decortication. In a study from Turkey, Gun et al[2] reviewed 79 cases of empyema over 15 years period, but in our series, most of the cases came late, i.e. in organised state of empyema, hence a major procedure was attempted.

RESULTS

There were no mortality or morbidity in this series. Follow up of these children done for 6 months postoperatively, none of them developed complications.

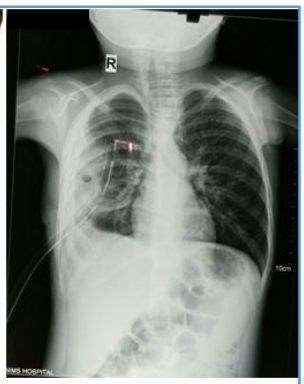
All the cases of empyema were proved to be pyogenic and none turned out to be tubercular, also 6 patients received antitubercular treatment, but after histopathology examination of pleura, debris and lung tissue, none proved to be tubercular, hence ATT was stopped.

CONCLUSION

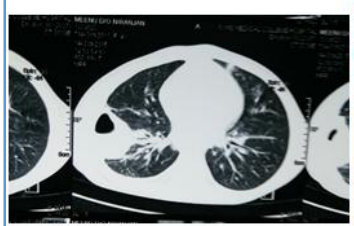
Early referral by the treating physician or paediatrician to the paediatric surgeon reduces the morbidity of the child. Contrast-enhanced computerised tomography is the best diagnostic tool to diagnose the condition at the same time guide for the surgical procedure to be done. Paediatric surgeon should not hesitate for thoracotomy, decortication or excision of necrotic lung tissue or even lobectomy. Early surgical intervention reduces morbidity and early recovery of the child, minimises hospital stay and reduces financial burden on parents.

PHOTOGRAPHS

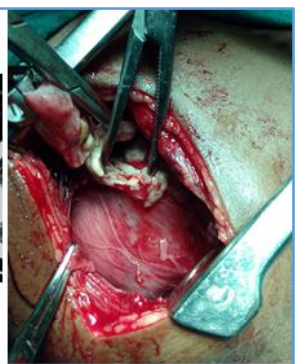
Chronic empyema repeated insertion of intercostal drainage tube.



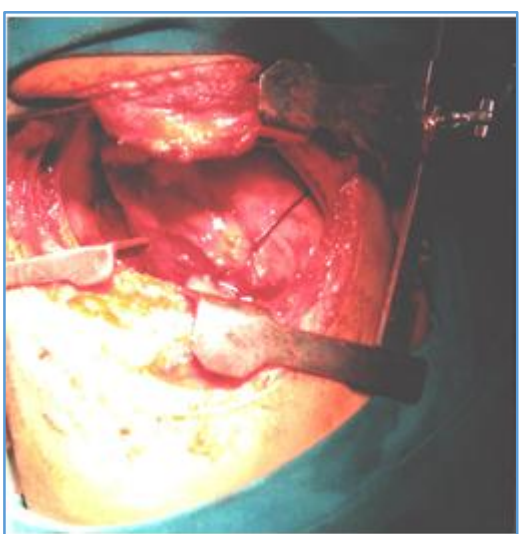
Same patient with chest tube.



CT Scan showing collapse lung with flakes



Lung necrosis, debris, fibrinous flakes



Thickened pleura with flakes

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