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Research Article

Thoracoscopic Management of Pulmonary Hydatid Cysts in Children: A Single Centre Experience

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Received: May 02, 2018; **Published:** July 23, 2018

Abstract

Hydatid disease is a well-known zoonosis occurring all over the world. Traditionally, open surgery was universal treatment for all these diseases. Pulmonary hydatidosis is the second most common involved organ. With the advent of thoracoscopy, the pulmonary hydatid cysts can be managed by minimal tissue damage and very rapid postoperative recovery.

Aim: To share experience of thoracoscopic excision of pulmonary hydatid cysts in children at a rural tertiary care center in India.

Method: Thoracoscopic excision was performed by three port technique. The average period of operative time was 90 minutes. There were no complications in any of the patients.

Results: Total 10 lungs were operated for thoracoscopic hydatid cyst excision between March 2014 to October 2017 successfully.

Conclusion: Thoracoscopic excision can be safely performed even in rural settings for pulmonary hydatid cysts excision.

Keywords: *Thoracoscopy; Hydatid Cysts; Children*

Introduction

Hydatid disease is a well-known zoonosis occurring all over the world. Man is the accidental host [1]. The incidence is high in cattle raising regions. Unhealthy food habits or personal hygiene is one of important etiological factors. Although liver involvement is the most common visceral involvement, it can affect lung, spleen, brain, kidney, heart, peritoneum or any other organ. Traditionally, open surgery was universal treatment for all these diseases [2]. Pulmonary hydatidosis is the second most common involved organ. With the advent of thoracoscopy, the pulmonary hydatid cysts can be managed by minimal tissue damage and very rapid postoperative recovery. It is also cosmetically better than open surgery and all the lobes of the lung can be approached with same port placements. We share our experience of thoracoscopic management of pulmonary hydatid cysts in children at a single centre in rural settings.

Aims

To share our experience of thoracoscopic management of pulmonary hydatid cysts in children at a single centre over last three years and confirm the feasibility of this technique in children as described in literature.

Method

All the children diagnosed with pulmonary hydatid cysts were managed by thoracoscopic excision successfully at Dr Ulhas Patil Medical College which is rural tertiary care center in India for the period between march 2014 to October 2017. Diagnosis was by chest x ray and computerized tomography of the chest (Figure 1 and 2). Procedure was performed under general anesthesia with selective opposite lung ventilation using bronchoscope and patient was placed in lateral position with affected side up. Monitor was placed in front and surgeon standing on opposite side of the monitor. Three ports technique was used. Camera port was placed just below the tip of the scapula with arm extended which was corresponding to 4^{th} intercoastal space. The two working ports were placed in triangularization to camera port depending upon the location of the lesion in upper or lower lobe of the lung (Figure 3). Pneumothorax was made using carbon dioxide with pressure of 5 mm Hg. The cyst was identified and contents were aspirated with endoscopic needle without any spillage in the pleural cavity. The cyst wall was opened using monopolar electro cautery and all the germinal membrane and daughter cysts were aspirated out. The inner lining of the cyst was inspected for bronchial openings and if air leak is seen then those openings were sutured by endosuturing using prolene 4-0 sutures. Postoperatively, pleural cavity was drained by tube and was removed after 48 hours (Figure 4-7).

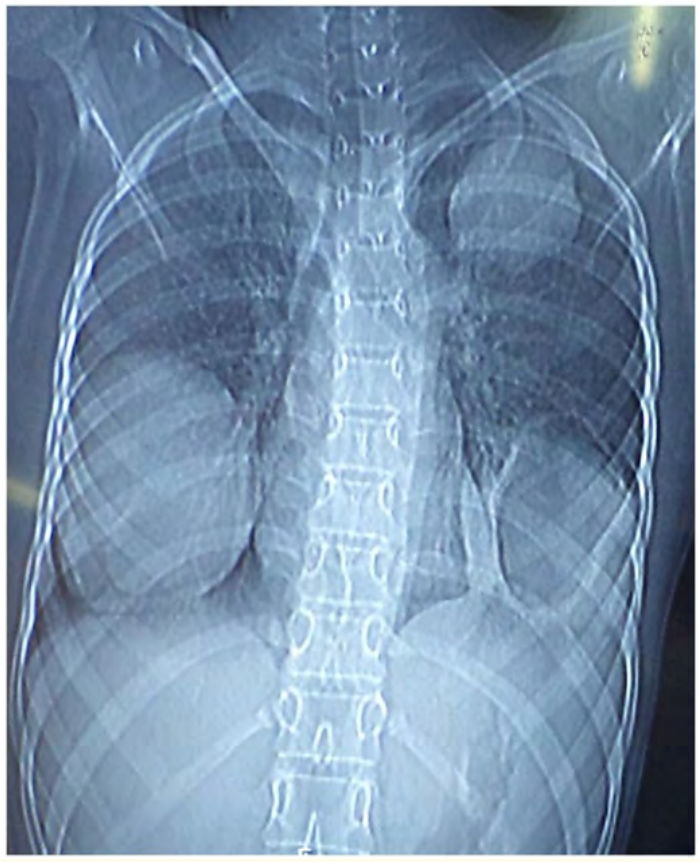

Figure 1: *Preoperative chest X-ray showing bilateral cyst.*

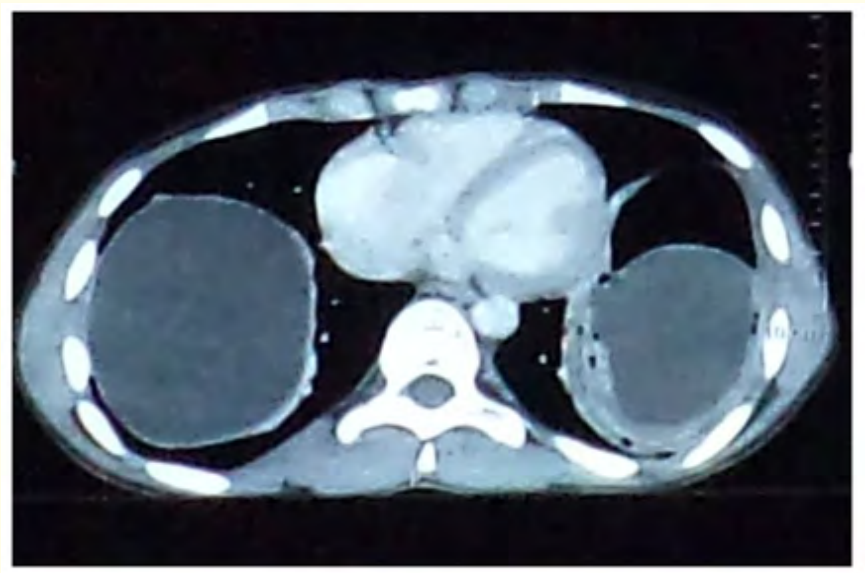

Figure 2: *Computerized tomography suggestive of hydatid cyst.*

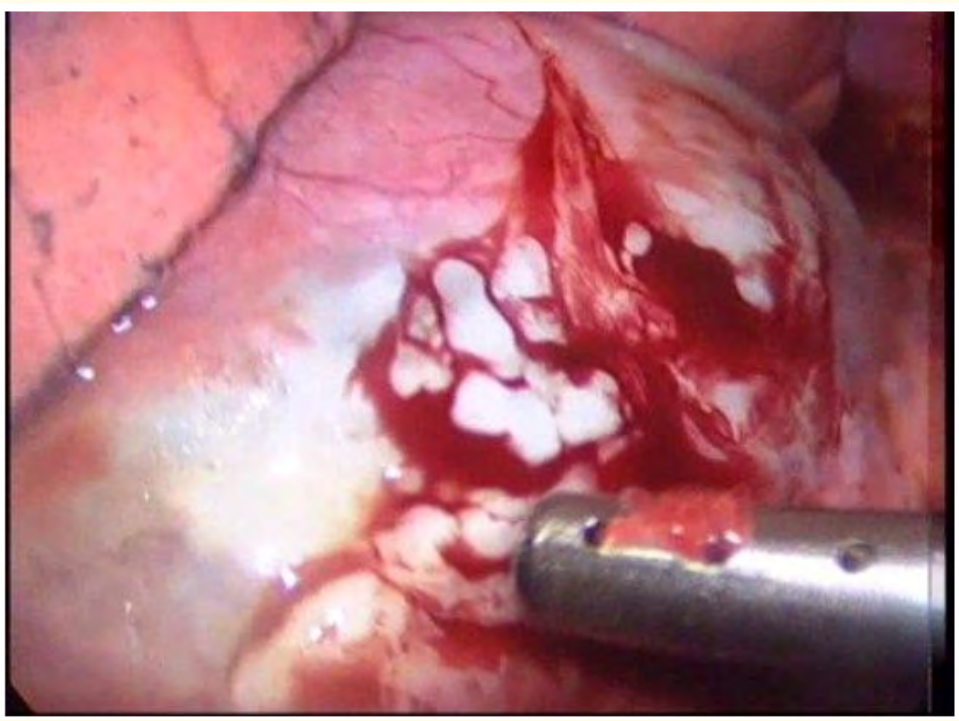

Figure 3: *Thoracoscopic view of the hydatid cyst before aspiration.*

Figure 4: *Post-operative x ray after right side thoracoscopic excision.*

Figure 5: *Post-operative x ray after left side thoracoscopic excision.*

Figure 6: *Follow up chest x ray after 6 months showing normal lungs.*

Figure 7: *Port site scars after healing.*

Results

All the surgeries were performed from March 2014 to October 2017. Total ten lungs were operated in this period by thoracoscopic excision. The age range was 12 - 18 years. 5 were female and 3 male children in the group. Two patients had bilateral lung involvement. Right lung involvement was more common with seven patients had right lung involvement. The most common symptoms were cough, hemoptysis, fever and thoracic pain. The average duration of surgery was 90 minutes. The average blood loss was less than 50 ml. There were no complications in any of the patients. The average duration of stay was 3 days postoperatively. All the patients received oral anthelmintics for 3 months. None of the patient had any recurrence of the disease till now with minimum follow up of six months now.

Discussion

Hydatid disease is a parasitosis caused by echinococcus granulosus, it is endemic in the Mediterranean countries, the Middle East, South America, New Zealand, Australia and India. Children are not commonly affected [1,2]. In children, the lung is the most frequent localization [3]. With the advances in thoracoscopy, pulmonary hydatid cysts can be effectively managed by minimal invasive method. Traditionally, the surgery was done by open incision method. However, it was associated with disfiguring scars, chest wall deformity, winged scapula. Thoracoscopy can avoid all these problems and gives equally good results [4,5]. In this technique, the camera is placed just below the tip of the scapula with the arm in over-head extension which corresponds to 4^{th} intercoastal space. The advantage of this port position is that all the lobes pathology can be effectively approached. One of our patient had involvement of upper and lower pulmonary lobes of the same side. But due to this port placement, we could manage both the cysts effectively without any ergonomical difficulty. Once all the contents of the cysts are aspirated, the compressed bronchiolar openings become free and air leaks manifest. These openings need suture closure or else patient can develop bronchopleural fistula. Sometimes, these openings are very small and air leaks from these openings stop on their own within 2 - 3 days [6-8].

Suturing of the large bronchiolar openings by endosuturing needs good skills. If these openings are left unsutured, in many cases they manifest as bronchopleural fistulas and need further intervention for closure [4,8-10]. We used prolene sutures for the closure of these bronchial openings as is the standard. Utmost care should be taken to avoid the spillage of cyst fluid in the pleural cavity as it can cause recurrence of the disease. The germinal membrane can block the openings of the suction canula and can cause spillage. Palanivelu., *et al.* have come up with a double suction instrument to overcome this problem. This instrument is really helpful in initial suction of the hydatid cysts [4]. Many scolicidal agents have been described in the literature. We have used 10% betadine solution as a scolicidal agent in our series of patients.

In all our patients, we have used selective lung ventilation of the non-affected side. Usually, this is achieved by double lumen endotracheal tube. However, this tube is not available for small children. In all our patients, we first performed bronchoscopy, passed guidewire in the normal side bronchus and then appropriate size cuffed endotracheal tube was passed over it. This also achieved good single lung ventilation without using double lumen tube.

In patients with bilateral lung hydatid, the decision to operate which side first was taken on the basis of size of cysts and their location in relation to tracheobronchial tree as assessed on computerized tomography. The side with larger cyst was operated first as there is potential chance of rupture of the cyst during endotracheal intubation and positive pressure ventilation during the surgery. Similarly, cysts which are close to major bronchial segment openings are more prone to rupture as compared to peripheral cysts. Hence such side should be operated first.

Two of our patients also had liver hydatid cysts in them, which were successfully managed by laparoscopy after 1 month.

None of our patients, needed postoperative ventilator support and all the patients made excellent recovery. The average duration of stay of patients was 4 days and had no complication in any of the patient in this series. All the patients are in regular follow up with mean duration of 1year post operatively. We compared our results with other published studies. Becmeur., *et al.* have initially managed the patients without selective lung ventilation [7]. In all our patients we selectively ventilated the non-operating side due to which minimal CO_2 insufflation was needed. In the results, by Saquib., *et al*, Parelkar., *et al.* and Amin., *et al.* the postoperative hospital stay duration was of 5 days on average which is comparable to what we also observed in our series [8-10].

Conclusion

Pulmonary hydatid cysts can be very effectively managed by thoracoscopic excision. Availability of double lumen endotracheal tube is desirable but in pediatric patients it is not mandatory for selective lung ventilation. Large bronchial openings must be closed to prevent bronchopleural fistula. Mastery on endosuturing comes very handy for this suturing.

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Volume 7 Issue 8 August 2018