THORACOSCOPIC APPROACH FOR PEDIATRIC PULMONARY HYDATID CYST

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ABSTRACT

Background: Hydatid cyst still remains an important health problem in our country as in many Mediterranean countries. Thoracoscopic treatment of pulmonary hydatid cyst (PHC) has been considered to be a good treatment option in children. The thoracoscopic approach is seen in the literature as small-case groups, especially in children. Our goal is to review our results and evaluate the efficiency of thorascopy in pediatric patients.

Methods: We conducted an analysis retrospective study of the medical charts of 60 children with pulmonary hydatid cyst (PHC) treated using the thoracoscopic approach among 252 subject to surgical treatment, from January 2004 to January 2016.

Results: The mean age of the patients was 9 years (range, 4–15 years). There were 40 males and 20 females patients. All patients exhibited one or more symptoms. Thoracoscopic removal of the germative membrane and cystotomy were accomplished in all cases, and Parenchyme-saving procedures were performed. Conversion to open thoracotomy was required in 6 cases (10%). Perioperative death was not observed. The hospital stay time was 3 days (2–8 days). Intraoperative blood loss levels were 9 ± 1.5 ml. Thoracic intubation indwelling time was 80 min (60 min–120 min). The mean duration of the drainage were 24 h in cysts less than 5 cm, and 4 days if more than 5 cm.

The complication incidence was 11, 6% (7/60) presented with lung infection; 2 cases required a prolonged drainage (8 days). And 7 subcutaneous emphysema. In all the other cases, the follow-up was uneventful. At mean follow-up of 52 months, all patients were asymptomatic without recurrence.

Conclusions: Thoracoscopic approach is a safe option for the treatment of hydatid cyst disease. It can be used as an alternative to thoracotomy.

INTRODUCTION

Hydatid cyst is a parasitic infectious disease, which is endemic in many places around the world, such as the Mediterranean countries, Iran, India, Australia and South America. According to World Health Organization (WHO), the annual incidence of Cystic Echinococcus is up to 220 per 100,000 inhabitants in these countries. Surgical treatment is considered to be the most effective therapy in pulmonary hydatid cyst (PHC). Open surgical approach is commonly preferred for the surgical treatment of PHC. All stages of the surgical treatment of hydatid cyst of the lung can be easily accomplished by thoracoscopy, with less morbidity and early recovery. The thoracoscopic approach is seen in the literature as small-case groups, especially in children. We report a case series of 60 children with pulmonary hydatid cyst treated successfully using thoracoscopy.

METHODS

We conducted an analysis retrospective study of the medical charts of 60 children with pulmonary hydatid cyst (PHC) treated using the thoracoscopic approach among 252 subject to surgical treatment, in the Pediatric Surgery Department of CHU Hassan II, Fez, Morocco. From January 2004 to January 2016. Diagnosis of pulmonary hydatidcysts was carried out from medical histories and various combinations of poster anterior and lateral chest x-rays and computed tomography (CT) of the chest, abdominal ultrasound, hematological and biochemical tests were studied in all patients. Data were gathered through a standardized form, including age, gender, symptoms, and characteristics of the hydatid cyst (number, size, location, and complication). These patients were operated according to one technique. The mean age of the patients was 9
years (range, 4–15 years). There were 40 males and 20 females patients.

All patients exhibited one or more symptoms. The most common symptoms were: Cough 55%, thoracic pain 41%, Hemoptysis is 40%, hydatidemis is 23% , dyspnea 16% ,and fever 12%. X-ray chest was performed in all cases with (figure 1): signs of rupture in 18% cases and multiple Hydatid cyst in 16% cases. Chest computed tomography (CT) has completed the assessment in 10 cases (16%) where the diagnosis were uncertain. The cysts were located in the right lung in 72%, in the left lung in 28%. The size of the cysts varied from 3.5 to 8 cm. Abdominal ultra sonography were performed to detect liver cysts, were found in all cases with liver cyst in 20%. The preoperative workup included routine hemography, determination of the blood urea, sugar, and serum creatinine levels.

Surgical approach (figure 2): Surgery was performed under general anesthesia, with single-lung ventilation was performed with a double-lumen endotracheal tube. For thoracoscopic cyst excision. The telescope port was 10 mm in size and placed in the fifth intercostal space in the midaxillary line, or according to the location of the cystic lesion, to create an operative port. Other ports were a 5-mm and a 5-mm port placed on either side of the cyst. These were positioned in the third and seventh intercostal spaces. The ports were placed anteriorly if the cyst was located posteriorly, and vice versa. The scolicidal agent used was 10% hypertonic saline solution. It was first injected all around the cyst. An aspirating needle was then placed into the cyst, and the cyst contents were aspirated with a 50-mL syringe. A similar amount of hypertonic saline solution was introduced into the cyst. Adequate exposure time (5 minutes) was provided, and then the cyst was aspirated. The capsule of the hydatid cyst is opened up using monopolar tissue sealing device and the remaining fluid and membrane was aspirated or was put in an endobag and taken out from a 10-mm port. Partial pericystectomy was performed. After closing bronchial fistulae, the caponage of the residual cavity was performed. The chest is closed over a tube through one of the ports. After the operation, patients underwent a chest x-ray. This chest x-ray were repeated 1 month, 3 months, 6 months, and 12 months after surgery. Follow up included a routine in clinic consultation service (Figure 3). The intraoperative and postoperative observations, including hospital stay, intraoperative blood loss, thoracic intubation indwelling time, complication incidence, and relapse rate, were recorded in detail after the operation. Statistical analyses were conducted in micro soft Excel 2010. This study was approved by the Ethics Committee of the university.

![Figure 1 A. Preoperative pulmonary x-ray: Intact cyst in the left lung.](image)

![Figure 2 A. Surgical instrumentation](image)

![Figure 2 B. Aspiration of the cyst.](image)

![Figure 2 C. Suction cannula was aspirating the content of the cyst and Germinative membrane](image)
Thoracoscopic removal of the germinative membrane and cystotomy were accomplished in all cases, and Parenchymal-saving procedures were performed. Conversion to open thoracotomy was required in 6 cases (10%) for uncontrollable air leakage. Perioperative death was not observed. The hospital stay time was 3 days (2–8 days). Furthermore, intraoperative blood loss levels were 9 ± 1.5 ml. In addition, the thoracic intubation indwelling time was 80 min (60 min–120 min). The mean duration of the drainage were 24 h in cysts less than 5 cm, and 4 days if more than 5 cm. The complication incidence was 11.6% (7/60) presented with lung infection; 2 cases required a prolonged drainage (8 days). And 7 (11.6%). subcutaneous emphysema. In all the other cases, the follow-up was uneventful. At mean follow-up of 52 months, all patients were asymptomatic without recurrence.

RESULTS
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DISCUSSION
Echinococcosis is still an important health problem throughout the world, particularly in the Mediterranean area. In children, the diagnosis and treatment of the pulmonary hydatid disease are usually prolonged. Principle mode of treatment in pulmonary hydatiddisease is surgery. The choice of surgical technique depends on the conditions encountered during surgery. In the literature, several techniques are defined, including enucleation plus capitonnage, cystotomy plus capitonnage, pericystectomy, wedge resection, segmentectomy, lobectomy, and pneumonectomy. The current treatment is complete excision of disease process with maximum preservation of the lung tissue. Surgical methods most frequently preferred in our departement are parenchymal-saving surgical approaches such as enucleation, cystotomy, and capitonnage.

Few case series of the treatment of pulmonary hydatid disease by thoracoscopy were introduced to the literature. In the literature, the mean time of Thoracoscopic for pediatric Pulmonary Hydatid Disease was 75 min, and the mean hospital stay was 5 days. To our knowledge this is the largest pediatric series up to date treated successfully using thoracoscopy.

The thoracoscopic approach constitutes of principals such as aspiration of the cystic fluid, removal of the germinative membrane, closure of the bronchial connections, and management of the cavity, which are present also in the open approach.

Paterson recommended thoracoscopic interventions for dead cysts and stated that removal of no complicated cysts with thoracoscopy lacked the advantage of cap tonnage in the management of bronchial air leakages and may cause pouring and pleural relapse; however, they stated that the minimal invasive technique may be performed in live cysts as well with the increasing experience and better performance ability with the thoracoscopy.

The average duration of the procedure in our serie was 80 min. The most challenging and time-consuming part of the procedure was the capitonnage. In our serie, the mean duration of the drainage were 24 h in cysts less than 5 cm, and 4 days if more than 5 cm. The hospital stay time was 3 days (2–8 days). In our departement, in the thoracoscopic serie, intraoperative blood was loss, postoperative analgesia requirement was less and the intercostal drain was removed earlier than in the thoracotomy serie.

The morbidity of the thoracoscopic approach is low and its mortality is null. In our study, VATS was superior. Our results were supported by previously published articles. Thoracoscopy is an advantageous method over traditional surgical practices, by means of shorter duration of hospital stay and faster postoperative recovery period.

As mentioned in most of the studies, prolonged air leak is the most frequently seen complication. In the present study the most frequently seen complication was prolonged air leak. The variability of documented recurrence rates (2% to 30%) presumably mirrors the duration of follow-up. In our series, long-term follow-up revealed that all patients were asymptomatic without recurrence.

CONCLUSION
Thoracoscopic management of pulmonary hydatid cyst is safe, offers the advantages of less pain, rapid recovery, less short- and long-term morbidity, and good cosmesis.
Informed Consent

Written informed consent was obtained from patients who participated in this study.

Conflicts of Interest

The authors do not declare any conflict of interest.

Author Contributions

All the authors participated in the development and implementation of this work. They read and approved the final version of the manuscript.

References


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