

Thoracoscopic Treatment of Pulmonary Hydatid Cyst in Children - Seven Years of Experience

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Abstract

The hydatid cyst is an anthroponosis caused by the development of the *Echinococcus granulosus* tapeworm larva in humans. It is endemic in the Mediterranean, South America, Middle East, Australia, New Zealand, and India. Lung localization is ranked second in order of frequency for all age groups after liver localization. Treatment is mainly surgical and consists in the resection of the protruding dome after cyst puncture, suction, and sterilization using a Scolicide solution followed by proligerous membrane extraction and bronchial fistulas obstruction. This surgery can be performed through a thoracotomy or a thoracoscopy. The main objective of our retrospective study is to demonstrate the feasibility of thoracoscopic approach in treatment of pulmonary hydatid cyst in children, analyze results and specify limit of this approach.

Keywords: *Hydatid Cyst; Thoracoscopy; Lung; Algeria*

Introduction

The hydatid cyst is an anthroponosis caused by the development of the *Echinococcus granulosus* tapeworm larva in humans. It is endemic in Algeria and constitutes a real public health problem [1,2]. Lung localization is ranked second in order of frequency for adult groups after liver localization. Treatment is mainly surgical and consists in the resection of the protruding dome after cyst puncture, suction, and sterilization using a Scolicide solution followed by proligerous membrane extraction and bronchial fistulas obstruction. This surgery can be performed through a thoracotomy or a thoracoscopy.

Methods

Clinical presentations were Chest pain (40%), hemoptysis (07%), broncho-pulmonary infection (20%), dyspnea (07%), and dry cough (26%). Chest x-ray and thoracic CT scan performed in all patients, found 21 uncomplicated hydatid cyst of lung with bilateral localization in 03 cases and associated with hepatic localization on abdominal sonography in four patients.

A total of 15 patients underwent thoracoscopic approach in treatment of pulmonary hydatid cyst (10 boys, 05 girls, and mean age 7.8 years) by the same surgeon from 2011 to 2017 in pediatric surgery department of military central hospital of Algeria.

No patient received Albendazole chemotherapy before surgery.

Patients older than 08 year old underwent thoracoscopy with general anesthesia by double-lumen endobronchial intubation using selective single-lung ventilation.

For children under 8, selective intubation has always been attempted with a standard endotracheal tube but not always successful.

Operative technique

Under general anesthesia with single lung ventilation, all patients are placed in lateral position (Figure 1a).

The placement of trocars was guided by the location of the cyst on the thoracic CT scan. Three or four trocars 5 mm were used respecting triangulation; the first one for 30° telescope and two or three others placed under control were used for dissection.

After partial filling of the pleural cavity with a 10% hypertonic saline solution (Figure 1b), the surgical principles of the thoracoscopic treatment of pulmonary hydatid cysts are performed as follows: puncture of the cyst at its dome using a Veress needle, suction, and sterilization with a 10% hypertonic saline solution for 15 minutes (Figure 1c); resection of the protruding dome; extraction of the proligerous membrane through 10 mm Endobag® (Figure 1d); closure of bronchial fistulas by means of intracorporeal stitches (Figure 1e); padding was done in some cases; double chest drainage (anterior and posterior).

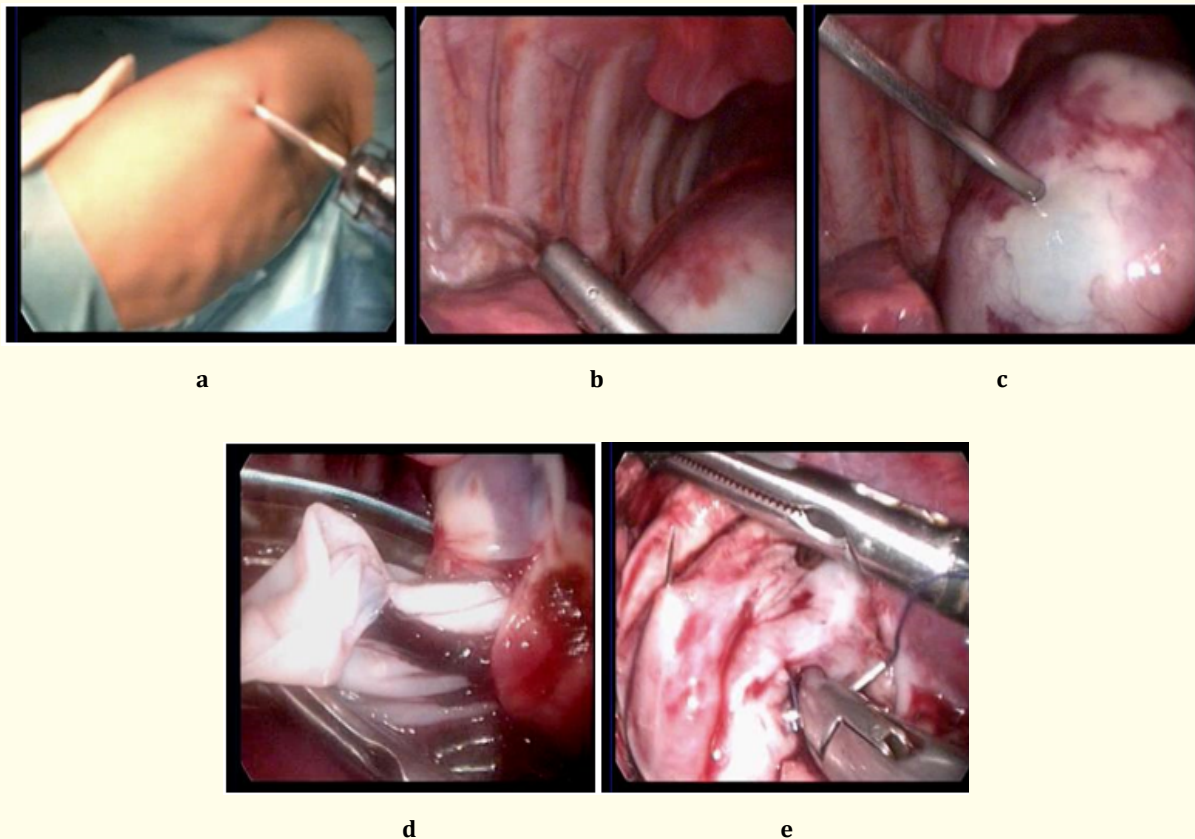


Figure 1: PAIRE procedure.

Results

The average age of our patients was 7.8 years with extremes ranging from 4 - 14 years

Of the 15 patients, 10 patients (67%) were boys and 05 (33%) were girls.

From a total of 21 operated cysts, the cyst was located in the left lung (02 cases), right lung (10 cases) and both lungs (3 cases).

The average diameter of the cyst was 6.9 cm (3 - 17 cm).

The hydatid serology made in 11 patients, was positive in only 6 cases.

Thoracoscopic surgery was done successfully in 13 patients without conversion.

Two cases of open conversions are noted due to anaphylactic shock in a girl appeared after puncture of the cyst and difficulties closing fistulas in a second case with huge hydatid cyst (17 cm) (Figure 2).

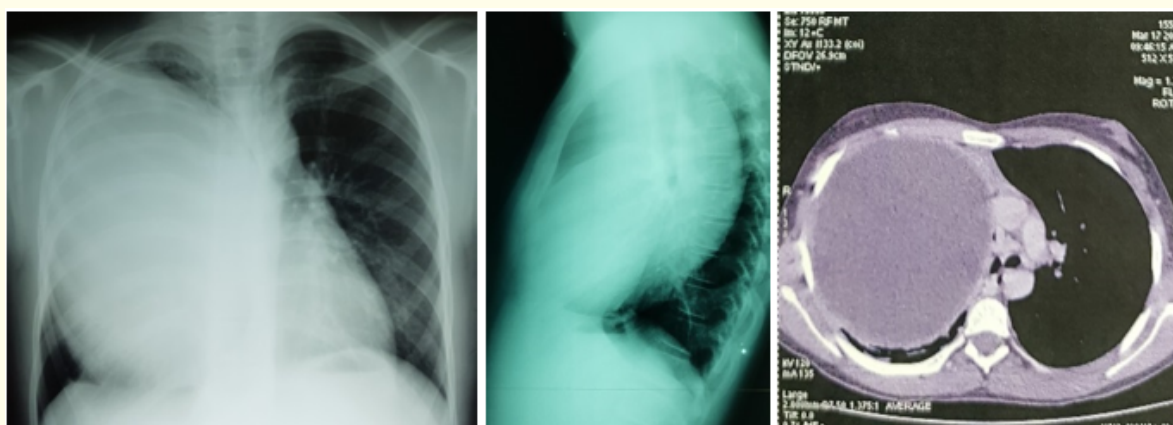


Figure 2: Preoperative chest x-ray with CT scan of right pulmonary hydatid cyst in 14 years old boy (17cm).

The bilateral forms were operated in an interval of one month (Figure 3).

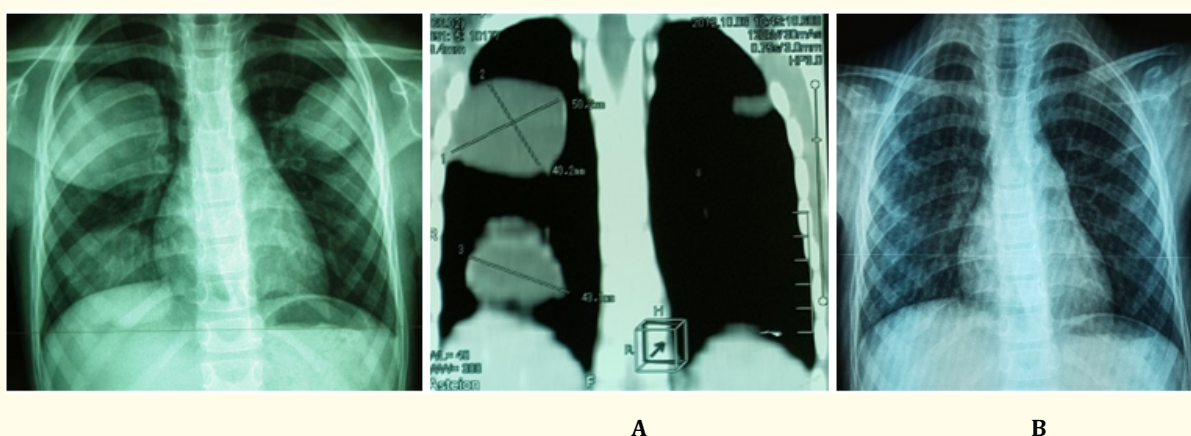


Figure 3: A: Preoperative chest x-ray with CT scan of bilateral pulmonary hydatid cyst in 6 year old girl.
 B: Postoperative chest x-ray.

The mean operative time was 192 +/- 11.6 mn.

Paracetamol with anti-inflammatory were sufficient to manage postoperative pain in all our patients. Drains tubes were removed in third post-operative day and mean hospital stay was 4.8.

One immediate postoperative complication was noted, it was persistence of a big air-leak with chest pain in boy with huge hydatid cyst (13 cm) sutured by thoracoscopy in second postoperative day with good results (Figure 4).

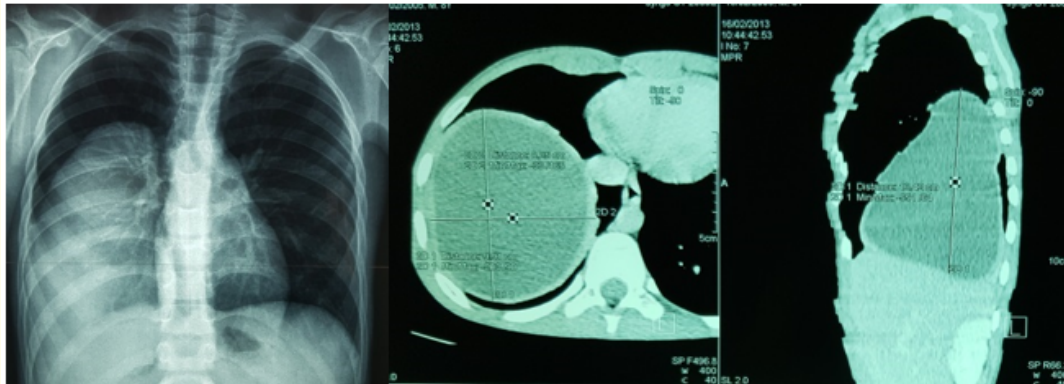


Figure 4: Preoperative chest x-ray with CT scan of hydatid cyst of right lung in 8 year old boy (13.5 x 10 cm).

Albendazole was not prescribed in our patients postoperatively except for the patient who presented anaphylactic shock.

At mean follow-up of 3 years, outcomes were extremely favorable clinically, radiologically, and cosmetically speaking, all patients were asymptomatic.

Discussion

Hydatid disease is an anthroozoonosis caused by *Echinococcus granulosus*. It is still endemic in Algeria. Hepatic and pulmonary localization of the cyst remains the most frequent with predominance of pulmonary localization pediatric population [3].

The hydatid cyst of the lung is often symptomatic (cough, dyspnea, chest pain hemoptysis). In our series chest pain was the most common symptom (40%) followed by coughing (26%). No complicated cases were observed before surgery.

In our population 62% of patients had hydatid cyst diameter above 5 cm, Ksia., *et al.* had chosen only cysts less than 5 cm for thoracoscopy [4]. On the other hand Khattala., *et al.* reports in their publication that 90% of cyst had a diameter less than 10 cm [5].

Surgery is the primary mode of treatment for patients with pulmonary hydatid disease. It can be performed by thoracotomy or thoracoscopy.

Surgical treatment of lung hydatid cyst in children by thoracoscopy initially described in 1993 [6] has now become an approach increasingly used by pediatric surgeons worldwide because of its advantages [7], it reproduces the same surgical principles of conventional surgery.

Thoracoscopic approach was successful in 13 cases (86%). We observed two open conversions (14%) because of anaphylactic shock in one case and difficulties to close large bronchial fistula in a second case due to huge hydatid cyst (17cm). The big sizes of hydatid cyst with difficulties to suture large fistulas were cited in the literature as reasons of conversions [4,8,9].

We agree with Eroglu when he said that hydatid cysts greater than 10 centimeters are not a contraindication to thoracoscopy, this is what Alpray reported in its paper [10,11], indeed we operated a hydatid cyst of the lung 13cm in diameter without incidents. And in our opinion, the limit of thoracoscopy in the treatment of hydatid cyst of the lung depends essentially on the space occupied by this cyst in the thorax.

The average operating time in our series was 192 +/- 11.6 minute, longer than the data from the literature [4,5]. It can be explained by the large size of the cysts treated in our population (62% above 5 cm) as well as the presence of several cysts on the same side in some cases. The chest drains are removed on the 3rd or 4th postoperative day depending on the size of the hydatid cysts treated, and the patient was discharged the day after.

Our mean hospital stay was 4.8 (3 - 6 day), which corresponds the data of the literature [4,5,8]. No Albendazole was prescribed in our patients postoperatively except for the patient who presented anaphylactic shock.

At mean follow-up of 3 years, outcomes were extremely favorable clinically, radiologically, and cosmetically speaking, all patients were asymptomatic.

Conclusion

Our preliminary results indicate that the thoracoscopic approach to the management of pulmonary hydatid cysts is feasible. It completely changed the postoperative evolution of thoracotomy, which causes pain and parietal sequelae in children.

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