Cystotomy and Capitonnage for Pulmonary Hydatid Cyst in Upper Egypt, multicenter experience

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Objective: **Hydatid disease is the most severe helminthic zoonosis with an important public health. Hydatid cyst is caused by the tapeworm Echinococcus granulosus. It usually involves liver and lungs in humans. Surgical intervention is the definitive therapy.The goal of surgery is to remove the cyst while preserving as much lung tissue as possible. The aim of our study was to present the results of current parenchyma-sparing surgical treatment of pulmonary hydatid cysts with its complications.**

PATIENTS AND METHODS: **Between 2009 – 2013, 40 patients with pulmonary hydatid cyst treated surgically. there were 31 males and 9 females, aged from 20–48 years old, with long history of contact with animals or travelling aboard . Cystotomy and capitonnage were performed for most cases.**

RESULTS: **Cystotomy and capitonnage were done for most (37 out of 40) patients without intra/postoperative complications or mortality. No recurrence recorded during 12 months follow up.**

CONCLUSION: **Cystotomy and capitonnage procedure is safe and easy method for surgical management of pulmonary hydatid cyst.**

KEYWORDS : **Hydatid cyst , cystotomy , lung .**

Hydatid disease is the most severe helminthic zoonosis with an important public health. Hydatid cyst is caused by the tapeworm Echinococcus granulosus. It usually involves liver and lungs in humans [1]. Rudolphi *(1808)* first used the term hydatid cyst. It is frequently encountered in the sheep and cattle raising regions of the world and has been observed in Australia, New Zealand, South Africa, South America, Mediterranean counties of Europe, Asia, and Africa [2,3].

Hydatid cyst is a parasitic infestation caused by larva form of Echinococcus. It occurs frequently in liver *(55-75%)* and lung *(15-25%)*, the two organs can be affected simultaneously in about *(5-13%)* [4].

Pulmonary Hydatid cysts are uncommon in non endemic regions like Egypt. Humans are intermediate host. This disease occurs when humans ingest the hexacanth embryos of the dog tapeworm. Pulmonary Hydatid cysts are classified as simple, complicated, and ruptured. Pulmonary hydatid cyst is very rare to have calcified wall. Calcification does not always mean that the cyst is dead [5].

Computerized Tomography *(CT)* is the main diagnostic tool for pulmonary hydatid cyst as it is efficient in locating and detecting smaller cysts, finding their relation to surrounding organs, and for follow up. Usualy it reveals the cyst with smooth margin [5].

Surgical intervention is the definitive therapy.The goal of surgery is to remove the cyst while preserving as much lung tissue as possible. One lung ventilation*(OLV)* provides safety for the patient and better operative field. It is important to avoid any accidental spilling of hydatid fluid into operative field [5].

The aim of our study was to present the results of current parenchyma-sparing surgical treatment of pulmonary hydatid cysts with its complications.

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PATIENTS AND METHODS

This study was conducted at the Cardiothoracic Surgery departments in Minia, Qena, and Sohag universities (Upper Egypt), between January 2009 and December 2013, forty patients with pulmonary hydatid cyst were included in this study. The age, sex, clinical picture, number of cysts, side of affection, associated liver hydatid cyst was recorded ***(table 1)***. Chest x-ray, and ***CT*** findings were analyzed.

The patients were assessed with pre-operative clinical/ radiological and laboratory investigations. All patients underwent imaging with postero-anterior and lateral chest x-rays, thoracic computed tomography and abdominal ultrasonography or abdominal computed tomography and complete blood count/biochemical parameters. The diagnosis was made based on the clinical findings and indirect diagnostic methods (radiological) ***(figure 1).*** Indirect hemagglutination test was performed in the suspected cases.

Technique:

Posterolateral thoracotomy approach was used in all patients. Pericyst was incised after aspiration of cyst contents by 50ml syringe, so the cyst was lax and avoid rupture during cystotomy ***(figure 2).*** Pleural cavity and operative field were covered with pads soaked with 10% povidone-iodine solution to prevent dissemination of disease in pleura. Then, cyst was enucleated from the cavity, and residual cavity was obliterated by separated multiple purse string sutures starting from the deepest level ***(figure 3).*** In 3 cases the cyst was peripheral and wedgeresection was done. One lung ventilation was used to decrease the risk of aspiration of hydatid fluid and dissemination to the other lung.

Variable	Number of patients
Total number of patients	40
Male/female	31/9
Age (years)	20 -48
Number of cysts	48
Single cyst	36 cases
Multiple cysts	4 cases
Location of cysts	
Rt lower lobe	28 patients
Rt middle and lower lobe	4 patients
Lt lower lobe	7 patients
Lt upper lobe	1 patient
Associated liver cysts	2 cases

Table (1): preoperative patients' characteristics

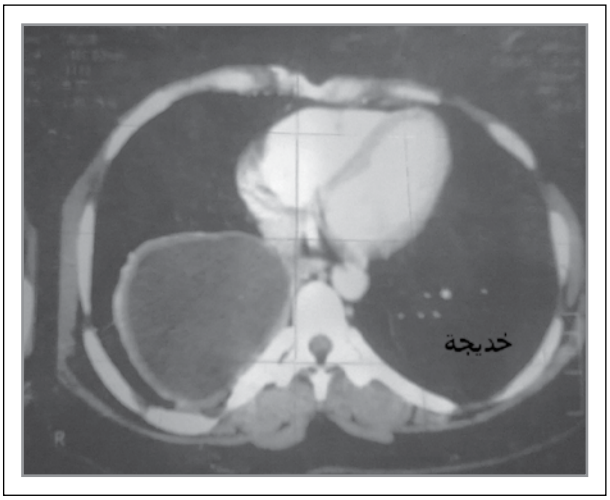

Fig 1. CT chest scan (mediastinal window) showed large hydatid cyst in right lower lobe.

The inner cavity was irrigated with saline solution and cleaned with gauze compresses soaked in povidone-iodine. The bronchial stumps were closed using 3-0 polyglactin. Capitonage was performed at the cyst area using 3-0 polyglactin. In the tow patients with associated liver cysts, diaphragmatic incision (phrenotomy) was performed following thoracotomy, and cystotomy was performed for the liver cyst by co-operation with general surgeons. Following resection of the liver cyst, biliary leakage was checked, a drainage tube was inserted and the diaphragm was sutured using non-absorbable sutures. Two chest tubes, one apical and the other basal, were placed in the thorax after hemostasis.

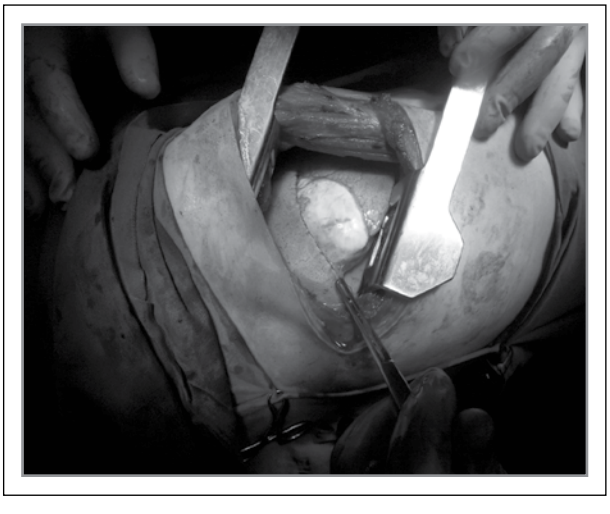

Fig 2. Photo showed posterolateral thoracotomy with large pulmonary hydatid cyst.

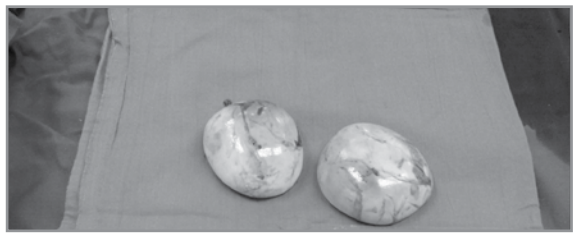

Fig 4. Two intact hydatid cysts after extraction (not tense after aspiration)

Postoperatively, the patients was given full course of albendazole treatment (10-15mg/kg albendazole) for 21 days in three periods, It prevents recurrence and complications.

RESULTS

Forty patients with lung hydatid cysts (2 with combined lung and liver cysts) were included in the study. These 40 patients underwent 42 operations. All operations were performed by thoracic surgeons, and co-operation with general surgeon when associated with liver hydatid cyst. The gender distribution of the patients was: 31 males and 9 females. The cyst was perforated in 5 (12.5%) out of 40 patients. The most common presentation was coughing (19 patients 47.5%), other presentation are sudden onset of chest pain and dyspnea (5 perforated cysts), dyspnea (5 patients), flank pain (2 patients), and in 9 (22.5%) patients it discovered accedentally.

The hydatid cysts were located in the right lung (80%), in the left lung (20%) and more common in lower lobes. There were concomitant liver cysts in two patients. The total number of cysts in 40 patients was 48. The mean cyst diameter was 10.9 cm (4-20 cm). The mean length of postoperative hospital stay was 8.2 days (5-16 days). There was no hospital Mortality. Five (12.5%) patients developed postoperative complications (There were atelectasis in 2 patients, prolonged air leake in 2 patients, and hemoptysis in one patient).

During the follow up period (12 months), there were no recorded complications or cyst recurrence, Follow up was done by clinical examinatin, chest x-ray and CT.

DISCUSSION

The primary treatment for lung hydatid cyst is surgical. Medical treatment should be preferred in patients who cannot undergo surgery and in patients with recurrence or multiple cysts. Cystotomy alone or cystotomy and capitonage operations are methods of choice for achieving optimal parenchymal preservation. Anatomic resections such as pneumonectomy, lobectomy and segmentectomy are usually avoided [6]. Kavukcu et al.,[6] performed 1118 operations in 1032 patients with lung hydatid cyst and none of the patients required anatomic lung resection.

In our series, we didn't need anatomic resection and in most patients parenchyma-preserving techniques such as cystotomy and capitonage were preferred. Wedge resection was performed for the 3 cysts with peripheral localization.

Concomitant pulmonary and hepatic hydatid cysts may occur in 4%-25% of patients. Single stage operation for pulmonary and hepatic hydatid cysts was found to be a safe procedure with low morbidity and mortality [7]. So, we performed right thoracotomy and phrenotomy for two cases.

All pulmonary hydatid cysts should be surgically treated as soon as possible after their diagnosis in order to avoid complications [8]. Several operative techniques are used to manage pulmonary hydatid cyst. The objective is resection of intact cyst and preserving pulmonary tissue. Most authors do not advocate cystectomy (Perez - Fontana method) because it increases the risk of air leaks and postoperative bleeding [3]. Some authors recommend leaving the cavity open without capitonnage. It is clear that leaving a potential cavity might allow infection, hematoma, and abscess formation. Uncontrolled spillage of the cyst contents may cause secondary pleural and bronchogenic hydatidosis [3]. Mahmodlou et al., [9] were dealing with residual cavity in an uncapitonnage manner by removing the thin margins of the pericyst and closing the bronchial openings at the cavity floor. That study had result 4.7% incomplete lung expansion and infection later on and 0.7% persistent air leak.

We used cystotomy and capitonnage to remove hydatid cyst intact without spillage of its contents and closure of residual cavity to avoid its complications in the majority of our cases (except the 3 cases with peripherally located cyst). Our results were without any air leak or infection.

Surgery for pulmonary hydatid cysts with the use of mini-thoracotomy proved to be a method of choice. The access permits early recovery and shorter rehabilitation period , allowing to perform the second liver surgery on the 3rd -7th day after the first operation [10]. Concomitant pulmonary and subdiaphragmatic hepatic cysts can be treated effectively and safely in a single stage operation via a right postero-lateral thoracotomy and Phrenotomy[7]. We performed lung and liver hydatid cyst via right thoracotomy trans-diaphragmatic approach in one stage.

Although the standard treatment of pulmonary hydatid cyst is surgery, some other interventional treatments have been reported. One of these treatments is the evacuation of the cyst with the help of a transthoracic catheter and then injection of a scolocidal substance inside. However, this treatment modality may be preferred only in patients who cannot tolerate surgery and in patients with accompanying infective clinical picture (obstructive pneumonia, empyema, etc.) in spite of the medical treatment [11].

Complications such as spontaneous pneumothorax, empyema, pleural thickening, hepatopleural fistula, pericarditis, and hepatobronchial fistula may develop after rupture of the pulmonary hydatid cyst into pleura [12].The ruptured cysts may lead to a misdiagnosis with the complications caused. They can be confused with other lung diseases such as pneumonia, tuberculosis, tumor, pleurisy, and pneumothorax [13].

In our study, 5 cases (12.5%) with perforated cysts presented to the emergency department with clinical findings of pneumothorax, hydropneumothorax. These patients had symptoms of sudden-onset chest pain, dyspnea and cough. It should not be overlooked that perforated pulmonary hydatid cyst cases may present to hospital with clinical findings of pneumothorax/hydro-pneumothorax, and the diagnosis of pulmonary hydatid cyst should be kept in mind.

CONCLUSION

Surgery is the primary treament of lung hydatid cyst with low morbidity and mortality. Cystotomy and capitonnage is safe and effective for surgical management of pulmonary hydatid cyst without recurrence in 12 months follow up. That procedure decrease risk of air leak and bleeding, so decrease cost and hospital stay.

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