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Surgical Treatment of Complicated Pulmonary Hydatid Cyst

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ABSTRACT

Background: Hydatid disease is caused by an infection with the cestode, *Echinococcus granulosus* and is endemic in Iran. Medical therapy and surgical management are two main treatments. The purpose of this study is to represent our ten-year experience in surgical management of patients with complicated pulmonary hydatid disease including cysts ruptured into the pleural space or bronchi, multiplicity, hemoptysis, large size cysts and coexistence with liver cysts.

Materials and Methods: Medical records of 109 patients, who underwent surgery for the treatment of pulmonary hydatid disease in Masih Daneshvari Hospital from December 1995 to October 2005, were reviewed. Among these patients, we selected our study group in accordance with the following criteria:

1) Cyst rupture into the pleural space or bronchi, 2) Occupying more than two third of the hemithorax in radiological studies, 3) Multiple cysts, 4) Massive hemoptysis, and 5) Synchronous pulmonary and liver cysts.

Results: Among the 109 patients with pulmonary hydatid cyst, 82 patients (59% male and 41% female) met the above mentioned criteria. The mean age of patients was 31.7 years (range 9-80 yrs). The cyst diameter was determined by radiological imaging. The mean diameter was 6.23 cm, and 13 patients had giant cysts (occupying more than 2/3 width of the hemithorax). In this study group 55 patients had ruptured hydatid cysts, 29 had multiple cysts, 11 had significant hemoptysis and 15 had synchronous pulmonary and liver cysts. All patients had undergone surgery with or without previous medical therapy. Our procedure of choice was thoracotomy, cystectomy and closure of the bronchial openings before irrigating the cavity with silver nitrate (0.5 %) soaked sponge. Pulmonary resection was done in 8 patients due to the irreversible parenchymal damage. Post operative complications occurred in 16 (19%) patients including residual pleural space in 8, broncho-pleural fistula in 2, pleural effusion in 1, pulmonary embolism in 1, osteomyelitis of sternum in 1, laceration of diaphragm in 1, and inability to access the liver hydatid cyst after thoracotomy and post operative pulmonary insufficiency necessitating mechanical ventilation also in 1 patient. One patient died because of sepsis (she had been operated on for combined pulmonary and liver hydatid disease). In the 1 to 60 months follow up period, 2 recurrences occurred.

Conclusion: Although post operative complications occurred in 19% of our patients, all were treated by conservative managements. This rate of complications was acceptable among patients with complicated hydatid disease. Our procedure of choice is draining the cyst; closing all the bronchial openings in the pericyst and leaving the pericyst cavity open into the pleural space. (Tanaffos 2007; 6(1): 19-22)

Key words: Hydatid disease, Complicated pulmonary hydatid cyst, Lung, Surgery

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INTRODUCTION

Hydatid disease is caused by an infection with the cestode *Echinococcus granulosus* and is endemic in Iran. Adult worms mature in the intestine of dog (definitive host) and the eggs are released in the stool. Animals like sheep get this disease by via ingestion of contaminated vegetables. By an accidental ingestion in human beings (accidental host), oncospheres hatch in the duodenum, penetrate the intestines and are carried via the bloodstream to various organs. The most commonly involved organ is the liver followed by the lungs. The prevalence have been of pulmonary involvement is reported to be 10% to 40%. Two main treatment methods recommended in the literature: medical therapy and surgical treatment (1). In the former, benzimidazole products such as albendazole are administered. In numerous studies, surgery has still remained the treatment of choice (2-12). Medical therapy is indicated in cases where surgery is not feasible. Pulmonary hydatid disease may be accompanied by complications including cyst rupture into the pleural space or bronchi, massive hemoptysis, large size cysts, multiplicity and concomitance with liver cysts (2). Massive hemoptysis is defined as blood loss of more than 500 cc in 24 hours. Also, cysts occupying more than 2/3 width or length of the thorax in chest radiography are considered to be large size (6). These patients have a more complicated treatment course with a higher rate of complications as compared with uncomplicated cases. Therefore, considering the fact that Masih Daneshvari Hospital is a thoracic surgery referral center serving a large number of patients with pulmonary hydatid cyst, we decided to present our 10-year experience in surgical treatment of the patients with complicated hydatid disease and their outcomes.

Our experience might be helpful for others in the treatment of complicated cases.

MATERIALS AND METHODS

Medical records of patients with pulmonary hydatid cyst who were admitted to the thoracic surgery department of Masih Daneshvari Hospital from October 1995 to September 2005 were reviewed. Those with the pulmonary hydatid cyst with the below mentioned criteria were included in the study:

- 1) A ruptured cyst visible in the radiography
- 2) A large size cyst occupying more than 2/3 the width or length of the hemithorax in chest x-ray
- 3) Multiple pulmonary hydatid cysts
- 4) Pulmonary hydatid cyst synchronous with liver cysts
- 5) Massive hemoptysis (more than 500 cc bleeding in 24 hours)

Sex, age, clinical signs and symptoms, chief complaint, characteristics of the cyst in chest x-ray and lung CT-scan, sonographic study of the liver, treatment modality and in those who were operated upon, type of the tracheal tube, surgical incision, type of surgical procedure, rate of complications and post operative morbidity and mortality in thoracic surgery department and the rate of recurrence during the follow up period were the factors we evaluated in the patients' medical records.

RESULTS

Of the 109 patients affected with pulmonary hydatid cyst, 82 cases (75%) had complicated cysts and entered the study group. There were 59% males and 41% females with a mean age of 31.7 years (range 9-80 yrs). The mean diameter of the cysts was 6.23 cm. Of all patients, 55 had

ruptured cysts, 29 had multiple cysts, 15 had synchronous pulmonary and liver cysts, 13 had large size cysts, and 11 had massive hemoptysis. Some patients had two or more complications simultaneously. The most common complaint was cough and sputum seen in 27 (33%) patients. Lower lobe of the right lung was the most commonly involved site. Out of 55 patients with ruptured cysts, in 31 cases the cysts had been ruptured into the pleural space, in 23 cases the cysts had been ruptured into the bronchi and in 1 case into the biliary ducts. Eighty-one patients underwent surgery out of which 36 had previously undergone medical therapy with albendazole. One patient did not accept the surgery and was only followed-up. Posterolateral thoracotomy was the most common surgical incision (table 1).

Table 1. Types of surgical incision in patients with complicated pulmonary hydatid cyst

Number	Type of surgical incision
74	Thoracotomy
4	Thoracotomy along with incising the diaphragm
2	Median sternotomy
1	Clamshell incision

The applied surgical procedures included cystectomy along with repair of the bronchial openings and leaving the pericyst open in 69 cases, cystectomy with capitonnage in 4 cases, wedge resection in 6 cases and lobectomy in 2 cases. In 63 cases, type of the tracheal tube used during anesthesia had been specified in their medical records. In 62 of them, a double lumen tube and in 1 case a single lumen had been used. Surgical complication occurred in 16 cases (19%). The most common complication was residual pleural space which was detected in 8

cases (table 2). Death occurred in the case of a 19-year-old female whose lung did not expand following surgical evacuation of the cyst. She consequently developed empyema and underwent pleural decortication. Afterwards, she developed septicemia resulting in her death. In the follow up period of 1 to 60 months, 2 cases developed recurrent disease (2.4%).

Table 2. Post operative complications in patients with complicated pulmonary hydatid cyst

Number	Type of post operative complication
8	Presence of residual pleural space
2	Broncho-pleural fistula
1	Pleural effusion
1	Pulmonary embolism
1	Sternal osteomyelitis
1	Perforation of the diaphragm due to adhesion to the lung
1	Incising the diaphragm without approach to the liver cyst
1	Post operative tracheal intubation due to respiratory distress

DISCUSSION

Hydatid disease of the lung has a higher tendency to expand as compared to the cysts of other body organs. This might be due to the low elasticity of the lung parenchyma, negative pressure of the pleural space and absence of calcification. Due to its higher growth, the complications are also higher. In the literature, surgical excision with preservation of the lung parenchyma as long as possible is recommended for the treatment of pulmonary hydatid cyst (8, 11, 12). Enucleation and cystectomy with capitonnage are the most common procedures. Rate of complication in these procedures was 12.9% to 19%, mortality rate was 0 to 2% and rate of recurrence was reported to be 0 to 2.7 (1, 2, 3, 4, 5, 8, 10).

Among patients presented to our center with pulmonary hydatid cyst, 75% had complicated cysts. Out of 82 patients, 81 underwent surgery, which is the treatment of choice for pulmonary hydatid cyst.

The most commonly used incision was the right posterolateral thoracotomy and the most frequently used surgical procedure was cystectomy with repair of the bronchial openings and leaving the pericyst open into the pleural space which was performed in 84% of the cases. Only in 10% of the cases was lung parenchymal resection required since the lung parenchyma had been greatly destroyed. Complications occurred in 19% of our patients. The most frequent complication was residual pleural space. Except one case, all patients with this complication were treated by supportive therapy. If we had spent more time repairing the bronchial openings more precisely, we would have had fewer complications of this sort. Death occurred in one case (1.4%) and in the follow-ups; rates of mortality, morbidity, and recurrence were comparable with those of other studies.

CONCLUSION

Considering the low mortality, acceptable rate of complications, and low recurrence, we recommend surgery for the treatment of complicated hydatid cysts. Our recommended surgical procedure is thoracotomy, evacuation of the cyst, closure of the bronchial openings, and leaving the pericyst open into the pleural space.

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