Surgical Treatment of Complicated Hydatid Cysts of The Lung

Gökhan Hacıbrahimoğlu, MD[1]; Muharrem Çelik, MD[2]; Canan Şenol, MD[2]; Alpay Orki, MD[2]; Şenol Urek, MD[2]; Bülent Arman, MD[2]

[1] *Yedikule Hospital for Chest Disease and Thoracic Surgery, Department of Thoracic Surgery, İstanbul, Turkey*
[2] *Heybeliada Chest Disease and Thoracic Surgery Center, Department of Thoracic Surgery, İstanbul, Turkey*

Abstract

In this retrospective study, we analysed the characteristics on presentation, operative techniques, and postoperative morbidity and mortality rates in 91 patients with complicated hydatid cyst of the lung. There were 96 complicated cysts in 91 patients. Among these cysts, 60 were perforated, 21 were infected, and 15 were cysts with pleural complications. The series consisted of 48 male and 43 female patients with a mean age of 30±11 years. There was no mortality. Cystotomy plus capitonnage was the most frequently performed operative technique (n:46), followed by cystotomy plus closure of bronchial openings (n:28), pericystectomy plus capitonnage (n:14), decortication (n:5), lobectomy and segmentectomy (n:3). The 7 cases with coexisting liver cysts were approached by right thoracophrenotomy. Postoperative complications developed in 5 patients (5.4%).

It was concluded that, application of appropriate surgical treatment in complicated hydatid cysts results in low complication and recurrence rates.

Turkish Respiratory Journal, 2003;4:(3):127-130

Key words: *hydatid cyst, complicated, lung, surgery*

Introduction

Hydatid disease; caused by *Echinococcus granulosis*, is endemic in some countries, particularly where sheep and cattle are raised, such as Australia, New Zealand, the Mediterranean countries, the Middle East, and South America [1]. In Turkey, where the incidence of hydatid disease is reported to be 20/1 000 000, it is particularly common in the rural population (2,3). After the liver, the lung is the second most common site for hydatid cysts in adults.

The aim of the study was to evaluate the functional results in the surgery of complicated hydatid cysts.

Methods

In this retrospective study, we report our 10-year experience with complicated hydatid cysts of the lung. The clinical files of 260 patients who had undergone operations for hydatid disease of the lung in our clinic from January 1989 to December 1998 were reviewed. Among these patients, 91 (35%) had complicated cysts. The group consisted of 48 male and 43 female patients with a mean age of 30.8±11.2 years, ranging from 5 to 65 years.

Patients with hydatid cysts of the lung who have perforated cysts or cysts complicated by infection, calcification, or pleural involvement, are included in a special clinical entity called

Correspondence: *Dr. Gökhan Hacıbrahimoğlu*
Kalıpçı Sok. Mustafabey Apt. No: 77/2
Teşvikiye, 80 200 İstanbul, Türkiye
Tel: +90 (0) 212 261 27 78 (home)
Tel: +90 (0) 212 664 17 00/201 (office)
Fax: +90 (0) 212 351 50 35
e-mail: g.haciibrahimoglu@mail.com

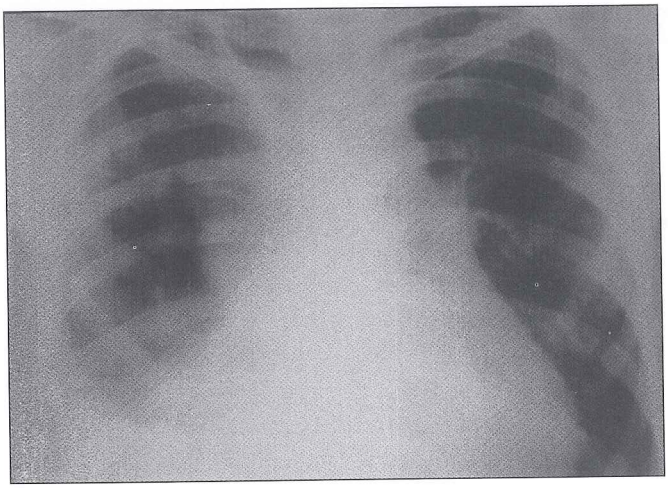

Figure 1. *Chest x-ray image of complicated hydatid cyst with pleural complication.*

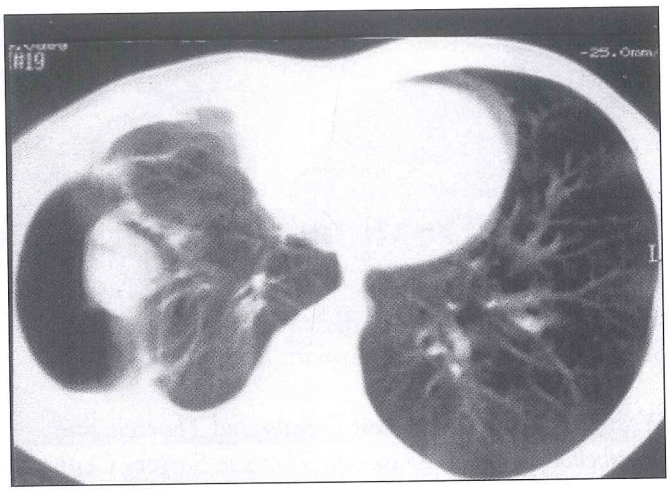

Figure 2. *Chest CT of the same patient.*

"complicated hydatid cysts" (4). Thus the term "complicated" does not necessarily indicate an infected cyst.

Preoperative evaluation was done by means of physical examination, hematological and biochemical investigations, chest X-ray, electrocardiogram, computed tomography of the chest and of the upper-abdomen (CT) and bronchoscopy (either preoperative fiberoptic or preoperative rigid bronchoscopy) if an endobronchial lesion was suspected. Additional investigations such as Casoni's intradermal test, or specific anti-echinococcus IgE were also performed. We did not routinely perform Casoni's intradermal test, Weinberg complement fixation test, and eosinophil count for diagnosis because their diagnostic value are suboptimal. A diagnosis of complicated hydatid cyst was made based on chest X-ray, CT or medical history.

Operative techniques: All procedures were performed under general anesthesia with double-lumen endotracheal tube. A posterolateral thoracotomy through the fifth or sixth intercostal space was accomplished in lateral decubitus position. When the hydatid cyst was identified, the surgical wound and adjacent tissue was covered with packed gauges soaked in 1% povidone-iodine so that only the area of the lung containing the cyst was exposed. In patients with perforated and infected complicated cysts, after removal of remnants of germinative membranes and laminated membranes, the residual cavity was carefully cleaned and re-examined for spillage of daughter vesicles. The cystic cavity was cleaned by suction and irrigated with 1% povidone-iodine in all patients. Cystotomy plus capitonnage were performed in these patients. Though recently cystotomy plus closure of bronchial openings technique in perforated hydatid cysts are being performed. Bronchial openings were detected using saline solution, and closed with a 3-0 polyglactin 910 (Vicyrl, Ethicon, Edinburgh, Scotland). Decortication was performed in patients with pleural complications.

With application of positive endopulmonary pressure, air escaping through any bronchial openings is visualized by the formation of bubbles. This maneuver was repeated until all air leaks were sealed. There were 3 patients who underwent resections (1 left lower lobectomy, 1 right lower lobectomy, 1 lingulectomy) due to a destroyed lobe. In all patients, either a 32F or 28F chest tube was positioned posteriorly and anteriorly, in a respective order. All of the patients were transferred to the intensive care unit following operation. During the postoperative period, chest tubes were placed on -20-25 cm H_2O suction and were removed when no air leak was evident and when the drainage was less than 150ml in 24 hours. A right thoracophrenotomy was performed in 7 cases with concomitant liver hydatid cysts. Twenty one patients were given albendazole in a dosage of 10 mg/kg as a postoperative prophylactic measure to prevent recurrence. Treatment was given as 3 sequential 28-day courses, with 14-day intervals between courses and continued for two years.

Results

A nonproductive cough was the main complaint of the patients at presentation. Some of the patients with centrally located cysts complained of blood-streaked sputum and others of a dull ache in the chest. Hydatoptysis, the only pathognomonic symptom of pulmonary hydatid disease was observed in 2 patients (2.1%). Fourteen patients (15.3%) described a salty taste in mouth after vomit-like expectoration of a colorless fluid that was an important indication of a perforated pulmonary hydatid cyst. Allergic reactions were not observed in any of the patients.

The most common findings in the chest x-ray films of patients with complicated cysts were the presence of an air-

Table 1. Location of 96 complicated hydatid cysts in 91 patients

	Upper Lobe	Middle Lobe	Lower Lobe	Total	%
Right lung	19	11	24	54	56
Left lung	21	-	21	42	44
Total	40	11	45	96	100

Table 2. Surgical data for 91 patients

Operative Method	No. of Operations	Condition of cyst		
		Perforated	Infected	Pleural Complication
Cystotomy+capitonnage	46	22	14	10
Cystotomy+closure of bronchial openings	28	26	2	-
Pericystectomy+capitonnage	14	12	2	-
Decortication	5	-	-	5
Resection (Lob+Seg)	3	-	3	-
Total	96	60	21	15
Right Phrenotomy	7			

Lob: Lobectomy, Seg: Segmentectomy

Table 3. Postoperative complications and operative techniques

Complications	No. of patients	%	Operative technique
Hemorrhage*	1	1.09	Pericystectomy+Capitonnage
Prolonged air leaks (>7 days)	1	1.09	Cystotomy+Capitonnage
Atelectasis	3	3.27	Cystotomy+Capitonnage

*Re-operation

fluid level or the precence of air between the two layers of the cystic wall. The findings were noted in 77 patients (85.7%). Total pneumothorax occurred in 2 patients (2.1%) (Fig. 1,2). Once the suppuration occurred following perforation, contrast enhancement of the cyst wall and an increase of the fluid density (>20 Hounsfield units) within the cyst were seen in 12 patients on CT (12.2%).

Fifty-four of the complicated cysts were located in the right lung and 42 in the left lung (Table 1). Seven cases had concomitant liver hydatid cysts. Cystotomy plus capitonnage were the most frequently used operative technique (n:46), followed by cystotomy plus closure of bronchial openings (n:28), pericystectomy plus capitonnage (n:14), decortication (n:5), lobectomy and segmentectomy (n:3) (Table 2). There was no emergency procedure.

There was no mortality among our patients but 5 (5.4%) early postoperative complications (1 hemorrhage, 1 prolonged air leak, and 3 patients with atelectasis). One patient was re-operated for hemorrhage. The remaining patients were treated conservatively. Prolonged parenchymal air leak (>7 days) was managed by continuous negative aspiration and chest physiotherapy until the lung was fully expanded. There was no correlation between postoperative complications and the technique used (Table 3).

Follow-up: Eleven patients were lost to follow-up. All of the remaining patients were followed for periods varying from 5 months to 10 years. Median follow-up period was 48 months. While there was no recurrence in the patients who received chemopro-phylaxis, recurrences developed in 2 patients (2.5%) who had not received chemoprophylaxis. Recurrences were observed with disseminated pleural hydatidosis in two patients 4 and 9 months after the operation. In both of these two patients, the recurrence site was in a different lobe but on the same side as the original cyst. Both patients had a second thoracotomy.

Discussion

In this paper based on a retrospective review of 91 patients with complicated hydatid cysts of the lung, we present our experience with respect to the clinical characteristics of these patients, to treatment modes and treatment outcomes.

Diagnosis of pulmonary hydatid cysts is generally based on clinical and radiological findings. Pulmonary hydatid disease presents a wide range of radiological findings (5). Uncomplicated cysts are seen as round opaque lesions on chest radiography. Infection and perforation may change the radiographic appearance of hydatid cyst, which may lead to an incorrect diagnosis and delayed treatment. Although infected cysts are usually associated with perforation, this is not generally true and some ruptured cysts may remain uninfected (6,7). Computed tomography (CT) may be helpful in establishing the diagnosis in complicated cysts, but the routine use of CT is not recommended unless a complicated hydatid cyst is suspected. (8). CT is also helpful to detect malignant lesions in elderly patients and a useful guide for surgeons, allowing to perform a single operation for bilateral pulmonary and concomitant liver cysts.

Although several clinical laboratory studies including, fiberoptic bronchoscopy, Casoni's intradermal test, and the indirect hemaglutination test are believed to be useful in the diagnosis, these tests/interventions are not reliable for reported sensitivity rates vary significantly (9,10,11). Therefore these tests are not used for diagnosis routinely. Although a recent report has suggested medical therapy with albendazole in patients with hydatid cyst disease (12), surgery continues to be the treatment of choice in pulmonary hydatid disease. Chemotherapy alone is not reliable in controlling this disease. Albendazole is used routinely only in the treatment of patients with thoracoabdominal multiple hydatid disease, those with complicated hydatid cysts of the lung, in patients that have undergone nonradical resection,

in patients with recurrent cysts and in inoperable cystic hydatidosis.

Operation is the treatment of choice for pulmonary hydatid cysts. Various surgical procedures have been described in the literature, namely, excision of the entire cyst by enucleation (Barret technique), excision of pericyst (Perez Fontana), cystotomy, capitonnage, wedge resection, segmentectomy, and lobectomy (2,6). The choice of surgical technique depends on the conditions encountered during surgery. As a rule, the lung parenchyma should be preserved as much as possible in patients with pulmonary hydatid disease and radical procedures must be avoided (13). If, however, bronchiectasis or severe inflammation is present, the affected lung should be excised. Lung resection was carried out in 3 (3.2%) of our patients with infected cysts. In our series, we tried to avoid lung resection in treatment of the infected cyst as much as possible and we believe this policy has contributed to the successful outcome in our patients. For this reason, we have concluded that parenchyma resection should not be the first choice for the treatment of an infected hydatid cyst. Decortication was performed in 5 patients (5.4%), because of the pleural thickening. Conservative surgical techniques, such as cystotomy plus capitonnage constituted the routine surgical approach in our clinic. But, recently, we started to perform cystotomy plus closure of bronchial openings technique. While conservative surgical technique such as capitonnage is widely performed for the management of the residual cystic space, it can cause atelectasis by obliterating the bronchus surrounding the cyst or the residual cavity may not be obliterated completely by this procedure. Especially in patients with perforated cysts, postoperative complication rates can be lowered by the application of the cystotomy plus closure of bronchial openings technique.

About 20% of patients with lung hydatid cysts also have cysts in the liver. Pulmonary hydatid cyst patients with concomitant hepatic cysts are approached through a right thoracophrenotomy if the liver cysts is a) located on the upper surface of the liver, b) located in the upper and posterior part of the right lobe of the liver, c) penetrating through the diaphragm into the pleura, lung, or pericardium, and d) located in the upper part of the left lobe of the liver (14).

In conclusion, CT scans of the chest and upper abdomen are helpful for diagnosis and for selection of the appropriate surgical approach in patients with complicated hydatid cyst of the lung. Conservative surgical procedures should be used as first choice. The lung parenchyma should be preserved as much as possible. In patients with coexisting liver cysts, thoracotomy or median sternotomy accompanied by a transdiaphragmatic approach is preferable. An appropriate surgical approach results in low complication and recurrence rates.

References

1. Aletras H, Symbas PN. Hydatid disease of the lung. In: Shields TW, eds. General Thoracic Surgery (ed 3). Philadelphia, PA, Lea & Febiger, 2000; 1113-22
2. Aytaç A, Yurdakul Y, İkizler C, et al. Pulmonary hydatid disease: Report of 100 patients. Ann Thorac Surg. 1977; 23: 145-51
3. Kalyoncu AF, Selçuk ZT, Emri AS, et al. Echinococcosis in the Middle East and Turkey. Reviews of Infectious Disease. 1991; 13: 1028-29
4. Crausaz PH. Surgical treatment of the hydatid cyst of the lung and hydatid disease of the liver with intrathoracic evolution. J Thorac Cardiovasc Surg. 1967; 53: 116-29
5. Gouliamos AD, Kalovidouris A, Papailoy J, et al. CT appearance of pulmonary hydatid disease. Chest 1991; 100: 1578-81
6. Doğan R, Yüksel M, Çetin G. Surgical treatment hydatid cysts of the lung: report on 1055 patients. Thorax. 1989; 44: 192-99
7. Çelik M, Şenol C, Keleş M, et al. Surgical treatment of pulmonary hydatid disease in children: Report of 122 cases. J Pediatr Surg. 2000; 35: 1710-3
8. Saksouk FA, Fahl LF, Rizk GK. Computed tomography of pulmonary hydatid disease. J Comput Assist Tomogr. 1986; 10: 226-32
9. Orueta A, Fau LF, Montero A. Surgical treatment of hydatid cysts of the lung. Br J Dis Chest. 1984; 68: 183-92
10. Wattal C, Malla N, Khan IA, et al. Comperative evaluation of enzyme-linked immunosorbent assay for diagnosis of pulmonary echinococcosis. J Clin Microbiol. 1986; 24: 41-46
11. Saygı A, Öztek İ, Güder M, et al. Value of fiberoptic bronchoscopy in the diagnosis of complicated pulmonary unilocular cystic hydatidosis. Eur Respir J. 1997; 10: 811-14
12. Gil-Grande LA, Rodriguez-Caberio F, Prieto JG, et al. Randomized controlled trial of efficacy of albendazole in intraabdominal hydatid disease. Lancet. 1993; 342: 1269-72
13. Halezeroğlu S, Çelik M, Uysal A, et al. Giant hydatid cysts of the lung. J Thorac Cardiovasc Surg. 1997; 113: 712-17
14. Eren N, Özgen G. Simultaneous operation for right pulmonary and liver echinococcosis. Scand J Thorac Cardiovasc Surg. 1990; 24: 131-34