

15 Years in Surgical Management of Pulmonary Hydatidosis

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Objectives: Echinococcosis remains an endemic surgical problem in countries where sheep and cattle raising is carried out, particularly in many Mediterranean countries. This study aims to evaluate the management of different presentations of pulmonary hydatidosis and their outcome over 15 years.

Design: Retrospective study.

Setting: Thoracic surgical department, Chest Diseases Hospital, Kuwait.

Patients: Sixty patients operated upon for hydatid disease were evaluated pre- and post-operatively; 35 males, 25 females with a mean age of 28.4 years. Most patients were investigated by laboratory, serological and radiological studies. Different surgical techniques were used to remove the hydatid cyst from the lung.

Results: The most common presenting symptoms were cough (41 patients), and 12 patients were asymptomatic. Chest X-ray showed a rounded shadow in 42 patients; 19 cases were of vigorous size >10 cm. Thoracotomy was done in 57 patients; two chest wall cases were managed by minimal skin incision and enucleation, one hydatid cyst of the heart was approached through a median sternotomy. The mean hospital stay was 9 days. Postoperative complications occurred in 9 patients; prolonged air leak in 4 patients, pleural effusion in 3, pneumothorax, and wound infection in one patient each. One patient (65 years old) died on the 6th post-operative day most probably from pulmonary embolism. In a follow-up period of 2-15 years, 4 recurrences have been noted.

Conclusion: Surgical excision of pulmonary hydatidosis with maximum preservation of the lung parenchyma is the main stay of treatment. (*Ann Thorac Cardiovasc Surg* 2002; 8: 131-4)

Key words: pulmonary hydatidosis; surgical treatment; thoracotomy

Introduction

Hydatid disease is seen quite frequently in the sheep-raising areas of the world, such as South America, Australia, Greece and Middle Eastern countries. Kuwait is one of the Middle Eastern countries in which hydatid disease is endemic. Hydatidosis is quite common in this country so this disease should always be considered in the differential diagnosis of mass lesions and other respiratory symp-

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toms. Over the past 15 years, from 1983 till 1998, 60 cases were studied in retrospective analysis. The clinical presentation of these cases and their management were analysed.

Patients and Methods

The medical records of 60 patients with pulmonary hydatidosis who presented to Chest Diseases Hospital in Kuwait between 1983 and 1998 were reviewed. Thirty-five patients were males (58.5%) and 25 were females (41.5%). The ages ranged from 4-65 years with a mean age of 28.4 years. In 12 patients who were asymptomatic (19.2%), the diagnosis were purely accidental. The rest evidenced a diversity of symptoms (Table 1). Chest radiographs and computed tomography (CT) of the chest and upper abdomen were done for all patients. Chest X-

Table 1. Incidence of clinical picture in 60 patients with hydatid cyst

C/P	No.	%
Asymptomatic	12	19.2
Cough	41	65.5
Expectoration	26	43.5
Chest pain	26	43.5
Fever	17	27.2
Dyspnea	7	11.2
Hemoptysis	5	8.0
Rt. hypochondrial pain	2	3.2
Bitter taste	2	3.2
Others	3	6.4

Some patients presented with more than one symptom.

ray showed a rounded shadow in 42 patients (67%) (Fig. 1), pleural effusion in 6 patients (9.6%), and an ill-defined lung shadow in 8 patients (12.8%). Cysts with fluid levels were seen in 3 patients (5%) (Fig. 2), CT scanning of the chest and abdomen allowed accurate localization, measurement and confirmation of hydatid cysts (Fig. 3). Fifteen cases (24%) were discovered to have other visceral hydatid cysts (11 cases liver hydatid cyst, 2 cases in the spleen, and left kidney and heart, one case each).

Surgical procedures

The operative approaches used in this series were thoracotomy only in 46 cases, thoracotomy and transdiaphrag-



Fig. 1. Posteroanterior view of chest roentgenogram showing three echinococcal cysts in the left lung.

matic incision in 9 cases, thoracotomy and laparotomy in 2 patients, skin incision and enucleation of chest wall cysts in 2, and median sternotomy in one. Several operative techniques were used in our series. Forty cases were managed initially with instillation of 1% formalin into the cyst under careful isolation of the cyst area. After that the cyst was opened and removed (liquid + hydatid membrane with complete extirpation of the endocyst). Twelve cases were managed initially by injecting 10 ml of 10% NaCl solution into the cyst. In almost all cases we resected a piece of the adventitia with the purpose of leaving the residual cavity largely open to pleura. After that, careful control of small and large bronchial fistulae, was carried out with or without removal of the fibrous pericyst. Cystectomy by suction and marsuplization were done in 36 patients, enucleation with marsuplization in 5 patients, capitonage in 9 cases, and enucleation with wedge resection in 6 cases. Decortication was done in 2 patients, lobec-



Fig. 2. Posteroanterior view of chest roentgenogram showing a collapsed echinococcal membrane lying above the air fluid level.

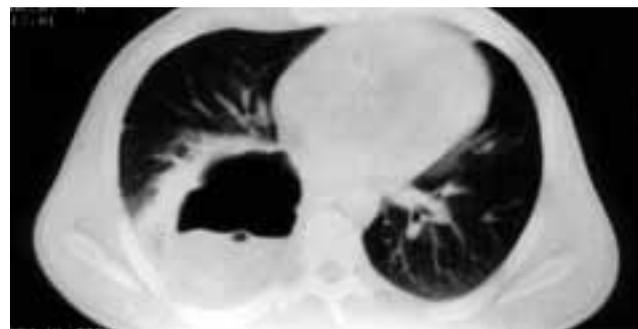


Fig. 3. Computed tomography of the chest showing a ruptured echinococcal cyst in the right lower lung field with the cystic membrane floating on the hydatid fluid.

tomy was performed when after removal of the cyst, the lung tissue was found to be destroyed by prolonged compression or infection in 9 cases. In some patients whom had multiple hydatid cysts, more than one operative techniques were used.

Results

Pre-operative diagnosis was pulmonary hydatid cyst in 41 patients (65.7%), 8 patients (13%) were presented as pleural effusion, empyema or hydropneumothorax and an intercostal tube was inserted for every one of them before the surgical treatment. Eight patients (13%) were presented with ill defined lung shadow. Cyst with air fluid level were seen in 3 patients (5%). Nineteen cases (29%) presented with a cyst of a vigorous size >10 cm (Fig. 3). The lesion was on the right side in 43 patients (69%) and the left side in 22 cases (35%). The lower lobe was affected more than the upper or middle lobe. Multiple hydatid cysts were seen unilaterally in 3 cases (5%) and 6 cases (10%) were multiple and bilateral. The mean hospital stay was 9 days (7-16 days). The following complications occurred in the early postoperative period; prolonged air leak (more than 10 days) in 4 cases (6.5%), pleural effusion in 3, pneumothorax and wound infection in one patient each. The management of patients with prolonged air leak was pleural drainage in 2 cases, reoperation and closure of air leak in one, and right lower lobectomy in one patient. Only one patient in this series died at the 6th postoperative day most probably from pulmonary embolism. The postoperative follow-up was from 2-15 years, recurrence of hydatid cysts had been noted in 4 patients and were operated upon and covered by a course of albendazol 400 mg twice daily for three months.

Discussion

The term simple hydatid disease is used to indicate that the parasite itself is intact; but a simple cyst may, upon occasion, cause suppuration in the lung. A complicated cyst is one in which the hydatid has ruptured and this accident may or may not be associated with pneumonitis. Primary hydatid disease indicates that the cyst in question has developed from an embryo derived directly from a dog. Secondary hydatid disease means that a primary cyst lodged elsewhere has ruptured and caused a new cyst to develop by embolism or by direct spread. Daughter cysts are cysts which grow within the cavity left by spontaneous evacuation or inadequate surgical removal of the parasite.¹⁾ The cyst con-

sists of three layers: first, a protective membrane called the pericyst, second the laminated membrane on its outside and third the innermost germinative layer with the hydatid fluid. The germinative layer performs two major functions: (1) production of the laminated membrane on its outside and (2) germination of later generation scolices. The scolices appear to be from the broad capsules and not directly from the germinative membrane. Presumably after the broad capsule has become loaded with scolices, it breaks off from the germinative membrane, forming miniscule particles floating in the hydatid fluid or settling at the bottom to become part of the hydatid sand.^{2,3)} The clinical picture is often limited⁴⁾ and nonspecific in pulmonary hydatid disease^{2,5)} and diagnosis may be made only if a routine X-ray film is taken, which is the main diagnostic tool⁶⁻⁹⁾ or infection or rupture of the cyst into the bronchus or pleural space occurs.⁷⁾ For some time, great importance was placed upon Casoni and Weinbers reactions, but at present these are discredited.⁶⁾ Every patient who has hydatid cysts of the lung should be investigated for associated cysts in the liver or other abdominal organs by chest computed tomography (CT) and upper abdomen and abdominal ultrasonography and if those cysts are accessible through the diaphragm, they should be resected at the same thoracotomy setting.^{10,11)} After having made a tentative diagnosis, we have always found, it is necessary to confirm the identity of the lesions pathologically, and until the present, the only treatment for hydatid disease has been surgical excision.^{3,4,6,7,12-16)} We are not only in agreement with the authors Dogan et al. regarding chemotherapy, it should be considered only in patients with cysts that are inoperable (because they are anatomically inaccessible or the patient is a poor surgical risk) or for recurrent disease, when operative morbidity and mortality are higher,¹⁷⁻¹⁹⁾ but also with its usage before surgery to decrease the recurrence rate.^{2,12,14,20,21)} The recommended regimen for adults is 10 to 15 mg/kg/day or 400 mg twice daily for 28 days, followed by 14 days rest and then a second and, perhaps, third course. Six weeks of therapy before surgery and three cycles afterwards are recommended.^{2,12,14,20)} The operation for hydatid cyst has undergone considerable modification since recent advances in thoracic surgery have been made.⁵⁾ Our surgical goals are (1) total eradication of the parasite; (2) prevention of the cyst rupture in the operative field and its consequent dissemination;^{5,8,18)} (3) extirpation of the residual cavity; (4) preserving the lung parenchyma as far as possible and avoiding radical procedures^{5,6,7,17)} so as to limit resections to only those cases with seriously ruptured cysts which have given rise to considerable destruction of adjacent tissue.⁶⁾ Opinion as to the injection of formalin into the

cyst before opening it or swabbing the cyst with formalin after evacuation varied. The type of operation varied according to the state of the disease present in the patient and the result was excellent.^{5,13,15} Some authors advocate aspiration of the cyst followed by installation of a parasitocidal agent such as hypertonic saline. The evidence that this is effective is not well grounded.^{13,17} However, none of these procedures provides sure protection against dissemination. Furthermore, the literature indicates that recurrence of the disease is extremely rare.⁶ In the small simple cysts, enucleation and closure of the resulting cavity by suture should be done.²² When the simple cyst is large, segmental resection or lobectomy should be done. A complicated cyst may require segmental resection, lobectomy, pneumonectomy or marsupialization.^{4,5,19} Resection should be avoided in children if possible because the damaged lung parenchyma has a great capacity for recovery.^{17,23} As we have 9 cases (14.5%) out of the 60 where some were complicated cysts and other were so large that the remaining pulmonary tissue is not believed salvageable and were managed by resectable techniques.

Conclusion

- (1) The clinical picture is non-specific and radiological investigation is suggestive.
- (2) Surgery is the primary treatment for most patients with pulmonary hydatid disease.
- (3) The lung parenchyma should be preserved as far as possible in patients with pulmonary disease and radical procedure should be avoided.
- (4) The use of albendazol pre-operatively for one month and postoperatively for 3 interrupted courses is recommended to decrease the incidence of recurrence.
- (5) The choice of operation in the individual patient must be guided by whether the cyst is simple or complicated.

References

1. Barret NR, Thoms D. Pulmonary hydatidic disease. *Br J Surg* 1952; **40**: 222–44.
2. Shalabi R, Rajendran U, Abdul Majeed O, et al. Polyvisceral echinococcosis with involvement of the heart and chest wall: follow-up and review of literature. *Ann Thorac Cardiovasc Surg* 1999; **5**: 248–53.
3. Meltzer H, Kovacs L, Orford T, et al. Echinococcosis in north American Indians and Eskimos. Canada. *MAJ* 1956; **15**: 121–8.
4. Scott SM, Takaro T, Davis RD. Pulmonary echinococcosis. In: Baune AE, Geha AS, Hammond GL eds.; Glennis Thoracic and Cardiovascular Surgery. New Jersey: Appleton and Lange, 1996; pp 321–3.
5. Ginsberg M, Miller JM, Surmonte JA. Echinococcus cyst of the lung. *Chest* 1958; **134**: 496–505.
6. Alvarez A, Tellezde Peralto G, Burgos L, et al. Surgical treatment of pulmonary hydatidosis. *J Thorac Cardiovasc Surg* 1981; **82**: 569–75.
7. Wolcott MW, Harris SH, Briggs JN, et al. Hydatid disease of the lung. *J Thorac Cardiovasc Surg* 1971; **62**: 465–9.
8. Trigt III PV. Lung infections and diffuse interstitial lung disease. In: Sabiston and Spencer eds.; Surgery of the Chest. Philadelphia: WB Saunders, 1995; pp 703–4.
9. Burgos L, Baquerizo A, Munoz W, et al. Experience in the surgical treatment of 331 patients with pulmonary hydatidosis. *J Thorac Cardiovasc Surg* 1991; **102**: 427–30.
10. Peleg H, Lael-Anson B, Gaintini D. Simultaneous operation for hydatid cysts of right lung and liver. *J Thorac Cardiovasc Surg* 1985; **90**: 783–7.
11. Sarsam A. Surgery of pulmonary hydatid cysts, review of 155 cases. *J Thorac Cardiovasc Surg* 1971; **62**: 663–8.
12. Fauci, Braunwald Isselbacher. Echinococcosis. In: Nutman TB ed.; Harrison's Principles of Internal Medicine. New York: The McGraw-Hill Companies, 1998; pp 1225–6.
13. Taha AM, Shabb B, Nassar H. Surgical therapy for pulmonary hydatidosis. *Int Surg* 1996; **81**: 187–8.
14. Blanton R. Cestode infections. In: Kelley WN, ed.; Text Book of Internal Medicine. Philadelphia: Lippincott-Raven, 1997; pp 1835–7.
15. Halezeroglu S, Celik M, Uysal A, et al. Giant hydatid cysts of the lung. *J Thorac Cardiovasc Surg* 1997; **113**: 712–7.
16. Crausaz PH. Surgical treatment of the hydatid cyst of the lung and hydatid cyst of the liver with intrathoracic evolution. *J Thorac Cardiovasc Surg* 1967; **53**: 116–29.
17. Dogan R, Yuksel M, Cetin G, et al. Surgical treatment of hydatid cysts of the lung: report on 1,055 patients. *Thorax* 1989; **44**: 192–9.
18. Schantz MP. Effective medical treatment of hydatid disease. *JAMA* 1985; **253**: 2095–7.
19. Moore RD, Urschel JD, Fraser RE, et al. Cystic hydatid lung disease in northwest Canada. *Can J Surg* 1994; **37**: 20–2.
20. Edwards CRW, Bouchier IAS, Haslett C. Echinococcosis Granulosus (Taenia Echinococcus). In: Davidson's Principle and Practice of Medicine Text Book. New York; Churchill Livingstone, 1995; pp 170–1.
21. Dhaliwal RS, Kalkat MS. One-stage surgical procedure for bilateral lung and liver hydatid cysts. *Ann Thorac Surg* 1997; **64**: 338–41.
22. Sharma SK, Eggleston FC. Management of hydatid disease. *Arch Surg* 1969; **99**: 59–63.
23. Lamy AL, Cameron BH, Le Blanc J, et al. Giant hydatid lung cysts in the Canadian north west: outcome of conservative treatment in three children. *J Pediatr Surg* 1993; **28**: 1140–3.

In the present study, 15 patients were acutely ill. Three of our patients had expectoration of grape skin-like material that was pathognomonic of in-tra-bronchial rupture of PHC [15] while two had tension pneumothorax due to the rare intra-pleural HC rupture [1] [9] [11]. Hoarseness of voice was observed once due to a big HC compressing the left recurrent laryngeal nerve. The aim of surgery in pulmonary hydatid cyst is to remove the cyst completely while preserving the lung tissue as much as possible. Lung resection is performed only if there is an irreversible and disseminated pulmonary de-struction [24]. There is a general agreement about the central role of surgery in management of pulmonary hydatidosis and the adjuvant value of medical therapy [13]. Seventy two patients of pulmonary hydatid cyst were treated surgically, majority belonged to the age group 13 to 58 years and male to female ratio was 1.88:1 (Table-1). The youngest patient was 1 year old male who had ruptured hydatid cyst and presented with tension pneumothorax. [2].

Shalabi RI, Ayed AK, Amin A (2002) 15 years in surgical management of pulmonary hydatidosis. *Annals of thoracic and cardiovascular surgery*. 8(3):131-134. Hydatidosis may be asymptomatic for many years. It may become evident when a cystic lesion is noted during imaging for other reasons. It may also be symptomatic depending on the size, location, and complications of the cyst [4]. R. I. Shalabi, A. K. Ayed, and M. Amin, "15 Years in surgical management of pulmonary hydatidosis," *Annals of Thoracic and Cardiovascular Surgery*, vol. 8, no. 3, pp. 131-134, 2002. Fifteen years of surgical assessment related to involved structures, operative procedures, complications, and the recurrence rate is analyzed in pediatric patients with pulmonary and abdominal hydatid cysts. Between 1986 and 2001, the records of 42 pediatric patients (15 girls, 27 boys; ages 2-15 years) with pulmonary and abdominal hydatid cysts operated on in our clinic were analyzed retrospectively. (1994) ArticleTitle Diagnostic evaluation and surgical management of hydatid disease of the liver *World J. Surg.* 18 859-865 Occurrence Handle 1:STN:280:ByqC2cbltFM%3D Occurrence Handle 7846909. CAS PubMed Google Scholar. 14. (1994) ArticleTitle Surgical treatment of pulmonary hydatidosis in children: experience in 92 patients *J. Pediatr. Surg.* Objectives: Echinococcosis remains an endemic surgical problem in countries where sheep and cattle raising is carried out, particularly in many Mediterranean countries. This study aims to evaluate the management of different presentations of pulmonary hydatidosis and their outcome over 15 years. Design: Retrospective study. Setting: Thoracic surgical department, Chest Diseases Hospital, Kuwait. Patients: Sixty patients operated upon for hydatid disease were evaluated pre- and post- operatively; 35 males, 25 females with a mean age of 28.4 years. Most patients were investigated by laboratory, s