

ORIGINAL ARTICLE

EFFECT OF SIZE ON THE SURGICAL MANAGEMENT OF PULMONARY HYDATID CYST

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Background: Hydatid cyst disease is a parasitic disease caused *Echinococcus granulosus*. Hydatid cysts of 10 cm or greater in diameter are called “giant” cysts and traditionally have been considered to be more difficult to treat surgically often requiring pulmonary resection. In this study we reviewed our experience with pulmonary hydatid cysts. **Methods:** This study was carried out in Thoracic surgery unit Lady Reading Hospital Peshawar, from 1st June 2007 to 31st May 2012. Patients admitted with intra-thoracic hydatid cysts were evaluated. Patients were divided into 2 groups, i.e., patients who had cysts <10 cm (group A) and those who had large cysts which were ≥10 cm (group-B). Data regarding age, sex, symptoms, diagnostic procedures, anatomic location of cysts, surgical procedures, complications, and outcomes were collected and analysed. **Results:** Total of 224 patients underwent hydatid cystectomy. Group A comprised 190 patients (85%), Group-B comprised 34 patients (15%). Large cysts were more common in younger patients. The most frequent complaints were cough, chest pain, and dyspnea. Patients with large cysts were more often symptomatic at presentation. In both groups, lower-lobe locations predominated. Parenchyma-saving operations were almost uniformly performed for each group; however, a higher percentage of patients in group B required anatomic resection (5.8% vs. 1%). Cystic rupture occurred more frequently in group-B than in group-A (26% vs. 12%). There were no deaths in either group, and the morbidity was 23(12%) in (group-A) and 6(17.6%) in (group-B). **Conclusion:** Large hydatid cysts of the lung occurred more often in younger patients and were more often symptomatic at presentation. Regardless of size, the cysts could usually be surgically treated without lung resection, and size did not appear to influence short-term post-operative outcomes.

Keywords: Hydatid cyst, Intraparenchymal cyst, Large Hydatid.

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INTRODUCTION

Hydatid cyst disease is a parasitic disease which has been known since the time of Hippocrates. Hydatid cyst disease is an endemic parasitic disease in countries like North Africa, Turkey, Middle-East, New Zealand, South America, Mediterranean Australia, Baltic areas, the Philippines, Northern China, and the Indian subcontinent. However, physicians and surgeons worldwide may encounter the disease sporadically because of increased travel and immigration.^{1,2} It is caused by a parasite, *Echinococcus granulosus*, which is a cestode. It lives in the small intestine of dogs and other canines. Eggs are eliminated in the feces and when ingested, liberate their larvae in the duodenum of an intermediate host. The intermediate host can be sheep/ goat (pastoral hydatidosis) or reindeer/moose/caribou (sylvan hydatidosis). Humans are accidental intermediate hosts. The larvae cross the intestinal wall and via the portal system reach the hepatic sinusoids where they develop into cysts. The larvae which are not filtered in the liver and remain in the blood to reach the next destination, the lungs. Some may pass through the pulmonary

circulation and travel to other organs. Larva may get access to the mesenteric lymphatics and are carried to the cisterna chili, the thoracic duct, and into the general circulation, ending up in a variety of distant sites.^{1,3} Although the liver and the lungs are the usual sites of the disease, cysts can also form elsewhere in the body.^{4,5}

Pulmonary sites are the most common site of intra-thoracic hydatid cyst development; there, they are called pulmonary hydatid cysts. Conversely, cysts in the diaphragm, pleura, mediastinum, pericardium, myocardium, fissures, and chest wall are called intra-thoracic extra-pulmonary cysts and they can cause a variety of symptoms.^{6,7}

Surgical treatment of pulmonary hydatid cyst is removal of cyst and obliterating the space and closing the small bronchial communications, or if the cyst is very large with no salvageable lung parenchyma then lung resection surgery is indicated. Treatment aims at restoring the patient to his occupation as speedily as possible and all efforts should be made to see that his convalescence, after surgical intervention, is complete. It is not enough to cure the patient of his hydatid disease, rehabilitation

of the patients with proper post-operative physiotherapy is also mandatory.^{5,7}

Hydatid cysts of 10 cm or greater in diameter are called "giant" cysts and traditionally have been considered to be more difficult to treat surgically often requiring pulmonary resection. We reviewed our experience with giant pulmonary hydatid cysts, focusing on clinical symptoms, cystic location, extent of surgery, and postoperative complications, according to age, long-term results, and comparison with smaller cysts.

MATERIAL AND METHODS

This prospective observational study was carried out in Thoracic surgery unit Lady Reading Hospital, Peshawar, from 1st June 2007 to 31st May 2012. Patients admitted to Thoracic unit with intra-thoracic hydatid cysts were evaluated prospectively. Data regarding age, sex, symptoms, diagnostic procedures, anatomic location of cysts, surgical procedures, complications, and outcomes were collected. Total of 224 patients were having cysts in the pulmonary parenchyma. We excluded the patients having intra-thoracic extrapulmonary locations, patients who had experienced transdiaphragmatic transmission, and patients not fit for open surgical procedure. Hydatid cysts were categorized into 2 groups, in accordance with radiologic and operative findings: those smaller than 10 cm (group-A) and those 10 cm or greater (group-B).

Most patients were symptomatic, most commonly with chest pain and cough. Chest radiography, computed tomography, thoracic and abdominal ultrasonography were performed preoperatively in all of the cases. Bronchoscopy and spirometry was also performed in all patients for assessment and operability. If hydro-pneumothorax and cystic rupture developed preoperatively, the pleural cavity was first drained by means of a tube thoracostomy.

All patients underwent operation as soon as conditions were optimal. Patients who presented with simultaneous liver and lung cysts underwent thoracotomy and resection of the pulmonary cyst first. If the liver cyst was located at the dome of the liver, a radial incision was made in the diaphragm, through which the cyst was injected with hypertonic saline. If liver cysts were located deeper within the parenchyma of the liver, they were treated at a later stage via a separate laparotomy. A posterolateral thoracotomy was performed on all patients. Surgical Removal of cyst and obliterating the space and closing the small bronchial communications performed in most of the patients, in few patients lung resection was also performed. Albendazole (10 mg/kg) was prescribed to all patients for as long as 3

months with 14 days interval between each course postoperatively.

Statistical Analyses were performed with SPSS-10. *p*-value of <0.05 was taken as significant.

RESULTS

Total of 224 patients were operated for hydatid cystectomy. Group-A comprised 190 patients (85%), Group-B comprised 34 patients (15%). Group-A consisted of 190 patients of whom 90 were females (47%) and 100 were male (53%). In group-A the age of patients ranged from 6–78 (33.2±11.4) years. Of the 34 patients in group-B, 16 were female (47%) and 18 were male (53%). The mean age of the group-B patients age of patients ranged from 5–70 (29.8±16.6) years. The distribution of sex was not significant (*p*=0.973). The percentages of symptomatic patients in groups-A and B were 82% and 91%, respectively (*p*=0.1426) as shown in table-1. The most common symptom in group-A was coughing, while it was chest pain in group-B. Other symptoms included haemoptysis, dyspnea, and fever (Table-2).

Comparing our two group's right-lung involvement was similar for groups-A and B (59% and 64%, respectively) the right lower lobe was the most commonly involved location in both groups). There was no significant difference in the frequency of bilateral cysts between group-A and group-B (9% vs. 11.7%; *p*=0.549). Simultaneous involvement of the liver occurred in 23 (12%) group-A patients and in 6 (17.6%) group-B patients.

Hydatid cysts less than 10 cm in diameter were more common in 31–45 years age group. Large cysts were more common in younger patients 16–30 years age group. The 2 groups revealed significantly diverse age distribution. Most patients in group-B were 16–30 years of age, while most group-A patients were 31–45 years of age as shown in table-3.

A total of 167 patients (87.8%) in group-A, had intact cysts, and 23 (12%) had ruptured cysts. Twenty-five group-B patients (73.5%) had intact giant cysts, and 9 group-B patients (26%) had ruptured cysts. In group- A 168 (88.4%) patients had cystectomy with obliteration of cavity while in group-B 26 (76.4%) patients had this procedure. Cystectomy with obliteration of cavity with decortication was performed in 20 (10.5%) of group-A patients and 6 (17.6%) of group-B patients. Lobectomy was done in 2 (1%) of group-A patients and 2(5.8%) of group-B patients.

The most common postoperative complication in both groups was prolonged air leak, which occurred in 11 group-A patients (5.7%) and in 3 group-B patients (8.8%). Other postoperative complications were pneumonia in 8 (4.2%) group-A patients and in 2 group-B patients (5.8%); empyema

in 4 group-A patients (2%) and one in group-B patients (3%). There was no respiratory failure and no patients needed long-term mechanical ventilation. There was no death within one month of surgery. The mean hospitalization period was 7±2.2 days, in both groups.

Table-1: General Characteristics

Variables	Group A n=190	Group B n= 34	p-value
Mean Age years	33.2 years	29.8 years	0.472
Age Range years	6–78 years	5–70 years	---
Male Sex	100 (53%)	18 (53%)	0.973
Symptomatic	156 (82%)	31 (91%)	0.1426
Ruptured Cysts	23 (12%)	9 (26%)	0.0310
Post Operative Complications	23 (12%)	6 (17.6%)	0.2615

Table-2: Common Symptoms

Symptoms	Group A n=190	Group B n=34	p-value
Chest Pain	104 (54.7%)	27 (79.4%)	0.0051
Cough	116 (61%)	14 (41.1%)	0.0248
Haemoptysis	34 (17.8%)	8 (23.5%)	0.2875
Dyspnea	33 (17.3%)	7 (20.5%)	0.4586
Fever	5 (2.6%)	4 (11.7%)	0.0322

Table-3: Age of Patient and Diameter of Cyst

Age	Group A <10 cm	Group B >10 cm
0–15 years	20 (10.53%)	4 (11.76%)
16–30 years	32 (16.84%)	16 (47.06%)
31–45 years	92 (48.42%)	6 (17.62%)
45–60 year	30 (15.79%)	5 (14.71%)
>60 years	16 (8.42%)	3 (8.82%)
Total	190 (100%)	34 (100%)

DISCUSSION

Hydatid disease has been known since the time of Hippocrates. Since then the epidemiology and clinical features of the disease have been well described. Echinococcosis is rare in developed countries. Greater population mobility and migration may portend an increase in the frequency of this clinical entity.⁸ This disease is not uncommon in our country. Although the liver and the lungs are the usual sites of the disease, cysts can also form elsewhere in the body.^{7,8}

Due to the elasticity and compliance of the lung parenchyma, hydatid cysts typically grow faster in the lung than in other organs. Therefore, larger cysts are more common in the lung, where they can grow from a few millimeters to 5 centimeters in 1 year.^{9,11} Furthermore; cysts appear to grow faster in young people than in elderly people. The relationship between the diameter of cysts and the age of our patients is an important and statistically meaningful feature of our study. In our study, hydatid cysts were more commonly seen in patients aged 45 years and

younger; in patients older than 60 years, cysts diminished both in frequency and in size.

As shown in our study the prevalence of hydatid cysts was greater in the right lung and in the lower lobes of both lungs. This is in accordance with some other studies.^{9,12,13} Pulmonary cysts can increase in size substantially without symptoms, but, in general, symptoms depend on the size and location of the cyst, on the amount of pressure the cyst exerts on surrounding tissues, and whether or not the cyst is ruptured.¹⁴

Surgery remains the treatment of choice for hydatid cysts of the lung, and a parenchyma-saving operation is usually possible. Preservation of the parenchyma is fundamental to the surgical management of these cysts. However, in cysts that cause parenchymal damage by involving more than 50% of a lobe or that are associated with such sequelae as chronic abscess, bronchiectasis, or severe hemorrhage, lobectomy is performed.^{9,15} Often, it can be difficult to predict preoperatively whether lobectomy will be required. Only after the cystic fluid has been aspirated, the bronchial openings closed, and the lung inflated, do we decide whether to perform resection or not.

In our study, the percentages of cysts that caused parenchymal damage were 5.8% in giant cysts and 1% in normal-sized cysts, slightly lower than the rates of 7–13%^{10,16} reported in the literature, but selection bias certainly could play a role in these differences. Even though giant cysts in our series were statistically more likely to require anatomic lung resection, we were able to perform parenchyma-sparing operations in the overwhelming majority of cases (94%).

In literature, morbidity rates for all hydatid cyst surgery range from 3.5–27%, whereas mortality rates range from 0 to 2%.^{10,12,13,17–20} If there are less complicated cysts and bronchial openings are firmly closed, and cavity properly closed, the morbidity rate of hydatid cyst surgery can be very low and the mortality rate almost zero. In our study, the overall morbidity rate was 13% (12% vs. 17.6%, in groups-A and B, respectively; $p=0.27$), and the mortality rate was zero. There are some reports that small cysts can be cured with albendazole. However patients who do not undergo surgical therapy develop ruptures, infections, and hemoptysis after isolated albendazole treatment.^{17,21} That is why surgical treatment of hydatid cysts may be preferred.

CONCLUSION

Giant hydatid cysts of the lung were more prevalent than smaller cysts in younger age groups, the incidence of giant hydatid cysts declining gradually in persons over the age of 45 years. Surgery for hydatid cysts of the lung, whether giant or otherwise, can be safely

performed, with low morbidity and negligible mortality rates

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