Is Video-Assisted Thoracoscopic Surgery Adequate in Treatment of Pulmonary Hydatidosis?

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Background. **Surgical management of pulmonary hydatid cyst disease has been well established. However, there are still limited data on the role of video-assisted thoracoscopic surgery in treatment of this disease. The aim of this study is to identify the advantages and disadvantages of minimally invasive surgery and compare the outcomes with patients undergoing thoracotomy in this parasitic disease.**

Methods. **The medical records of 77 patients (53 male, 24 female) undergoing surgery for pulmonary hydatid cyst disease between January 2011 and January 2014 were reviewed. Removal of the hydatid cyst was completed using video-assisted thoracoscopic surgery in 39% (n = 30) of the patients, whereas open thoracotomy was used in 61% (n = 47). Conversion rate was 21%. Statistical analysis was used to assess differences in drainage amount, time to drain removal, length of surgery, length of hospital stay, and pain scores. Probability values of less than 0.05 were considered significant.**

Results. **The drainage amount, time to drain removal, length of surgery, duration of narcotic analgesics usage, and visual analog scale scores in the thoracotomy group were significantly longer than those of the thoracoscopy group. Postoperative complications occurred in 4.3% of thoracotomy and in 13.3% of thoracoscopy patients. There was no mortality in either group. During the follow-up period, no recurrence was detected.**

Conclusions. **Video-assisted thoracoscopy for surgery of pulmonary hydatid cyst disease is superior to open thoracotomy causing less postoperative pain, a better cosmetic result, a shorter surgical time, a lower drainage volume, and a shorter time to drain removal in a selected group of patients. The fear of recurrence because of incomplete isolation of the cyst during removal was not a concern regarding our technique.**

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Pulmonary hydatid cyst disease is a parasitic disease commonly encountered in low-to-middle income countries. It is endemic in sheep- and cattle-raising areas of the world such as the Mediterranean, the Middle East, South America, Australia, India, and the Balkans [1, 2]. In Turkey, hydatid disease is endemic in the eastern and southeastern parts of the country with an incidence of approximately 20/1,000,000 [3]. The classic management of pulmonary hydatid disease is surgical removal of the cysts by means of thoracotomy or sternotomy [3, 4]. Despite of the fact that video-assisted thoracoscopic surgery (VATS) is developing rapidly in practice and minimally invasive surgery is proposed even for complex resections, VATS was the surgical method of choice in only a few small groups of pediatric patients with pulmonary hydatid disease [5–9]. In adults, a new surgical method of minimally invasive approach using the same principles of conventional hydatid disease surgery was published recently in 2012 by our group [10].

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In this study, we aimed to compare the clinical outcomes and long-term results of patients with pulmonary hydatid cyst disease who underwent either VATS or thoracotomy.

Material and Methods

The medical records of 77 consecutive patients (53 male and 24 female) who underwent surgery for pulmonary hydatid cyst disease between January 2011 and January 2014 were retrospectively reviewed. Demographic characteristics and intraoperative and postoperative data were collected. Average age was 32.7 years (range, 8 to 85 years). Thirteen patients (16.8%) had a history of close and prolonged contact with animals. Symptoms at the time of presentation were cough (35%), dyspnea (15.6%), fever (11.7%), hemoptysis (6.5%), and hydatid fluid expectoration (5.2%). Twenty patients (26%) were asymptomatic. Patients who had suspicious lesions for hydatic disease on chest roentgenographs underwent computed tomography scan imaging. Cystic lesions were peripherally located in 41 patients (53%) and central in 36 patients (47%). Dimensions of the cystic lesions varied from 2 × 2 to 15 × 10 cm. Eight patients had evidence of cystic perforation in computed

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tomography images, and 7 patients presented with multiple cysts. We performed the following laboratory tests: complete blood counts, biochemistry, and indirect hemagglutination examination. The indirect hemagglutination test was positive in 46.7% of the patients. Transthoracic fine-needle aspiration biopsy was avoided for all pulmonary cystic lesions in our practice. The rest of the demographic characteristics were comparable between the two groups and are listed in Table 1.

The number of patients who underwent thoracotomy was 47 (61%), whereas removal of the hydatid cyst was completed in 30 (39%) patients using VATS. Conversion to open thoracotomy was necessary in 8 patients (8 of 38; 21%). Reasons for conversion to open thoracotomy were intolerance to single-lung ventilation (n = 2), severe adhesions (n = 4), and inability to locate the cyst (n = 2). The data of the patients who were converted were included in the open thoracotomy group.

The University of Marmara Ethics Committee approved this retrospective study and waived the need for patient consent.

Statistical Analysis

Variables statistically compared between the VATS and open thoracotomy groups were age, sex, number and location of the cysts (peripheral versus central), diameter of the cystic lesions, lobe affected by the disease, duration of the surgery, length of intensive care unit stay, length of hospital stay, volume and duration of the drainage, postoperative complications, duration of narcotic analgesic usage, and pain according to visual analog scale evaluation.

Normally distributed variables were reported as mean ± standard deviation with 95% confidence interval (CI), and were compared using unpaired Student's t test. Categorical variables were presented as percentages with ranges and were assessed using Fisher's exact test with Yates' continuity and Pearson's χ^2. If the data were not showing a standard distribution, the Mann-Whitney U test was applied. Friedman's S and Wilcoxon's tests were used for group homogeneity evaluation.

In this study, the maximum type I error was 0.05, and the level of significance was accepted as less than 0.05. All analyses were performed using the SPSS for Windows 15.0 (Statistical Package for Social Sciences; IBM Corp, Armonk, NY) software package.

Patient Selection

There are two groups of surgeons in our institution. Minimally invasive surgeons had changed their practice in treatment of pulmonary hydatid disease since January 2011 with the advent in thoracoscopic techniques. The rest of the surgeons continued to use open thoracotomy for removal of the hydatid cysts. Patients with multiple cysts in the same lung detected on preoperative computed tomography scans and those with a contraindication to VATS for any cause (intolerance to single-lung ventilation, excessive pulmonary adhesions) underwent or converted to open thoracotomy. None of the patients received albendazole treatment preoperatively.

Surgical Technique

The thoracotomy patients underwent a standard muscle-sparing posterolateral thoracotomy incision after a double-lumen endobronchial intubation. The exocyst was opened, cystic fluid was aspirated, and the germinative membrane was removed. Bronchial communications were closed with sutures, and then the residual cavity underwent capitonnage using absorbable sutures. A single 28F chest tube was placed.

Video-assisted thoracoscopic surgery removal of the hydatid cyst disease was performed using a two-port technique. The first incision was a 2-cm thoracoport incision for the 30-degree telescope, and the second was a 3-cm long utility incision placed at the intercostal space just superior to the cystic lesion. After single-lung ventilation, the povidone-iodine–soaked gauzes were placed around the cyst to avoid any intrathoracic contamination. A closed-circuit aspirator was prepared, and the needle of the circuit was inserted into the cyst through the utility incision. The cystic fluid was aspirated to decrease the tension in the cyst. Then a diluted 2% povidone-iodine solution with an amount less than the aspirated cyst fluid was injected back into the cyst as a scolicidal agent. The scolicidal agent was not injected into those cysts with an evidence of infection or rupture, ie, fluid-air levels on computed tomography.

After waiting approximately 4 to 5 minutes, the exocyst was punctured using endoscopic scissors while a suction cannula was kept in place to avoid any spillage. The germinative membrane was carefully removed with the help of an endobag placed through the utility incision.

Table 1. Demographic Characteristics[a]

Characteristic	Thoracotomy Group	VATS Group	p Value
Age (y)	33.34 ± 17.47	31.70 ± 12.11	0.654
Sex			
Male	30	23	0.314
Female	17	7	
Cysts in other organs	4	5	0.28
Previous hydatid cyst surgery	No	No	
Other comorbidities	7	2	0.27

[a] Values are mean ± standard deviation or number.

VATS = video-assisted thoracoscopic surgery.