

Mediastinal Cyst Resected with Thoracotomy or Thoracoscopy

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ABSTRACT

Objective : To compare the standard and thoracoscopic operations for mediastinal cysts, we reviewed patients with mediastinal cysts who had undergone surgery from 1991 through 1998.

Methods : Twenty-four patients with mediastinal cysts were treated : 13 men and 11 women, ranging in age from 20 to 74 years. Ten patients had thymic cysts (1 had invasive thymoma), 4 had pericardial cysts, 3 had bronchogenic cysts, and 3 had esophageal cysts. From 1991 through 1994, 10 patients were treated, of whom 9 had thoracotomy or sternotomy and 1 required conversion of a thoracoscopic procedure to open thoracotomy. From 1995 through 1998, 14 patients were treated ; thoracoscopic resection was attempted in 13 patients and was completed in 12.

Results : The amount of bleeding during the operation, duration of operation, and the length of postoperative hospitalization were significantly less in patients undergoing thoracoscopic surgery than in patients undergoing thoracotomy or sternotomy. Ten of 24 patients had preoperative symptoms that resolved with surgery.

Conclusions : Our results suggest that thoracoscopic resection is effective for mediastinal cyst. This operative method is less invasive, provides symptomatic relief, and establishes a pathologic diagnosis. (Jikeikai Med J 2002 ; 49 : 121-5)

Key words : thoracoscopic surgery, mediastinal cyst, pericardial cyst, thymic cyst

INTRODUCTION

Mediastinal cysts are relatively uncommon but comprise several disease entities. Although various methods have been used to diagnose and treat mediastinal cysts nonsurgically, doing so is still difficult^{1,2}. Thoracotomy or sternotomy is often used to treat diseases of the mediastinum ; however, these approaches are often too invasive considering the severity of the mediastinal cysts. Thoracoscopic surgery has been used to treat of intrathoracic lesions, such as pneumothorax, lung tumors, and mediastinal lesions³⁻⁵. To clarify the thoracoscopic approach to treating mediastinal cysts and complications after

surgery, we reviewed our surgical experience with mediastinal cysts.

SUBJECTS AND METHODS

We reviewed the records of the First Departments of Surgery of the Jikei University Hospital and Daisan Hospital of the Jikei University to identify patients who had undergone surgery for cystic mediastinal masses from 1991 through 1998. The period of review was divided into an early period from 1991 through 1994 and a late period from 1995 through 1998. Masses with only minor cystic lesions were excluded. Symptoms, if present, and the anatomic distribution

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of cysts were noted. Surgical approaches and complications were documented to investigate advantages and disadvantages of open and thoracoscopic surgery. Postoperative complications were also recorded. Reports of pathologic evaluations were reviewed to determine the nature of the lesions and any accompanying disease.

Thoracoscopic operations were performed as follows. After intubation and administration of anesthesia with a double-lumen endotracheal tube and split-lung ventilation, the patient was positioned for surgery. For cysts in the anterior or middle mediastinum, the patient was placed in the supine position; we prefer a 30-degree off-center position and place a small roll under the side to be approached. For posterior mediastinal cysts, the patient was placed in the lateral position.

Statistical analysis

To assess intergroup differences, Student's *t*-test was performed. An intergroup difference was considered significant when the *P* value was less than 0.05.

RESULTS

Twenty-four patients with mediastinal cysts were identified. Cysts were diagnosed before surgery with chest x-ray films, computed tomography, or magnetic resonance. Thirteen patients were men and 11 were women and ranged in age from 20 to 74 years (mean age, 41.1 years). The pathologic diagnosis was thymic cyst in 10 patients, pericardial cyst in 4 patients, bronchogenic cyst in 3 patients, esophageal cyst in 3 patients, nonspecific cysts in 2 patients, thoracic duct cyst in 1 patient, and cystic schwannoma in 1 patient (Table 1). One thymic cyst was complicated by an invasive thymoma originating from the cyst wall. Cysts were symptomatic in 10 of 24 patients (Table 1).

Cysts were located at various sites in the mediastinum (Table 2). All thymic cysts had originated from the thymus. Two of the cysts contained ciliated epithelium on their walls but were located in the thymus. Both these cysts were diagnosed as thymic cysts. All 4 pericardial cysts were adherent to the

Table 1. Symptoms of mediastinal cysts

Pathological diagnosis	Symptomatic cases	
Thymic (<i>N</i> = 10)	<i>N</i> = 4	
	Pain	<i>N</i> = 2
	Sensation of compression	<i>N</i> = 2
Pericardial (<i>N</i> = 4)	<i>N</i> = 2	
	Dyspnea	<i>N</i> = 1
	Dysphagia	<i>N</i> = 1
Bronchogenic (<i>N</i> = 3)	<i>N</i> = 1	
	Fever	<i>N</i> = 1
Esophageal (<i>N</i> = 3)	<i>N</i> = 1	
	Fever	<i>N</i> = 1
	Cough	<i>N</i> = 1
Other (<i>N</i> = 4)	<i>N</i> = 2	
	Anterior chest pain	<i>N</i> = 1
	Posterior chest pain	<i>N</i> = 1
Total (<i>N</i> = 24)	<i>N</i> = 10	

Table 2. Anatomic location of mediastinal cysts

Location	No. of cases
Thymic (<i>N</i> = 10)	
Intrathymus	<i>N</i> = 10
Pericardial (<i>N</i> = 4)	
Paratracheal	<i>N</i> = 3
Anterior SVC	<i>N</i> = 1
Bronchogenic (<i>N</i> = 3)	
Right hilar	<i>N</i> = 2
Left paravertebral	<i>N</i> = 1
Esophageal (<i>N</i> = 3)	
Intraesophageal	<i>N</i> = 3
Other (<i>N</i> = 4)	
Paravertebral	<i>N</i> = 2
Paratracheal	<i>N</i> = 1
Anterior SVC	<i>N</i> = 1
Total	<i>N</i> = 24

SVC: superior vena cava

right upper side of the pericardium; 3 were in the paratracheal space and 1 was in the anterior space of the superior vena cava. Bronchogenic cysts were at the right hilum in 2 cases and in the left paravertebral space in 1 case. The thoracic duct cyst was in the paravertebral space in the upper third of the thoracic cage. The neurogenic cyst was in the 10th paravertebral space.

In the early period, surgery was done with thoracotomy in five patients and with median sternotomy in four patients. Thoracoscopic resection of a bronchogenic cyst was attempted in one patient but had to convert to thoracotomy, because the cyst could not be separated from the pulmonary vein.

In the late period thoracoscopic surgery was performed in 14 patients with mediastinal cysts; the cysts were successfully resected in 13 patients. Pathologic diagnoses were thymic cysts in 6 cases, pericardial cysts in 3 cases, bronchogenic cyst in 1 case, nonspecific cysts in 2 cases, and schwannoma in 1 case (Table 3). In one patient with a nonspecific cyst and myelodysplastic syndrome, a part of the cyst wall located in the paratracheal space was resected to rule out a malignant neoplasm; the cyst was diagnosed as a nonspecific cyst.

In the late period, surgery was difficult in two patients. In one patient with a nonspecific cyst in the paratracheal space, a small portion of the cyst wall could not be resected because it adhered tightly to the superior vena cava. In another patient, the thoracoscopic operation was converted to thoracotomy because a cyst in the esophageal wall adhered tightly to the esophageal mucosa. The pathologic diagnosis was esophageal cyst.

The amount of blood loss, the duration of operation, and the length of postoperative hospitalization were significantly less in patients undergoing thoracoscopic surgery than in patients undergoing thor-

acotomy or sternotomy (Table 3). No cysts recurred during the follow-up period.

DISCUSSION

The operative indications for mediastinal cysts remain controversial. Some authors advise follow-up with radiologic examination or needle biopsy⁶⁻⁸, whereas other authors suggest that conservative treatment is acceptable for asymptomatic bronchogenic cysts in adults⁹. Surgical excision is recommended by some authors to establish a diagnosis, alleviate symptoms, and prevent future complications and recurrence after cyst puncture^{10,11}. Mediastinal cysts are associated with a slight risk of malignancy¹² and a higher risk of such complications as bronchial obstruction, pulmonary arterial obstruction, and infections. We also suggest that when mediastinal cyst is suspected, surgery should be performed, unless otherwise contraindicated, to establish a definitive diagnosis, to prevent future symptoms, and to rule out malignant tumors. In addition, symptoms will resolve after surgery as they did in our patients.

Thoracoscopy has emerged as a possible method for diagnosing and treating various mediastinal disorders. Resection of mediastinal cysts on the basis of standard surgical indications would seem to be an ideal setting for the use of video-assisted thoracic surgical techniques⁴. Videothoracotomy ensures good exposure of the entire mediastinum and adequate room for surgical maneuvers and is much less invasive³. Patients who undergo thoracoscopic surgery experience minimal postoperative pain and seem to recover more quickly⁵. In our experience, most thoracoscopic operations for mediastinal cysts are minimally invasive.

Surgery for mediastinal cysts ranges in difficulty from simple removal to more technically complex excisions. Bronchogenic cysts in adults are more likely to adhere to neighboring structures because of intense inflammatory reaction¹³. St-Georges et al have reported that cysts often adhere closely to such structures as the tracheobronchial tree, the esophagus, the pericardium, and the lung¹⁴. Because of dense pericystic adhesions with adjacent organs, surgical

Table 3. Operative procedures

	Thoracos- copic	Converted	Thoracotomy or sternotomy
Thymic (N=10)	N=6		N=4
Pericardial (N=4)	N=3		N=1
Bronchogenic (N=3)	N=1	N=1	N=1
Esophageal (N=3)		N=1	N=2
Others (N=4)	N=3		N=1
Total (N=24)	N=13	N=2	N=9*
Bleeding (ml)	10±25	405 & 1119	108±71
Duration of op. (mins)	135±44	195 & 305	185±47
Postoperative			
Hospitalization (days)	7.6±2.7	13 & 14	12.8±4.8

*: Five cases could be operated thoracoscopically from operative records.

excision of mediastinal bronchogenic cysts can be hazardous⁷. St-Georges et al have reported intraoperative complications, including vagal trunk division, segmental bronchus laceration, and esophageal mucosal laceration, were reported in 14% of the patients in their series⁷. In our series, a bronchogenic cyst adhered broadly to neighboring organs, requiring conversion to open thoracotomy. In another case, bronchoplasty was done because of adhesions.

When a cyst is removed through thoracotomy, every effort should be made to remove the cyst completely to prevent recurrence¹⁵. If the cyst wall remains intact, the rate of recurrence is high. In addition, incomplete excision of infected cysts can lead to serious complications¹⁶. However, complete removal of an adherent cyst can be hazardous. What should be done when cysts cannot be separated from neighboring structures? When the cyst cannot be completely removed at thoracotomy owing to adherence to neighboring organs, partial excision with de-epithelialization may be done^{17,18}. Three cysts in our series were adherent to neighboring structures. Thoracoplasty was needed for one bronchogenic cyst, and conversion of thoracoscopic surgery to open thoracotomy was needed for another in the early period. For a third bronchogenic cyst in the late period, we were able to resect most of a nonspecific cyst that adhered to the superior vena cava and then performed de-epithelialization.

In the present series, 54% of mediastinal cysts were resected thoracoscopically. However, on the basis of operative records, we speculate that thoracoscopic resection, if attempted, would have been successful in 18 of 24 cases. Therefore, we recommend that thoracoscopic surgery be considered for mediastinal cysts.

However, because both the amount of bleeding and the duration of surgery were greater in cases requiring conversion to open thoracotomy, the timing of conversion must be judged precisely. The indications for thoracoscopic surgery are not limited to cysts of a certain size or to unilateral cysts. Furthermore, thoracoscopic surgery should be considered in cases of mediastinal cyst.

The severity of adhesion to neighboring organs is difficult to determine before surgery. Therefore, we recommend that thoracoscopic surgery should be attempted, but should be converted to open thoracotomy if adhesions are extensive.

Mediastinal cysts are sometimes symptomatic. In one reported series of 20 foregut cysts, 80% were symptomatic; the most common complaints were cough, dyspnea, dysphagia, and chest pain¹⁹. Many of the patients described in the present paper, although initially asymptomatic, later had severe symptoms. Of our patients operated on for mediastinal cysts, 10 had symptoms, including chest pain in 4 patients and fever in 3 patients.

Each type of mediastinal cyst is associated with specific locations, symptoms, and complications. Other studies have found that 39% to 67% of patients with mediastinal bronchogenic cysts have symptoms at the time of surgery^{14,20}. Common symptoms are retrosternal chest pain, cough, dyspnea, fever, and infection. Maier classified bronchogenic cysts into five types on the basis of location: paratracheal, carinal, hilar, paraesophageal, and miscellaneous²¹. Carinal bronchogenic cysts cause symptoms early in life and have an extremely high mortality rate. Maier also describes two patients with intrapericardial bronchogenic cysts who died suddenly, apparently owing to pressure on the heart or great vessels²¹. In addition, other severe and lethal complications of mediastinal cysts have been reported in relation to the tracheobronchus, pulmonary artery, and superior vena cava^{15,20}. In our series, three cases of bronchogenic cyst were treated surgically; bronchoplasty was required in one case and conversion to open thoracotomy was required in another. None of our patients died of complications, but previously reported complications and deaths suggest that mediastinal bronchogenic cysts should be treated surgically when detected on radiologic examinations.

Most cystic masses in the thymus are asymptomatic. When symptoms do occur, they are usually related to enlargement due to fluid accumulation, which can be extremely rapid²². In our series, as many as 4 of 10 patients with thymic cysts had such symptoms as chest pain, feelings of compression, and

dyspnea.

CONCLUSION

We have used surgery via thoracotomy or sternotomy or a thoracoscopic approach to treat mediastinal cysts in 24 patients. Our results suggest that thoracoscopic resection is a good approach for mediastinal cysts which is less invasive, provides symptomatic relief, and establishes a pathologic diagnosis.

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