

# *The THAI Journal of SURGERY*

*Official Publication of the Royal College of Surgeons of Thailand*

Vol. 23

July - September 2002

No. 3

## *Surgical Treatment of Mediastinal Tumor in Prince of Songkhla University*

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### **Abstract**

A retrospective review of mediastinal tumors treated in our surgical unit at Prince of Songkhla University from June 1982 to June 2001 was presented. The aim of this study was to determine the incidence, nature of tumor found in various locations in the mediastinum and to evaluate our surgical results in patients with mediastinal tumors.

During the study period of 19 years, we operated upon 96 cases of mediastinal tumors, 51 males and 45 females, age range from 5 months to 64 years old. There were 85 Thais, 6 Thai-Chinese and 5 Thai-Moslems. The majority of patients (81.25%) were symptomatic and the anterior mediastinum was the most common location (65.6%). Teratoma was the most common tumor in our study (32.29%). The tumor was benign histology in 63.5 per cent and malignant histology in 36.5 per cent.

**Conclusion :** The incidence of anterior mediastinal tumor and teratoma was slightly higher than in other reports. The relation between asymptomatic patients and benign histology was strong in our study. We also found the incidence in Thai-Moslem was lower than Thais because they infrequently has routine chest x-ray check up despite the fact that in some provinces in Southern Thailand the Thai-Moslem population is over 90 percent. The routine chest x-ray check up may increase the chance of diagnosis made for mediastinal tumor and the result of treatment may be improved.

The mediastinum is located in the central portion of the thorax, between the two pleural spaces, the diaphragm and the thoracic inlet.<sup>1</sup> It is usually divided into anterior, middle and posterior "compartment" to help categorize the pathologic lesions. However, there are no anatomical planes that separate these compartments.

The mediastinum is traversed by many organs

and structures. Many different histologic tumors arise from multiple anatomic sites, neoplastic, congenital and inflammatory conditions.<sup>2,3</sup> The patients with mediastinal tumor present with a myriad of symptoms and signs.<sup>2</sup> The natural history varies from those that are asymptomatic to aggressive, invasive neoplasms that are rapidly leading to death.<sup>2</sup> The increased use of chest x-ray and the improved sensitivity of imaging

modality have enabled the diagnosis of the mediastinal tumor at an earlier stage of diseases.

Our study is aimed to determine the incidence and nature of tumors found in various locations in the mediastinum and to evaluate our surgical results in patients diagnosed to have mediastinal tumors.

## MATERIALS AND METHODS

Retrospective review of medical records of the patients with mediastinal tumors treated in cardiothoracic surgical unit at Prince of Songkhla University between June 1982 to June 2001 was made.

Preoperative demographic characteristics, location of tumors, operative technique, postoperative complications, operative results and histologic reports were reviewed.

## RESULTS

There were 96 patients treated in our unit between June 1982 to June 2001. Fifty one patients (53.1%) were male. The male : female ratio was 1.13 : 1. The patient's age ranged from 5 months to 64 years old (average 34.3 years old). The majority of our patients was Thai and the Moslem population was 5.2 per cent (5/96).

Most patients presented with symptoms such as chest discomfort, chronic cough or dyspnea (81.25%). Only 18.75 per cent of the patients were asymptomatic. They were mostly referred to our service because of accidental finding on routine chest x-ray. Patients who were below 15 years-old more frequently presented with symptoms (Table 1).

Those patients without symptom had benign histology (94.44%) except only one patient (5.56%) had malignant lesion. In contrast to those patients with symptoms, 44.87 per cent (35/78) had malignant histology (Table 2).

We performed posterolateral thoracotomy in 73 patients (75.8%), median sternotomy in 20 patients (21.05%), and only in other 3 patients we used transcervical approach. Total tumor removal was accomplished in 78 patients (81.25%). In some cases, the adjacent structure such as pericardium, part of lung, had to be resected for complete removal. In 18 patients (18.75%) the surgery was just incisional biopsy after careful intraoperatively evaluation.

The location of tumors was 63 (65.6%), 20 (20.8%) and 12 (13.6%) in anterior, middle, and posterior mediastinum respectively. The common tumors found in anterior mediastinum were teratoma (32.32%), thymoma (23.8%), and lymphoma (11.11%) as shown in Table 3.

The common tumors in middle mediastinum

**Table 1** Relationship between age and presenting symptoms

Age	Symptomatic	Asymptomatic	Total
<=15 yr	17 (94.4%)	1 ( 5.6%)	18
>15 yr	61 (78.2%)	17 ( 21.8%)	78
<b>Total</b>	<b>78 (81.25%)</b>	<b>18 (18.75%)</b>	<b>96</b>

**Table 2** Relationship between symptom and histology

	Malignant	Benign
Symptomatic 78	35 (44.87%)	43 ( 55.13%)
Asymptomatic 18	1 (5.56%)	17 ( 94.44%)

**Table 3** Number of patients and nature of anterior mediastinal tumor\*

Anterior mediastinal tumors		
Benign teratoma		20
Malignant teratoma		10
Thymoma		10
Malignant thymoma		5
Lymphoma		7
Thymic hyperplasia		4
Thyroid disease		3
Others		13
<b>Total</b>		<b>72</b>

\* Benign 44/72 (61.11%)  
Malignant 28/72 (38.89%)

**Table 4** Number of patients and nature of middle mediastinal tumor\*

Middle mediastinal tumors		
Bronchogenic cyst		4
Tuberculosis		3
Pericardial cyst		1
Others		4
<b>Total</b>		<b>20</b>

\* Benign 9/12 (75%)  
Malignant 3/12 (25%)

**Table 5** Number of patients and nature of posterior mediastinal tumor\*

Posterior mediastinal tumors		4
Neurilemmoma		
Neurofibroma		2
Neurofibrosarcoma		1
Leiomyoma of esophagus		2
Others		3
<b>Total</b>		<b>12</b>
* Benign	9/12	(75%)
Malignant	3/12	(25%)

were teratoma (45%) and bronchogenic cyst (20%) (Table 4). Only 12.5 per cent of patients had the tumors in posterior mediastinal tumors and the most common ones (57.50%) were neurogenic tumors (Table 5).

We found that teratoma was most common in anterior compartment (21 cases), with 9 cases in middle mediastinum. There were malignant histology in 11 cases (35.5%).

There were 15 patients with thymoma but only in 2 patients that the tumors were associated with myasthenia gravis (13.33%).

#### **Mortality and Morbidity**

There were 2 operative deaths, the first one died on post-operative day 5 from pulmonary hemorrhage, pneumonia and respiratory failure; the second one died in the operating room before the surgery due to difficulty in intubation and severe hypoxia during the induction of anesthesia

The most common post-operative complication were lobar atelectasis (5), pneumonia (4) and phrenic nerve injury (4) which recovered after conservative treatment. Two patients had post-operative chylothorax that spontaneously ceased after aggressive medical therapy.

#### **DISCUSSION**

Anterior mediastinal tumors are the most common site in our study (75.0%) which are in contrast to many series reported. Wychulis et al,<sup>1</sup> Benjamin et al,<sup>3</sup> pokomy et al,<sup>4</sup> Azarow et al,<sup>5</sup> Cohen et al,<sup>6</sup> and Grosfeld et al<sup>7</sup> found the most common mediastinal tumors were neurogenic tumors. The difference may be due

to geographic location and populations. We also have no explanation why we found teratoma the most common tumor in our series. But teratoma and thymoma are still the most common anterior mediastinal tumor.

Teratomas are most commonly found in anterior mediastinum, with only 3 to 8 per cent in posterior mediastinum.<sup>2</sup> In our series, we found 33.3 per cent of teratoma in the middle mediastinum and none in posterior mediastinum. This may due to the difficulty in defining the precise location of the tumor, especially in some large mediastinum tumors that may (involve in overlapping location) occupy more than one compartment.

We found strong relationship between asymptomatic patients and benign histology, only one patient with asymptomatic had malignant histology (5.56%). Whereas 44.87 per cent of symptomatic patients showed malignant histology with compression or invasion of adjacent mediastinal structures or some part of lung parenchyma.

We found in 18 patients that their ages were below 15 years-old and most of them were symptomatic. Because of the limited space in the mediastinum in children, the tumor may compress or invade mediastinal structures in the early phase of disease. We also found that the teratoma were the most common tumors in this age group contrasting to Grosfeld series<sup>6</sup> that neurogenic tumor were the most common pathology.

We routinely perform posterolateral thoracotomy for middle and posterior mediastinal tumor and prefer this approach when the anterior mediastinal tumors extended more than half of hemithorax laterally. Because this position is more comfortable to dissect posterior aspect of the tumor and in some cases when we had to resect part of the lung.

#### **CONCLUSION**

We reported the finding of various tumors occurring in the mediastinum and recognized some features that differ to the finding in several other reports. The incidence of teratoma was slightly higher than had been reported by others. The relationship between asymptomatic patients and benign histology is strong in our study. Also we found that incidence in Moslem population was lower than Thai possibly

because they rarely received routine chest x-ray check up despite the fact that in some provinces in Southern Thailand, the Moslem population is greater than 90 per cent. Routine use of chest x-ray in check up examination may increase the chance of finding mediastinal tumor that may lead to early diagnosis and improvement of treatment results.

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