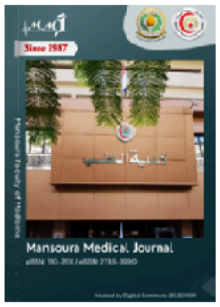
MANSOURA MEDICAL JOURNAL

ISSN - Print: 1110-211X - Online: 2735-3990

journal homepage: mmj.mans.edu.eg



Volume 31 | Issue 1 Article 9

SURGICAL TREATMENT OF THYMIC MASSES 22 YEARS EXPERIENCE

Reda A. Aboul Maaty

Cardiothoracic Surgery Department, Mansoura Faculty of Medicine

SURGICAL TREATMENT OF THYMIC MASSES 22 YEARS EXPERIENCE

By

Reda A. Aboul Maaty (MD.)

From

Cardiothoracic Surgery Department,

Mansoura Faculty of Medicine

ABSTRACT

Thymoma is the most common primary tumor of the anterior mediastinum while congenital thymic cysts are rare lesions mostly detected asymptomatically in the first decade of life . This is a study of the experience of mansoura university hospital in the surgical treatment of thymic masses .

From June 1979 till June 2001, 34 patients with thymic masses were studied. 21 patients were males "61.8%" and 13 females "38.2%". The age ranged from 2 to 60 years with a mean age of 34.94 years.

The symptomatic presentation was variable, where 10 cases had myasthenia gravis MG, 11 had dypsnea with or without chest pain, 1 had cervical LN, 2 had SVC obstruction, and 4 were asymptomatic.

The mass was approached through median sternotomy in 32 cases, Left thoracotomy in one, and the remaining case had no operation & diagnosed by cervical LN biopsy as Hodgkin lymphoma. Total thymectomy was done in 29 cases, large piece of pericardium was excised with total thymectomy in 2, total thymectomy & wedge resection of left upper lobe in one, one case was inoperable due to infiltration of SVC & heart.

According to Masaoka clinical staging we had 16 in stage I, 6 in stage II, 4 in stage III, 2 in stage IVa. We had 28 cases of thymoma, 16 were benign, 6 were atypical & 6 were thymic carcinoma. We had 4 cases with congenital thymic cysts . One case was thymolipoma in the second decade of life . One child had Hodgkin lymphoma with thymic enlargement . The correlation was significant be-

tween survival and pathologic types as well as clinical staging where p=0.001 & 0.009 respectively

14 patients about 40% experienced postoperative complications e.g. mediastinitis in 3, postoperative bleeding in 3, superficial wound infection in 2, postoperative pneumonia in 4, deep vein thrombosis (DVT) in 1 and left lung collapse in 1. Correlation was significant between complications & both Pathologic Types and Masaoka Staging (P = 0. 005 & O . 016) respectively. Thymic masses present in our locality are variable & include thymoma, thymic cysts and thymolipoma, plain x ray & CT scan are sufficient for diagnosis of nearly all thymic masses, thymectomy in the early stages of thymoma cases improves survival & decreases postoperative complications

INTRODUCTION

Thymoma is the most common primary tumor of the anterior mediastinum(1). Men & Women are equally affected & most patients are adults older than 40 years, thymomas are rare in children & adolescents(2).

Myasthenia gravis occurs in approximately 30-50% of patients with thymomas while only 15% of patients with Myasthenia gravis have a thymoma.(3) Thymoma is a rare epithelial tumor that often infiltrate adjacent thoracic organs and rarely metastasizes outside the chest (4). Congenital thymic cysts are rare lesions resulting from a persistent thymopharyngeal duct, most of them are asymptomatically detected in the first decade of life (5).

Aims of the study :

(1) To analyse the cases of thymic masses present in our locality regarding the demographic parameters of patients, clinical presentation, radiologic diagnosis, staging of disease at presentation, histopathologic types, surgical procedure & postoperative complications .

(2) To explore the relation between the stage of thymoma at presentation & both of survival and complications postoperativly

PATIENTS & METHODS

From june 1979 to june 2001, 34 patients (21 males &18 females) with thymic masses were studied who underwent surgical operation at Cardiothoracic Surgery Department, Man-

soura Faculty of medicine. The clinical, radiological, surgical & pathological notes were studied

In this series, thymomas were divided according to Masaoka's clinical staging (1981) into 4 stags as follow: stage I complete encapsulation macroscopically and no capsular invasion microscopically, stage II-invasion into surrounding fatty tissue or mediastinal pleura macroscopically or capsular invasion microscopically. Stage III-macroscopic invasion into neighboring organs i.e. pericardium, great vessels or lung, stage IVa -pleural or pericardial dissemination, stage IV b-lymphatic or hematogenous spread[6].

The recent pathologic classification of thymic tumors depend on their degree of organotypical differentiation and divided them into:

i) Well differentiated tumors" benign thymoma" characterized by minimal or absent cytological atypia and good preservation of the organotypical features of differentiation of the normal thymus.

ii) Poorly differentiated tumors" thymic carcinoma" characterized by overt cytological evidence of malignancy with loss of organotypical features of thymic differentiation.

Tumors bearing features of intermediate differentiation that, despite showing mild to moderate cytologic evidence of atypia, still retain many of the organotypical features of thymic differentiation (i.e. atypical thymoma)[7]

RESULTES

Table (1) Age & Sex Distribution Of the Patient group

Age Group	Sex		No. of Patients	Percentage
	Male	Female		
0-10 Years	4	-	4	11.7
11-20 Years	-	1	1	2.9
21-30 Years	2	5	7	20.6
31-40 Years	10	6	16	47.2
41-50 Years	4	1	5	14.7
51-60 Years	1	-	1	2.9
Total	21	13	34	100%

The age of patients ranged between 2 &60 years with mean age 34.94 years

Table No (2) Clinical presentation of the patient group

Clinical Presentation	Number of patients	Percentage
Myasthenia Gravis	10	29.4
Dyspnea	6	17.6
Dyspnea and cough	5	14.7
Dyspnea and pain	4	11.8
Asymptomatic (Radiological Diagnosis)	2	5.9
Cervical Lymph nodes	1	2.9
SVC Obstruction	2	5.9
Chest pain	4	11.8
Total	**34**	**100%**

Table No (3) Radiological Findings.

Radiological Finding	Number of patients	Percentage
Anterior Mediastinal Mass	30	88.2
Anterior Mediastinal Cyst	3	8.8
Anterior Mediastinal Cystic Mass	1	2.9
Total	**34**	**100**

N.B. Each Patient had C.X. Ray & C.T. Scan of Chest

Table No (4) Clinical Staging & Pathologic Classification Of Patients with Thymoma

No. of Patient	%	Masaoka clinical Staging	Pathologic Classification	No. of Patient	%
16	57.2	1	Benign	16	57.2
6	21.4	2	Atypical	6	21.4
4	14.3	3	Malignant	6	21.4
2	7.1	4a			
28	100	Total	Total	28	100

Details of Masaoka clinical Staging & Pathologic Classification are mentioned in Patients and Methods.

Table No (5) Type of surgical Procedure in Patient group

Operation	Number of patients	Percentage
Total Thymectomy	29	79.4
Thymectomy with Partial Pericardiectomy	2	5. 8
CT guided Needle Biopsy *	1	2. 9
With cervical L N biopsy		
Total Thymectomy & Wedge resection**	1	2.9
Inoperable, open biopsy***	1	
Total	**34**	

* CT guided Needle Biopsy of thymic mass and cervical L N biopsy in patient with Hodgkin's disease
** Total Thymectomy & Wedge resection of the left upper lobe of the lung
*** Thymic Carcinoma adherent to the heart and great vessels

Table No (6) Pathological Findings of the patient group

Pathological Finding	Number of patients	Percentage
Benign Thymoma	16	47.2
Atypical Thymoma	6	17.6
Thymic Carcinoma	6	17.6
Congenital Thymic cyst	4	11.8
Thymolipoma	1	2.9
Thymic Hyperplesia with Hodgkin	1	2.9
Total	**34**	**100**

Table No (7) Type of associated treatment of the patient group

Type of Treatment	Number of patients	Percentage
No Associated Treatment	18	53.0
Plasmapharesis	2	5.9
Steroid Administration	3	8.8
Plasmapharesis and Mestinon	1	2.9
Plasmapharesis and Steriod	1	2.9
Postoperative Chemotherpy	2	5.9
Postoperative Chemo-radiotherapy	5	14.7
Plasmapharesis, Steriod & Mestinon	2	5.9
Total	**34**	**100**

Table No (8) Postoperative complications of patient group

Type of complication	No. Of patients	%
No complication	20	58.8
Mediastinitis	3	8.8
Bleeding	3	8.8
Wound infection	2	5.9
Pneumonia	4	11.9
D V T	1	2.9
Lung Collapse	1	2.9
Total	34	100

Each patient had one complication

Table (9) Correlation between Pathology & Complications of thymoma

Pathology	Malignant	Atypical	Benign	Total
Complications				
Present	6 21.4%	2 7.2%	3 10.7%	11 39.3%
Absent	-	4 14.2%	13 46.5%	17 60.7%
Column Total	6 21.4%	6 21.4%	16 57.2%	28 100%

Correlation was significant (P Value = 0.005)

Table (10) Correlation between survival & pathology of Patients with Thymoma

Survival	Alive	Died	Total
Pathology			
Malignant	1 3.6%	4 14.3%	5 17.9%
Atypical	2 7.1%	2 7.1%	4 14.2%
Benign	18 64.3%	1 3.6%	19 67.9%
Total	21 75%	7 25%	28 100%

The Correlation was Significant (P Value = 0.001)

Table (11) Correlation between complications & Masaoka's clinical staging

*Stages	1	2	3	4a	Total
Complications Yes	4 14.3%	2 7.1%	4 14.3%	2 7.1%	12 42.9%
No	12 42.9%	4 14.2%	-	-	16 57.1%
Total	16 57.1%	6 21.4%	4 14.3%	2 7.1%	28 100%

The Correlation was Significant (P Value = 0.016)

Table (12) Correlation between Survival & Masaoka's clinical staging

Survival	Alive	Died	Total
Masaoka's clinical staging			
1	15 53.5%	1 3.5%	16 57.0%
2	4 14.2%	2 7.2%	6 21.4%
3	2 7.2%	2 7.2%	4 14.4%
4a	-	2 7.2%	2 7.2%
Total	21 75%	7 25%	28 100%

Significant Correlation between Survival & Masaoka's clinical staging (P = 0.009)

Fig (1) Malignant Thymoma: Large malignant cells with Vesic lar Nuclei (H & E X 400).

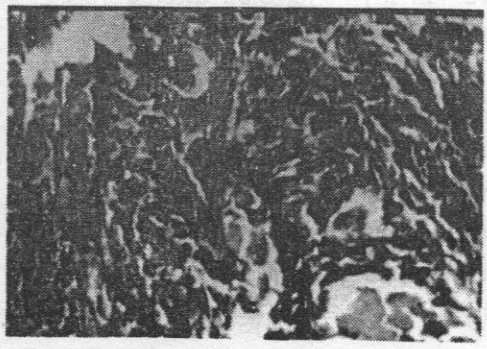


Fig (2) Benign Thymoma: Epithelial Neoplastic Cells In Whorly Appearance (H & E X 100).

Survival & follow up :

Follow up was available for 28 cases only and extended from 6 months to 10 years. We had 7 mortalities among 28 cases of thymoma, 4 patients died among 5 cases with malignant thymoma, one of them died after 1 year due to severe SVC obstruction and after repeated courses of chemotherapy & radiotherapy. Second case died after 3 years due to fatal pneumonia & Lt. Malignant pleural effusion, third case died after 2 years due to mediastinitis & the 4th case died after 12 years due to DVT & cerebral stroke.

2 out of 4 cases of atypical thymoma died, one after 7 years & other one after 10 years. Both cases died due to respiratory failure as a result of myasthenic crises. Only one case of benign thymoma died after 9 years due to myasthenic crisis also.

Five years survival rate for malignant thymoma was 40 % while that of benign & atypical thymoma were 100 % because we have no mortality after 5 years among patients with benign & atypical thymoma .

DISCUSSION

Embryologically, the thymus is formed from the ventral sacculation of the third pharyngeal pouch during the sixth week of development. The thymopharyngeal tract elongates & descends into the mediastinum with obliteration of the lumen during the seventh & eight weeks. Fusion of the tracts in the mediastinum occurs by the ninth week(8). It has been postulated that persistent sequestrated remnants of thymopharyngeal duct lead to the development of thymic cysts "congenital". An alternative theory of pathogenesis suggests that cysts result from acquired cystic degeneration of Hassal's Corpuscles "acquired"(9). Anatomic location of the thymic cysts occurs anywhere along the thymopharyngeal tract from the hyoid bone to the anterior mediastinum bordered laterally by the sternocleidomastoid muscles. Thymic cysts are rare and are commonly found within ectopic thymic rests located in the neck(10) however, we don't have any case of congenital thymic cysts located in the neck. Our 4 cases of thymic cysts were located in the anterior mediastinum, this finding is different from the finding of Hendrickeson et al.(11) who described 14 patients with congenital thymic cysts in children and concluded that they should be considered in the differential diag-

nosis of cervical masses in children. Our finding may be due to the relatively small number of thymic cysts present in our series.

The thymus reaches its greatest relative size when the patient is 2 years of age and greatest absolute size at puberty which may explain why most thymic cysts present between 2 & 15 years of age[12]. Our finding is similar to this author where we have 3 out of 4 cases (75%) under the age of 10 years & only one case (25%) with the age of 35 years because he was asymptomatic. Thymic cysts are mostly asymptomatic but sometimes cause dysphagia& Stridor[9] but most of our cases (75%) were symptomatic and diagnosed during the first decade of life and only one case (25%) was asymptomatic & diagnosed at the 4th decade of life during routine chest x-ray.

The cystic nature of the thymic masses of our 4 cases were diagnosed preoperatively by CT scan of chest but the definitive nature of thymic cyst was diagnosed postoperatively because more common diagnosis for cystic masses of anterior mediastinum include lymphangioma, teratoma & dermoid cyst[11]. Intact surgical excision of thymic cyst remains the curative treatment of choice because histological investigation is the only definitive means of diagnosis.

In pediatric patients with Hodgkin disease, the thymus was enlarged in 30% of cases in addition to nodal enlargement according to Heron et al.[12] but Luker et al.[13] showed that pediatric patients with Hodgkin disease can present with isolated thymic enlargement as the only site of Hodgkin disease in 2.8% of cases. Fortunately, we had one child 5 years old presented with thymic & cervical nodal enlargement which is similar to the finding of Heron et al., & different from that of Luker et al. the thymic enlargement showed complete regression after chemotherapy as detected by chest radiography which is similar to the finding of Norton et al.[14] & Wernecke et al.[15]. However, this case in our series is just an observation in our study because one case in not enough to do statistic or give a conclusion in this matter.

we have among our series the very rare thymic mass, thymolipoma. According to Strollo[16] and Molina et al.[17], thymolipoma is a rare benign slow-growing neoplasm of the thymus that affects male & female subjects

equally over a wide age range. However, young adults (with a mean age of 27 years) are most commonly affected. Our case was female aged 20 years & had progressive dypsnea and CXR & CT scan of chest showed huge anterior mediastinal mass. On surgical excision, our finding was similar to findings of Molina et al., where we found huge soft mass that occupied the whole anterior mediastinum and pathologically composed of mature adipose cells & thymic tissue.

Thymoma is the most common primary tumor of anterior mediastinum, Men & women are equally affected and most patients are adults older than 40 years. Although thymomas account for about 10% of anterior mediastinal masses in adults, they are rare in childhood(2,18) our finding differs from the finding of previous authors where we found 17 males with thymoma out of 28 cases i.e. male predominance among patients with thymoma. On the other hand we found all cases with thymoma were adults older than 20 years.

Most patients are asymptomatic but one third experience chest pain, cough, dypsnea, and up to one half of patients suffer from one or more paraneoplastic syndromes e.g. myasthenia gravis, hypogammaglobinaemia & pure red cell aphasia. Myasthenia gravis MG occurs in approximately 30% to 50% of patients with thymoma, in comparison, only 15% of patients with MG have a thymoma[19, 20].

We have 10 out of 28 cases of thymoma (35%) who had MG, which is similar to the previous authors. Approximately 25% of myasthenic patients with thymoma have gradual improvement of symptoms following thymectomy[18,21]. But we have better results than these authors as we have 9 myasthenic cases out of 10 (90%) who showed marked improvement after thymectomy and needed no postoperative treatment or postoperative ventilation for a long time. This may be attributed to our surgical technique in these cases as we used to remove the pericardial fat & open the two pleurae for complete excision of all thymic tissues.

According to the pathologic classification mentioned in patient and methods, we had 16 cases with benign thymoma, 6 cases with atypical thymoma & 6 cases with thymic carcinoma.

Thymic carcinoma is locally invasive and unlike thymoma, frequently metastasizes to regional lymph nodes & distant sites[22]. Among our 6 cases of thymic carcinoma, we had no case with distant metastases only they metastasized to the surrounding tissues e.g. pericardium & lung.

According to Masaoka's classification,[6] we had 16 cases in stage I, these were the cases of begnin thymoma which showed complete encapsulation macroscopically & no capsular invasion microscopically. 6 atypical thymomas were in stage II due to capsular invasion microscopically. Our 6 cases of thymic carcinoma, 4 of them were in stage III due to invasion of surrounding tissues e.g. Pericardium, lung & great vessels while the remaining two cases were in stage IV a due to dissemination into pleura & pericardium. 5 years survival rate was 40 % for our malignant thymoma cases which is nearly the same as that of Bacha et al which was 42%, but our 5 years survival rate for atypical & benign thymoma was 100% which is much better than that of Bacha et al which was 69 % . This may be due to the relativly higher number of thymoma patients studied in Bacha series (57 cases) than our series (28 cases) .

We found significant correlation (p=0.009) between survival & Masaoka clinical staging i.e. the survival decreased with more invasion of the capsule and surrounding tissues and this finding is similar to the finding of Fujimura et al.[23] who studied the survival of 66 patients against Masaoka's clinical staging & found significant correlation.

Also we found significant correlation (P=0.001) between survival & pathologic types i.e. the survival decreased with more degrees of cellular atypia which was similar to the results of Bacha et al.[24].

About 40% of our patients had surgical complications which is different from the results of Bacha et al(24)who found complications only in 17% of his cases. This difference may be due to higher incidence of mediastinitis & wound infection among our patients (15%) than Bacha's patients (6%).

Also we found that the incidence of complications increased with more cellular atypia. (P=0.005) which is similar to the results of others[23]. On other hand there was significant cor-

relation between complications and Masaoka clinical staging (p=0.016) which was similar to the resultes of Bacha et al [24].

Conclusions :

(1) Thymic masses in our locality are variable & include thymoma, thymic cysts & the rare thymolipoma mass . Thymoma affects males more than femals after the age of 20, while thymic cysts affect children in the first decade of life .

(2) Chest x ray & CT scan are sufficient for diagnosis of nearly all thymic masses .

(3) The majority of our thymoma patients presented early in stage 1&2 according to masaoka clinical staging .

(4) Total thymectomy is the most common surgical procedure done to patients in our series which is considered curative in the majority of cases .

(5) Thymectomy in the early stages of thymoma improves survival & decreases postoperative complications .

REFERENCES

1-Wyelmlis AR, Payne WS, Clagett OT, et al. (1972): Surgical treatment of mediastinal tumors. J Thorac Cardiovasc Surg 62:379-91.

2-Rosai J, Levine GD. (1976) : Tumors of the thymus. Atlas of Tumor Pathology, Washington. Armed forces institute of pathology. 34-212

3-Lennon VA, Jones G, Howard F, et al. (1983) : Autoantibodies to acetylcholine receptors in myasthesia gravis. N Engl J med 308:402-403.

4-Lastoria S, Vergara E, Palmieri G, Acampa W, Muto P & Salvatore M . (1998) : In vivo Detection of Malignant Thymic masses by Indium-111 DTPA-D- Phe- Octreotide-Scintigraphy. J Nucl Med 39:634-639.

5-Molina P, Marilyn J & Glazer H (1990) : Thymic masses on MR imaging. AJR 155:495.

6-Masaoka A, Monden Y, Nakahara K & Tanioka T (1981) : Follow up study of Thymomas with special reference to their clinical stages. Cancer, 48:2485-92.

7- Suster S, Mcran CA & Chan JK (1997): Thymoma with Pseudosarcomatous stroma: Report of an unusual histologic variant of thymic epithelial neoplasm that may simulate carcinosarcoma. The American Journal of Surgical Pathology, 21 (11): 1316.

8- Barrick B & O'Kell RT (1969) : Thymic cysts and remnant cervical thymus. J pediatr Surg, 4: 355-358.

9- Lev S & Lev MH (2000) : Imaging of Cystic lesions. Radiologic Clinics of North America148 (38):1013.

10- Guba AM, Adam AE & Jaques DA (1978) : Cervical presentation of thymic cysts. Am J Surg. (136):430.

11- Hendrickson M, Azarow K, Ein S et al. (1998) : Congenital thymic cysts in children - Mostly misdiagnosed. J Pediatr S (33):821.

12- Heron CW, Husband JE & Williams MP (1988) : Hodgkin disease: CT of the thymus. Radiology (167):647.

13- Luker GD & Siegel MJ (1993) : Mediastinal Hodgkin disease in children: Response to therapy. Radiology (189):737.

14- North LB, Fuller LM, Sullivan Hally JA & Hagmeister FB (1987) : Regression of mediastinal Hodgkin disease after therapy: Evaluation of time interval. Radiology (164):599

15-Wernecke K, Vassallo P, Peters PE & Patter R (1991) : Thymic involvement in Hodgkin disease: CT & sonographic findings. Radiology (181) :375.

16-Strallo DC (1997) : Primary mediastinal tumors. Tumors of anterior mediastinum.

Chest; 112:511-22.

17-Molina PL, Siegl MJ & Glazer HS (1990) : Thymic masses on MR imaging AJR 155:495.

18- Latters R (1962) : Thymoma and other tumors of the thymus: an analysis of 107 cases. Cancer (15): 1224:60.

19- Lewis JE Wick MR, Scheithauer BW et al. (1987) : Thymoma: a clinicopathologic review. Cancer (60):2727

20- Soudjian JV, Enriquez P, Silverstein MN et al. (1974) : The spectrum of diseases associated with thymoma. Arch Intern Med (134):374.

21- Maggi G, Giaccone G, Donadio M et al. (1986) : Thymoma: a review of 169 cases with Particular reference to results of surgical treatment. Cancer, 58:765.

22- Wick MR, Weiland LH, Scheithauer BW et al. (1982) : Primary thymic carcinomas. Am J Surg Pathol, 6:613.

23- Fugimura S, Kando T, Hand M et al. (1987) : Results of surgical treatment for thymoma based on 66 patients. J thorac. Cardiovasc Surg, 93:708.

24- Bacha E, Chapelier AR, Macchiarini P et al. (1998) : Surgery for invasive primary mediastinal tumors. Ann Thorac Surg, 66:234.