Araştırma Makalesi *Research Article*

Pamukkale Tıp Dergisi
Pamukkale Medical Journal

doi:https://dx.doi.org/10.31362/patd.645557

Primary mediastinal cysts and tumors: 10 year experience

Primer mediastinal kist ve tümörler: 10 yıllık deneyim

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Gönderilme tarihi: 11.11.2019 Kabul tarihi: 17.06.2020

Abstract

Purpose: To present the investigations related to the symptoms, surgical techniques, post-operative complications and pathologies of the cases with mediastinal cysts and masses.

Material and methods: Ninety cases with mediastinal cysts were evaluated retrospectively between 2009-2019. Patients were investigated regarding age, gender, complaints, radiological location of cysts, pre-operative diagnosis, type of surgeries, post-operative complications, removal of drains and pathologies.

Results: Of cases, 39 (43.3%) were men, and 51 (56.7%) were women. Mean age was 44, and 48.9% had no complaints. The most common complaints reported were, in turn, chest pain (41.3%), dispnea (34.8%) and cough (15.2%). Without any differentiation between benign and malignant cases, 74.4, 20 and 5.6% of the cysts were located in anterior, middle and posterior mediastinum, respectively. Preoperative diagnosis was performed by transthoracic or USG tru-cut biopsy in 8.9% of patients. For diagnostic and threapeutic purposes, 61.1%, 21.1% and 10% of patients were operated through thoracotomy, sternotomy and video-assisted thoracic surgery (VATS) respectively, while 7.8% were operated with first thoracotomy and then VATS. The drains were removed approximately on 5th day. The most common post-operative complications were atelectasis and secretion, and mortality rate was found as 2.2%. The post-operative pathologies were benign in 63.3% and malignant in 36.7% of the cases. Frequencies of pathologies were respectively as follows: thymic diseases (45.5%), neurogenic tumors (12.2%), developmental cysts (10%), Hodkgin's lymphomas (4%) and hydatid cysts (4%).

Conclusion: There is no need for invasive radiological interventions with the mediastinal structures in non-invasive cases for pre-operative diagnosis. Surgery is an effective method in the diagnosis and treatment of patients without invasion to surrounding tissues, and for whom no lymphomas and germ-cell tumors are considered.

Key words: Benign, cyst, malignant, mass, mediastinum.

Semerkant T, Esme H. Primary mediastinal cysts and tumors: 10 year experience. Pam Med J 2020;13:629-634.

Özet

Amaç: Mediastinal kist ve kitle nedeniyle opere edilen olguların semptomları, operasyon yöntemleri, postoperatif komplikasyon ve patolojilerini sunmak.

Gereç ve yöntemler: 2009-2019 yılları arasında mediastinal kitlesi olan 90 olgu retrospektif olarak incelendi. Hastalar yaş, cinsiyet, şikâyet, radyolojik yerleşim yeri, pre-operativ tanı, ameliyat şekli, postoperatif komplikasyonlar, dren çekilme süresi, patoloji yönünden analiz edildi.

Bulgular: Olguların 39'u (%43,3) erkek, 51'i (56,7) kadındı. Ortalama yaş 44 idi ve hastaların %48,9'unde şikâyet yoktu. En fazla şikâyet sırası ile göğüs ağrısı (%41,3), dispne (%34,8), öksürüktü (%15,2). Benign-malign ayrımı yapmadan olguların %74,4'i ön mediastende, %20'si arka mediastende ve %5,6'ü orta mediasten yerleşimliydi. Hastaların %8,9'unda transtorasik veya USG ile tru-cut biopsi yapılarak preoperatif tanı konuldu. Tanı veya tedavi amaçlı hastaların %61,1'ine torakotomi, %21,1'ine sternotomi, %10'una VATS, %7,8'ine ise VATS ile başlanıp torakotomiye dönülerek opere edildi. Hastaların drenleri ortalama 5.günde çekildi. Postoperatif en fazla olan komplikasyon atelektazi ve sekresyondu ve mortalite %2,2 idi. Olguların postoperatif patolojisi %63,3'ü benign, %36,7 maligndi. Patoloji en sık sırası ile %45,5 timik hastalıklar, %12,2 nörojenik tümörler, %10 gelişimsel kistler, %4 hodgking lenfoma, %4 hidatik kistti.

Sonuç: Radyolojik olarak mediastinal yapılara invazyon olmayan olgularda preoperatif tanı için invaziv girişimlere gerek yoktur. Lenfoma ve germ hücreli tümor olduğu düşünülmeyen ve etraf dokulara invazyon olmayan hastalarda cerrahi hem tanı hem tedavide etkin bir yöntemdir.

Anahtar kelimeler: Benign, kist, malign, kitle, mediasten.

Semerkant T, Esme H. Primer mediastinal kist ve tümörler: 10 yıllık deneyim. Pam Tıp Derg 2020;13:629-634.

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Introduction

Primary mediastinal cysts and tumors can be seen at any age. It can result from many structures in the mediastinum. The number of diagnostic possibilities can be reduced by taking into account the patient's age, location of the lesion, symptoms and signs, association with a systemic disease, radiographic findings, and biochemical markers. It can be used for both diagnostic and therapeutic purposes in surgical primary mediastinal lesions [1]. The purpose of our study is to discuss the symptoms, operative techniques, post-operative complications and pathologies of the patients operated due to mediastinal cysts and mass in light of the literature.

Material and methods

Due to the mediastinal mass, 90 patients who were operated in our clinic in the last 10 years were retrospectively analyzed. The patients were analyzed in terms of age, gender, complaint, radiological location, preoperative diagnosis, type of surgery, postoperative complications, drain removal time, and pathology. Metastatic mediastinal masses, sarcoidosis, tuberculosis, mediastinal lymphadenopathies were excluded. Statistical analysis

Statistical analysis of the study was performed with SPSS version 22 (Statistical Program for Social Sciences) software package. Descriptive statistics pertaining to categorical variables were expressed as frequencies and percentages, while those of continuous variables were expressed as mean, standard deviation, median, and minimum and maximum values.

Results

Thirty-nine of the cases (43.3%) were male, and 51 (56.7%) were female. The mean age was 44 (minimum age: 4, maximum age: 82). There were no complaints in 48.9% of the patients. The most common complaints were chest pain (21.1%), dyspnea (17.8%), cough (7.8%) (Table 1).

Table 1. The symptoms and signs of mediastinal masses

Symptoms and findings	Number of patients	Percentage (%)
No	44	48.9
Chest pain	19	21.1
Shortness of breath	16	17.8
Coughing	7	7.8
Swelling on neck	2	2.2
Diplopia	1	1.1
Difficulty swallowing	1	1.1

As well as routine hematological and biochemical blood examinations in all anterior mediastinal masses, the levels of alpha-fetoprotein, beta-HCG and LDH were also evaluated. Thoracic computerized tomography (CT) was performed in all cases. All cases were evaluated radiologically through magnetic resonance imaging (MRI) for vascular invasion and positron emission tomography/computed tomography (PET/CT) for malignancy. For this purpose, MRI was performed in 22.2% of the patients, while 12.2% were exposed to PET-CT was performed.

Without any differentiation between benign and malignant tumors, 74.4% of the cases were located in anterior mediastinum, while 20% and 5.6% were located in the posterior and middle mediastinum, respectively. As to the benign tumors, 68.4% were located in the anterior, 22.8% were in the posterior, and 8.7% were located in the middle mediastinum. Given the malignant tumors, 84.8% were located in the anterior, while 15.2% were located in the posterior mediastinum.

By performing transthoracic or USG tru-cut biopsies in 11.1% of the patients, pre-operative diagnosis was done in 8.9% of the patients. Based on diagnostic and therapeutic considerations, thoracotomy was performed in 61.1% of the patients, sternotomy was carried out in 21.1%, and VATS was done in 10%, while 7.8% of the cases were operated on initially

with VATS and then turned to thoracotomy. The drains were removed on 5th post-operative day (min. 1 day, max. 23 days). The most common post-operative complication was secretion along with atelectasis, and the complications are shown in Table 2.

Table 2. Post-operative complications

Post-operative complications	Number of patients
Atelectasis, secretion	4
Chylothorax	2
Pneumonia	1
Subacute thrombus in subclavian vein	1
Right vocal cord paralysis	1
Empyema	1
Arrhythmia and disorientation	1
Deaths	2

Considering post-operative pathologies, 63.3% of the cases were benign, and 36.7% were malignant. The most common post-operative complaints and findings were, in turn, thymic diseases (45.5%), neurogenic tumors (12.2%), developmental cysts (10%), Hodgkin's lymphomas (4%) and hydatid cysts (4%), and the findings are presented in Table 3.

Discussion

Mediastinum is a region where many vital organs and many benign and malignant lesions can occur. Primary mediastinal cysts and tumors are rare. It constitutes 3% of thoracic tumors. Definitive diagnosis is important due to various therapeutic and prognostic applications [2].

Symptoms in mediastinal masses are due to the mass's pressure on the surrounding structures, invasion or paraneoplastic syndromes. The most common symptoms are cough and weight loss, followed by dyspnea. In addition, hoarseness, dysphagia, superior vena cava syndrome, myasthenia symptoms can be observed [3]. Similarly, in our study, the most common symptom was chest pain, shortness of breath and cough.

Many mediastinal masses can be demonstrated by conventional radiography. However, CT and MR are required to determine the nature of the mass, its relationship with the surrounding tissue and its localization [4]. Thorax CT was taken in all of our cases. In 22.2% of cases, mediastinal MRI was taken due to suspicion of invasion into the mediastinal structures. PET-CT is clinically helpful in the evaluation of primary mediastinal tumors. Mean FDG uptake in malignant tumors is significantly higher than benign tumors [5]. In our study, PET-CT was taken in cases with a high suspicion of malignancy (12.2%).

In mediastinal masses, the diagnosis can be made by tru-cut biopsy. In a study, using a thick needle has been observed to increase the possibility of diagnosis. The diagnostic success rate was found to be 88.7% [6]. Our diagnostic success rate in cases with tru-cut biopsy was similar and was 80%. Masses that are well defined radiologically should be removed in total for diagnosis and treatment [7]. In our study, similar lesions were totally removed without preoperative invasive diagnosis. Thus, both diagnosis and treatment were provided. Only those who were considered to have lymphoma and germ cell tumors preoperatively were first biopsied.

There are operation methods such as thoracotomy, hemi-clamshell, videothoracoscopy and median sternotomy in mediastinal masses. Videothoracoscopic methods have many benefits. However, in complicated cases during videothoracoscopy or when complete resection cannot be achieved, open surgery should not be hesitated [8]. In our study, it was started with VATS in 7.8% and passed for reasons similar to thoracotomy.

Table 3. Post-operative pathologic and clinical findings

Pathology		Number of patients	Percentage (%)	Location of cysts (n)			Pre-op diagnosis (n)		Number of surgeries (n)		
		Anterior	Middle	Posterior	TTB	USG	Thoracotomy	Sternotomy	VATS		
Thymic diseases (45.5%)	Thymoma	24	26.7	23	-	1	3	4	16	-	2
	Thymic hyperplasia	11	12.2	11	-	-	-	-	7	4	-
	Thymolipoma	4	4.4	4	-	-	-	-	1	1	2
	Thymohemangiolipoma	1	1.1	1	-	-	-	-	1	-	-
	Thymic cysts	1	1.1	1	-	-	-	-	-	1	-
Neurogenic tumors (12.2%)	Schwannoma tumors	8	8.9	1	-	7	-	-	7	-	1
	Neurofibromas	2	2.2	-	-	2	-	-	1	-	1
	Ganglioneuromas	1	1.1	-	-	1	-	-	1	-	-
Develpmental cysts (10%)	Pericardial cysts	8	8.9	6	2	-	-	-	5	1	2
	Bronchogenic cysts	1	1.1	-	1	-	-	-	1	-	-
Hodgkin's lymphomas		4	4.4	4	-	-	1	-	1	2	1
Hydatid cysts		4	4.4	3	-	1	-	-	4	-	-
Teratomas		3	3.3	3	-	-	-	1	3	-	-
Lymphomas		3	3.3	3	-	-	-	-	3	-	-
Parathyroid adenomas		3	3.3	2	1	-	-	-	1	2	-
Sarcomas (2.2%)	Ewing sarcomas	1	1.1	-	-	1	-	-	1	-	-
	Chondrosarcomas	1	1.1	1	-	-	-	-	-	1	-
Neuroblastomas		2	2.2	-	-	2	-	-	2	-	-
Thyroid gland		2	2.2	2	-	-	-	1	1	-	-
Laryngoceles		1	1.1	-	-	1	-	-	1	-	-
Castleman's disease		1	1.1	-	1	-	-	-	1	-	-
Angiomyolipomas		1	1.1	1	-	-	-	-	1	-	-
Mesotheliomas		1	1.1	-	-	1	-	-	1	-	-
Solitary fibrous tumors		1	1.1	-	-	1	-	-	1	-	-
Cystic lympangiomas		1	1.1	1	-	-	-	-	1	-	-
Total		90	100	67	5	18	4	6	62	12	9

ttb: Transthoracic biopsy, USG: Ultrasonography, VATS: Video-assisted thoracic surger

Benign lesions are more common in primary mediastinal masses than malignant lesions. Mediastinal masses are located in anterior, posterior and middle mediastinum in order of frequency [9, 10]. Since metastatic diseases are not included in our study, the neoplastic rate is lower.

Mediastinal tumors are usually caused by thymic, neurogenic, lymphatic, germinal or mesenchymal tissues. In the studies, the order of priority changes. However, thymic diseases are in the first place [10-12]. In our study, thymic diseases were in the first place. The reason for the low rate of lymphoma is that we exclude mediastinal lymphadenopathies from the study.

Postoperative complication is 12% in excision of benign mediastinal masses. The most common complications, respectively, were 46.2% atelectasis, 30.8% atrial fibrillation, 15.4% respiratory distress, and acute exacerbation of IPF in 7.7%. There was no mortality. Postoperative complication is 14.4% in primary mediastinal malignant tumors. These are sternal wound infection, superior vena cava graft thrombosis, postoperative bleeding requiring reoperation, phrenic nerve palsy, pulmonary artery thrombosis, mediastinitis. The mortality rate is 6% [8-13]. In our study, the complication rate was 17.7%. The most common complication was atelectasis and secretion. Our mortality rate was 2.2%. The reason for the different postoperative complications and mortality rates in our study was that we included both malignant and benign groups.

Consequently, primary mediastinal masses are rarely seen. In cases where radiological mediastinal structures are not considered invasive (except for lymphoma and germ cell tumor), invasive procedures are not required for preoperative diagnosis. Total removal of the lesion provides both diagnosis and treatment.

Conflict of interest: No conflict of interest was declared by the others.

References

1. Date H. Diagnostic strategies for mediastinal tumors and cysts. Thorac Surg Clin 2009;19:29-35. https://doi.org/10.1016/j.thorsurg.2008.09.001
2. Sharma P, Jha V, Kumar N, Kumar R, Mandal A. Clinicopathological analysis of mediastinal masses: a mixed bag of nonneoplastic and neoplastic etiologies. Turk Patoloji Derg 2017;33:37-46. https://doi.org/10.5146/tjpath.2016.01371
3. Aroor AR, Prakasha SR, Seshadri S, Terthanath S, Raghuraj U. A study of clinical characteristicsof mediastinal mass. J Clin Diagn Res 2014;8:77-80. https://doi.org/10.7860/JCDR/2014/7622.4013
4. Juanpere S, Cañete N, Ortuño P, Martinez S, Sanchez G, Bernado L. A diagnostic approach to the mediastinal masses. Insights Imaging 2013;4:29-52. https://doi.org/10.1007/s13244-012-0201-0
5. Kubota K, Yamada S, Kondo T, et al. PET imaging of primary mediastinal tumours. Br J Cancer 1996;73:882-886. https://doi.org/10.1038/bjc.1996.157
6. Iguchi T. Hiraki T. Matsui Y, et al. CT fluoroscopy-guided core needle biopsy of anterior mediastinal masses. Diagn Interv Imaging 2018;99:91-97. https://doi.org/10.1016/j.diii.2017.10.007
7. Pun YW, Moreno Balsalobre R, Prieto Vicente J, Fernández Fau L. Multicenter experience of video-assisted thoracic surgery to treat mediastinal cysts and tumors. Arch Bronconeumol 2002;38:410-414. https://doi.org/10.1016/s0300-2896(02)75253-8
8. Kozu Y, Suzuki K, Oh S, Matsunaga T, Tsushima Y, Takamochi K. Single institutional experience with primary mediastinal cysts: clinicopathological study of 108 resected cases. Ann Thorac Cardiovasc Surg 2014;20:365-369. https://doi.org/10.5761/atcs.oa.13-00151
9. Dixit R, Shah NS, Goyal M, et al. Diagnostic evaluation of mediastinal lesions: Analysis of 144 cases. Lung India 2017;34:341-348. https://doi.org/10.4103/lungindia.lungindia_311_ 16
10. Bastos P, Magalhães A, Fernandes G, et al. Primary cysts and tumors of the mediastinum. Rev Port Pneumol 2007;13:659-673. https://doi.org/10.1016/s2173-5115(07)70361-5
11. Dubashi B, Cyriac S, Tenali SG. Clinicopathological analysis and outcome of primary mediastinal malignancies-a report of 91 cases from a single institute. Ann Thorac Med 2009;4:140-142. https://doi.org/10.4103/1817-1737.53354
12. Temes R, Chavez T, Mapel D, et al. Primary mediastinal malignancies: findings in 219 patients. West J Med 1999;170:161-166.
13. Bacha EA, Chapelier AR, Macchiarini P, Fadel E, Dartevelle PG. Surgery for invasive primary mediastinal tumors. Ann Thorac Surg 1998;66:234-239. https://doi.org/10.1016/s0003-4975(98)00350-6

Ethics committee approval: Ethical Committee Board approval was obtained from Health Sciences University Konya Training and Research Hospital (date and protocol number: 02.01.2020, 174).

Contributions of the authors to the article

T.S. formulated the main idea and hypothesis of the study. T.S. developed the theory and edited the material method section. T.S. and H.E. made the evaluation of the data in the results section. The discussion section of the article was written by T.S, T.S. reviewed, made the necessary corrections and approved. In addition, all authors discussed the entire study and confirmed its final version.