JSM Clinical Cytology and Pathology

Short Communication

Investigating on the Causes of Pleural Effusion in Patients with Exudative Pleural Effusion with Lymphocyte Dominant

Manouchehr Aghajanzadeh[1]*, Omid Mosaffaei[1], Ali Alavi Foumani[2], Azita Tangestaninejad[2], Alireza Jafarinezhad[2], Aydin Pourkazemi[3], and Shima Ildari[4]

[1]Department of Thoracic and General Surgery, Guilan University of Medical Sciences, Iran

[2]Department of Pulmonology, Guilan University of Medical Sciences, Iran

[3]Department of Infection Disease, Guilan University of Medical Sciences, Iran

[4]Department of Internal Medicine, Guilan University of Medical Sciences, Iran

Abstract

Background: Pleural effusion refers to accumulation of any fluid in the in the pleural space. Lymphocytic exudative pleural effusion (LEPE) is considered as one of the medical problems. A wide range of causes can produce (LEPE).This study aimed to the evaluation of causes of the pleural effusion in patients with lymphocyte- predominant exudative pleural effusion.

Methods: In this descriptive cross-sectional study, medical records of all patients admitted to the Razi and Aria Hospitals in the years 2015 to 2016 due to (LEPE). The information was derived using a form of information prepared according to the contents of the medical records, including the variables of age, gender, diagnosed cause, percentage of clinical symptom lymphocyte and diagnostic method. Patients were exposed to lymphocyte under open biopsy or thoracotomy to determine the cause of pleural effusion. In addition, the analysis of effusion and the used imaging method were examined.

Results: In this research, 119 patients with pleural effusion with lymphocyte preference were examined. Out of them, 71 cases (59.7%) were male and 48 cases (40.3%) were female. In terms of diagnostic and sampling method, 81 cases (68.1%) underwent VATS and 38 cases (31.9%) underwent thoracotomy. In terms of cause of the disease, 40 (33.6%) had lymphocytic pleuritis, 15 cases (12.6%) had lung cancer, 52 cases (43.7%) had TB, 5 cases had cancer metastases to other parts of the body and 7 cases (5.9%) had lymphocytic granulomatosis. The clinical symptom of shortness of breath had the highest frequency (52.9%). The mean age of subjects was 53.5 years and mean lymphocyte in the subjects was 81.8%. After analyzing the data and using one way Kruskal-Wallis, a significant difference was found between the mean age of subjects and different lymphocytic pleural effusion diagnoses (P = 0.0001).

Conclusion: The age factor as a determinant and predictive indicator can be helpful in diagnosis of the disease, so that at the ages lower than 40-45 years, infectious and inflammatory factors, and in the ages above 55-60 years, malignant and metastatic factors can be considered as pleural effusion factor.

Keywords: Pleural effusion; Exudative; Lymphocyte

Introduction

Pleural effusion refers to any fluid accumulation in the pleural space. Lymphocytic exudative pleural effusion is one of the medical problems [1]. In normal state, there is 15 to 20 ml of pleural fluid in each time [1,2]. Up to 75% of effusions caused by congestive heart failure are resolved within 48 hours with diuresis [3].However, one patient who has pneumonia and high pleural effusion and if this effusion is pussy and smelly, he would have empyema [4].

To evaluate pleural effusion, fluid sampling is required [5]. Based on clinical history, we examine the type and value of the available fluid, the nature of fluid accumulation, the cause of fluid formation, and the probability of recurrence [6-8]. Blood effusions are commonly malignant in macroscopic view and in the absence of trauma, which may also occur in pulmonary embolism or pneumonia conditions [1,5]. Various criteria were used in past to differentiate between transudate and exudate. If the ratio of pleural protein to the serum protein is greater than 0.5 and the ratio of LDH is greater than 0.6 or the absolute LDL of the pleural fluid is more than two thirds of the highest normal serum level, exudate effusion is considered [1,2].

Exudative lymphocytic pleural effusion is one of the medical problems. A wide range of causes including tuberculosis, malignancy, rheumatoid pleurisy, fungal pleurisy, sarcoidosis, and any parasitic disease such as Echinococcus granulosus are involved in this regard. Thus, in order to find the underlying cause in each patient, diagnostic actions including physical examination, chest x-ray, pleural fluid analysis and pleural biopsy

Submitted: 27 September 2019 | **Accepted:** 24 October 2019 | **Published:** 26 October 2019

***Corresponding author:** Manouchehr Aghajanzadeh, Department of Thoracic and General Surgery, Guilan University of Medical Sciences, Razi Hospital, Rasht, Iran, Tel: 98-911-331188; Email: maghajanzadeh2003@yahoo.com

Citation: Aghajanzadeh M, Mosaffaei O, Foumani AA, Tangestaninejad A, Jafarinezhad A, et al. (2019) Investigating on the Causes of Pleural Effusion in Patients with Exudative Pleural Effusion with Lymphocyte Dominant. JSM Clin Cytol Pathol 4: 4.

should be performed, which the last case (biopsy) is selective [9]. For diagnosis lymphocytic pleural effusion thoracentesis and biopsy are the most common tolls [10].The aims of this study are diagnosis of the cause of unusual and differential diagnosis of (LEPE)

Material and Methods

In this cross-sectional descriptive study, all patients admitted to Razi and Aria Hospitals during the years 2015 to 2016 due to (LEPE) were included. Accordingly, the results of surgical biopsy of patients with pleural effusion with unknown causes were examined. After obtaining the license from the Ethics Committee of Guilan University of Medical Sciences and coordinating with Hospital Management, the required information was collected from patients' medical records. The age, gender, diagnosed cause and diagnostic method were derived from the patients' medical records using the checklist. All collected information was entered to spss 22 software and to describe the quantitative variables in patients with pleural effusion with lymphocyte preference, mean and standard deviation were used and qualitative variables were described in terms of number and percentage.

Results

In this research, 119 patients with pleural effusion with lymphocyte preference were studied. Out of them, 71 subjects (59.7%) were male. In terms of age, 45 subjects (37.8%) had age between 51 and 70 years. In terms of diagnostic and sampling method, 81 cases (68.1%) underwent VATS. In our research, in terms of diagnosis of disease cause, 52 cases (43/7 %) had TB. In our research, in terms of percentage of lymphocyte level in thoracentesis fluid, 61 cases (51.3%) had age between 81-90%. In terms of dominant clinical symptoms during the admission, 63 cases (52/9%) had shortness of breath (Table 1). In this study, the mean age was 53.50 and standard deviation was 17.99 and the age range was 18-90 years and the rate of lymphocyte with a mean of 85.81 and a standard deviation of 13.8 was between 50 and 94%.

Table 1: Evaluation of the frequency distribution Demographic index in subjects.

Variable	Variable state	Frequency	Percent
Sex	Male	71	59/7
	Female	48	40/3
	Total	119	100
Age	≤30 years old	13	10/9
	30-50 years old	38	31/9
	51-70 years old	45	37/8
	>70 years old	23	19/3
	Total	119	100
Diagnostic method	VATS	81	68/1
	Open thoracotomy	38	31/9
	Total	119	100
Diagnosis	Lymphocytic pleuritis	40	33/6
	Lung cancer	15	12/6
	TB	52	43/7
	Metastasis	5	4/2
	Lymphocytic granulomatosis	7	5/9
	Total	119	100
Lymphocyte thoracentesis	≤70%	13	10/9
	71-80 percent	33	27/7
	81-90 percent	61	51/3
	>90 percent	12	10/1
	Total	119	100
Clinical symptom	Chest pain	21	10/6
	Dyspnea	63	52/9
	Cough	35	29/4
	Total	119	100

After examining the normal distribution of age variable in the subgroups of different causes of lymphocytic pleural effusion, the distribution of the variable was not normal ($p<0.05$).

There was a significant difference between the mean ages of subjects with different lymphocytic pleural effusion diagnoses, so that the mean age of people with TB was 43.46 years, mean age of people with lung cancer was 62.86 years, mean age of people with lymphocytic pleuritis was 58.75 years, mean age of people with metastasis was 64.6 years, and the mean age of people with lymphocytic granulomatosis was 70.14 years (Table 2). After examining the data and the results of Fishers Exact Test , no significant difference was found between the causes of pleural effusion in the subjects and gender ($p=0.440$), while most people with different diagnoses were male (Table 3). After examining the data, a significant difference was found between the cause of pleural effusion in the subjects and age using chi square test ($P = 0.001$), so that the highest frequency was in the age group of 51-70 years in patients with lymphocytic pleuritis, more than 50 years in patients with pulmonary cancer, 30-50 years with TB, more than 50 years with metathesis, and 51-70 years in patients with lymphocytic granulomatosis (Table 4).

After examining the data and the results of Fishers Exact Test , no significant difference was found between the causes of pleural effusion in the subjects and the diagnostic method ($P = 0.414$), so that VATS method was used in diagnosis of more people.

Based on the results of Fishers Exact Test, no significant difference was found between the causes of pleural effusion and the level of lymphocyte (0.212%). In almost all of the diagnostic cases, lymphocyte between 81-90% had the highest frequency.

After examining the data and using Fishers Exact Test , no significant difference was found between the causes of pleural effusion in the subjects and the dominant symptoms ($p=0.948$). However, shortness of breath had the highest frequency in almost all of the diagnoses studied.

Table 2: Distribution of mean age and mean lymphocyte in different causes of lymphocytic pleural effusion in subjects.

		Number	Mean± standard deviation	Median (Interquartile range)	Minimum	Maximum	P*
Age	Lymphocytic pleuritis	40	58.75±15.98	60 (44-70)	30	90	0.0001
	Lung cancer	15	62.86±14.50	65(62-72)	35	80	
	TB	52	43.46±16.06	41(31.25-56)	18	81	
	Metastasis	5	64.6±13.01	65(53.5-75.5)	44	78	
	Lymphocytic granulomatosis	7	70.14±14.32	70(54-85)	53	90	
Lymphocyte	Lymphocytic pleuritis	40	81.02±7.79	81.5(76-88)	68	92	0.386
	Lung cancer	15	82.26±9.75	86(78-88)	56	92	
	TB	52	82.84±8.38	84.5(78-89)	50	94	
	Metastasis	5	81.40±6.54	80(75-88)	73	88	
	Lymphocytic granulomatosis	7	78.71±5.85	80(72-83)	72	88	

Table 3: Evaluation of the frequency distribution Gender in the subjects studied according to the diagnostic causes of pleural effusion.

Diagnosis		Sex		Total	
		Male	Female		
Lymphocytic pleuritis	Frequency	21	19	40	0.44
	Percent	52.5	47.5	100	
Lung cancer	Frequency	10	5	15	
	Percent	66.7	33.3	100	
TB	Frequency	32	20	52	
	Percent	61.5	38.5	100	
Metastasis	Frequency	2	3	5	
	Percent	40	60	100	
Lymphocytic granulomatosis	Frequency	6	1	7	
	Percent	85.7	14.3	100	
Total	Frequency	71	48	119	
	Percent	59.7	40.3	100	

Table 4: Distribution of age in the subjects according to the diagnostic causes of pleural effusion.

Diagnosis		Age				Total	
		≤ 30 years old	30_50 years old	51_70 years old	≥ 70 years old		
Lymphocytic pleuritis	Frequency	1	11	20	8	40	P<0.001
	Percent	2.5	27.5	50	20	100	
Lung cancer	Frequency	0	3	6	6	15	
	Percent	0	20	40	40	100	
TB	Frequency	12	23	13	4	52	
	Percent	23.1	44.2	25	7.7	100	
Metastasis	Frequency	0	1	2	2	5	
	Percent	0	20	40	40	100	
Lymphocytic granulomatosis	Frequency	0	0	4	3	7	
	Percent	0	0	57.1	42.9	100	
Total	Frequency	13	38	45	23	119	
	Percent	10.9	31.9	37.8	19.3	100	

Discussion

In this research, 119 patients with pleural effusion with lymphocyte preference were studied, which majority of them was male. The mean age of them was 53.50 years. In addition, 43.7% of patients with pleural effusion had TB and 12.6% had lung cancer. In this study, the value of lymphocyte in the thoracentesis fluid was 51.3% and the most clinical symptoms during the patient admission were shortness of breath with 52.9%. In terms of diagnostic and sampling method, 68.1% of them underwent VATS. The mean age in patients with metastases and lymphocytic granulomatous was higher compared to other causes. This result suggests that we should look for inflammatory and infectious causes for lymphocytic pleural effusion at lower ages and malignant causes for lymphocytic pleural effusion at older ages. The mean percentage of lymphocytes was 81.02% in lymphocytic pleuritis, 82.26% in lung cancer, 82.84% in TB, 81.3% in metastasis, and 78.71% lymphocytic granulomatous.

In the study conducted by Anwar et al on 74 patients with exudative lymphocytic pleural effusion, the mean age of subjects was 47 years [9]. Moreover, previous studies which examined the causes of exudative lymphocytic pleural effusion reported that the most common causes of exudate lymphocytic pleural effusion were tuberculosis and malignancy [9]. In another study conducted by Khorram et al, 64.40% had TB and 13.55% had adenocarcinomas [11]. Various types of intra-chest diseases occur with certain symptoms, which any of clinical symptoms may indicate a particular disease. In our study, the most common symptoms were chest pain, shortness of breath and coughing. The frequency of symptoms in various diagnosis were evaluated, which the frequency of shortness of breath had the highest rate among other symptoms. No significant difference was found between symptoms of patients and diagnosis.

Conclusion

Based on the research results, it can be recommended that we should think more on diagnosis of infectious and inflammatory diseases, such as TB in the case of patients with dominant symptom of shortness of breath and coughing at the age of below 40 years and pleural fluid sample with lymphocyte preference and malignant and metastatic disease can be considered in the case of patients at the ages above 50 years.

References

1. Saha K, Maikap MK, Maji A, Moitra M, Jash D. Demographic, clinical, biochemical, radiological and etiological characteristics of malignant pleural effusions from Eastern India. Indian J Cancer. 2017; 54: 257-261.
2. Shields TW LJ, Reed CE, Feins RH. Parapneumonic Empyema. General Thoracic Surgery 7th edn: Lippincott Williams & Wilkins. 2009: 775-81.
3. Light RW, Girard WM, Jenkinson SG, George RB. Parapneumonic effusions. Am J Med. 1980; 69: 507-512.
4. Nyambat B, Kilgore PE, Yong DE, Anh DD, Chiu C-H, Shen X, et al. Survey of childhood empyema in Asia: implications for detecting the unmeasured burden of culture-negative bacterial disease. BMC Infect Dis. 2008; 8: 90.
5. Lee YC, Rogers JT, Rodriguez RM, Miller KD, Light RW. Adenosine deaminase levels in nontuberculous lymphocytic pleural effusions. Chest. 2001; 120: 356-361.
6. Khalil MY, Mapa M, Shin HJC, Shin DM. Advances in the management of malignant mesothelioma. Curr Oncol Rep. 2003; 5: 334-341.
7. Rusch VW, Rosenzweig K, Venkatraman E, Leon L, Raben A, Harrison L, et al. A phase II trial of surgical resection and adjuvant high-dose hemithoracic radiation for malignant pleural mesothelioma. J Thorac Cardiovasc Surg. 2001; 122: 788-795.
8. Lu C, Perez-Soler R, Piperdi B, Walsh GL, Swisher SG, Smythe WR, et al. Phase II study of a liposome-entrapped cisplatin analog (L-NDDP) administered intrapleurally and pathologic response rates in patients with malignant pleural mesothelioma. J Clin Oncol. 2005; 23: 3495-3501.
9. Anwar R, Farooqi JI. Causes of lymphocytic exudative pleural effusion as revealed by percutaneous pleural biopsy: Experience from Peshawar. Pak J Med Sci. 2005; 21: 39-43.
10. Fletcher CD, Unni KK, Mertens F. Pathology and genetics of tumours of soft tissue and bone: IARC. 2002.
11. Khurram M, Jaffery A, Khar HTB, Malik M, Javed S, Burki U, et al. Evaluation of lymphocytic exudative pleural effusion with pleural biopsy. JCPSP. 2002; 12: 74-77.