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Malignant Mesothelioma: A Study of Sixty-Six Cases

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ABSTRACT

***Background**: This study was conducted to review the epidemiology, and biochemical data of pleural fluid to assess the potential contribution to occupational risk of patients with malignant mesothelioma (MM) in Iran .*

***Materials and Methods**: Hospital files of patients with MM of the pleura in Masih Daneshvari Hospital were reviewed between 1997 and 2004 and were evaluated in a cross-sectional study.*

***Results**: 66 patients (49 men and 17 women) with a mean age of 53.8± 4.2 yrs were selected. Probable or known occupational contacts were detected in 8 (12.1%) patients. The diagnosis was confirmed by closed pleural biopsy in 26(39.4%) cases. Statistical analysis showed significant cut-off for LDH and glucose level in pleural fluid analysis.*

***Conclusion**: Detailed occupational history must not overemphasize blind biopsy as the first diagnostic approach for MM of pleura and pleural fluid glucose as well as LDH had characteristic levels respectively.* **(Tanaffos 2006; 5(4): 59-63)**

***Key words**: Mesothelioma, Epidemiology, Occupational exposure.*

INTRODUCTION

Malignant Mesothelioma (MM) is an aggressive tumor of serosal surfaces, such as the pleura and the peritoneum (1-3). There is a substantial concern that the increased use of asbestos in developing countries may result in an increase in the number of cases of malignant mesothelioma for many decades to come; unless strong occupational health controls are put in place(4). Although widespread exposure to asbestos is a main recognized factor, however, in most instances and situations finding the association between occupation and the disease is difficult. On the other hand, the combination of an unexplained pleural effusion and pleuritic pain should raise the suspicion of MM. Because of the low incidence of constitutional symptoms especially weight loss and fatigability, rare metastasis, extension of tumor by the time of presentation and lack of epidemiologic features of asbestos exposure, MM is rarely considered at the first presentation and the diagnosis is usually delayed for a several months (5).

In this article we review the clinical features, biochemical assays of pleural fluid, and accurate diagnostic tools in 66 patients with MM.

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MATERIALS AND METHODS

A cross-sectional study during 1997 to 2004 was performed on 66 patients with a documented diagnosis of MM at the National Research Institute of Tuberculosis and Lung Disease. These cases were all biopsy proven cases of MM (based on histological appearance, distribution of tumor by CT-scan and in some cases the results of immunohistochemical studies especially calretinin stain). In all cases, the diagnosis of MM was made independent of asbestos exposure history. Information regarding age, sex, occupation and characteristic of biochemical data of pleural effusion (LDH and glucose level) and type of biopsy taken was also obtained. Information regarding the occupational exposure was obtained through review of the medical records. More attention was paid to the occupational asbestos exposure. In our study, statistical analysis was performed on biochemical data of pleural fluid such as LDH and glucose level.

RESULTS

There were 66 patients of which 49 (74.2%) were males and 17(25.8%) were females with a mean age of 53.8±4.2 yrs. Occupational exposure was detected in only 8(12.1%) cases (Table 1).

The predominant cell type was epithelial (75%) and all primary tumors arose from the pleura; 58 patients (87.8%) presented with dyspnea, 43 patients (65.1%) with pleuritic pain, and 39 patients (59%) had experienced coughs. Exudative pleural effusion, thickened pleural and pleural plaque were confirmed in 51(77.2%), 24(36.3%) and 3(4.5%) patients respectively. One-Sample t-test analysis of biochemical data of pleural fluid showed significant cut-off for LDH and pleural glucose. Statistical analysis for biochemical studies of pleural fluid showed that in 25 percent, glucose level was <36mg/dl; in 50 percent <65mg/dl; and in 75 percent <82mg/dl. These measurements for LDH were 370 lU/dl, 650 IU/dl, and 769 IU/dl respectively. One-Sample t-test showed significant ranges of LDH levels between 200 (p=0.00) and 400 IU/dl (p=0.004). The same results were obtained regarding the glucose of pleural fluid which was between 40 (p=0.00) and 50 (p=0.038).

Table 1. Occupational data in 66 patients of malignant pleural mesothelioma (1997-2004)

Exposure type	No. of patients	%
Housewife	16	24.3
Tradesman	5	7.6
Farmer	7	10.7
Butler	4	6
Military Personnel	2	3
Cement factory worker	8	12.1
Construction works man	8	12.1
Driver	2	3
Fruit market worker	1	1.5
Officer	11	16.7
Shoemakers	2	3

Pathologic diagnosis was confirmed by blind percutaneous needle biopsy in 26 (39.4%) patients (Figure 1).

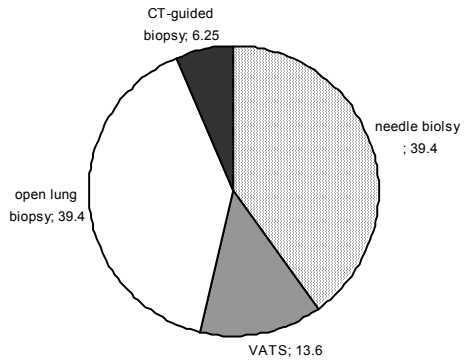

Figure 1. The methods used for the confirmation of pathologic diagnosis

The percentile of glucose and LDH measurement are shown in figure 2, 3.

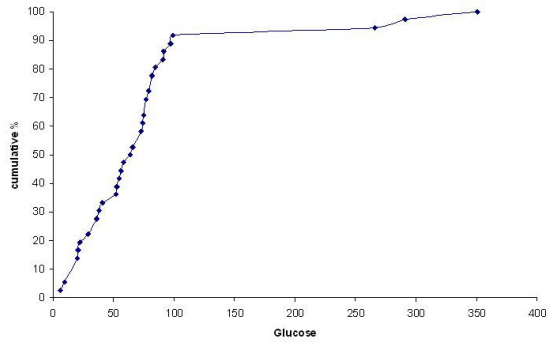

Figure 2. Cumulative percentage of glucose values in patients with MM

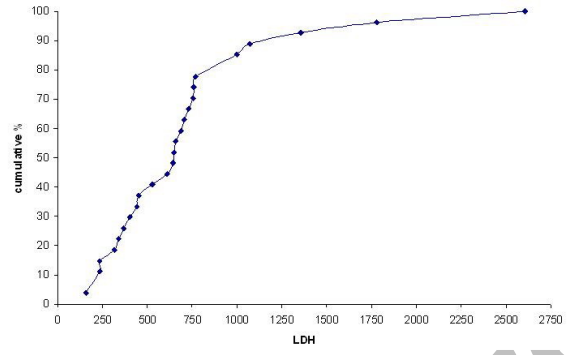

Figure 3. Cumulative percentage of LDH values in patients with MM

DISCUSSION

It is said that MM is almost always caused by inhalation of asbestos fibers, years before the presentation (6, 7, 8). Furthermore, many studies have examined workers exposed to asbestos (9, 10, 11). In the present study, a significant correlation between occupation and asbestos exposure and MM was not detected. These groups of patients accounting for 85 percent of current series probably include those who were exposed to asbestos unknowingly and incidentally in the myriad of situations in which asbestos fibers are released into the atmosphere in industrialized countries (2, 12). Although a detailed occupational history should alert the clinician to the possibility of mesothelioma as a cause of the patients' symptoms, obtaining an accurate occupational history cannot be overemphasized (13, 14). The importance of detailed occupational history at the first consultation may carry more weight than a history which is elicited after the diagnosis of mesothelioma has been made (2).

This case series showed typical MM patients presenting with dyspnea, chest pain, or both. Unlike carcinoma of bronchus, hemoptysis and symptoms due to distal metastases are unusual. The disease is more likely to progress by local extension than hematogenous spread. A chest wall mass, weight loss, abdominal pain, and ascites (due to peritoneal involvement) are less common presentations (1,8). In non of the patients in this case series, symptomatic metastasis was confirmed.

The initial approach to diagnosis depends on the presenting feature. For instance, chest wall pain, unilateral pleural thickening, and undiagnosed pleural effusion, all raise the possibility of mesothelioma. Although CT-scan findings have a key role in the diagnosis of mesothelioma (such as pleural plaques or thickening and nodularity of the pleura) pathological confirmation is recommended, unless the patient is frail or has extremely advanced disease (2,3).

In the past, closed pleural needle biopsy (CPNB) was thought to deliver insufficient tissue to allow a definite diagnosis of MM. The diagnostic yield for CPNB has generally been reported as 20 to 30 percent (4,5). However, we found that a blind directed CPNB using an Abram's needle produced a yield of % 40. A CT-guided approach gave a yield of % 6.25. Video-assisted thoracoscopy (VATS) has been used universally to obtain samples for diagnosing MM of the pleura. Diagnostic yields of 60 to 75 percent have been reported (15). However, the use of this procedure is not cost effective especially in third world countries and CPNB is suggested to be performed prior to open lung biopsy

(OLB) in patients in whom a definitive diagnosis of MM of the pleura is required (16).

The steadily increasing incidence of MM of the pleura during 1997-2004 in our institution corresponds with the rapid growth period from late 1970. Industries such as iron, steel construction, and pharmaceuticals grew quickly, and the household electrical products as well as the petrochemical industry developed with this economic growth. The use and the amount of asbestos expanded, but with some factors such as immunohistochemical staining technique, the diagnosis of MM has also become more accurate than before (2, 3, 14).

Statistical analysis showed that there was a strong association between glucose level of 40-50 mg /dl and LDH level of 200-400mg/dl and MM of the pleura. Although these indices were not specifically addressed to MM of the pleura they had a very important role in deciding for surgical biopsy. But even then, the diagnosis remains elusive.

Nevertheless, to our knowledge, such a systematic approach on large unselected patients with MM has not been previously reported.

There are a number of limitations in the present study. First of all, the sample tissues were not examined for detection of asbestos bodies and fibers by chemical and staining or energy dispersive x-ray analysis. For this reason conclusions may not be representative of all individuals exposed to dust, occupationally (17). Secondly, historical information obtained by the patient interview is subject to recall bias for events that occurred decades ago. This may explain the absence of %88 cases of reported exposure to commercial asbestos fiber in our study. Thirdly, there is a possibility that exposure might be induced by environmental factors other than occupation (18). However, we think that this is unlikely, since a number of investigators using somewhat more sensitive, and sophisticated methods found no correlation between the concentration of asbestos fiber and the risk of MM (15). A more troublesome issue in this article is the fact that we could not prove any correlation between MM and the type of occupation (15, 16). In this regard we think that these patients were exposed to asbestos unknowing and incidentally in the myriad of situations, in which asbestos fibers are released into the atmosphere. Thus, we recommend that prompt referral to a pulmonologist should be done for any patient in whom early assessment raises the possibility of MM.

REFERENCES

1. Luo S, Liu X, Mu S, Tsai SP, Wen CP. Asbestos related diseases from environmental exposure to crocidolite in Da-yao, China. I. Review of exposure and epidemiological data. ***Occup Environ Med*** 2003; 60 (1): 35- 41; discussion 41-2.
2. Villena Garrido V, Lopez Encuentra A, Echave-Sustaeta J, Alvarez Martinez C, Rey Terron L, Sotelo MT, et al. Pleural mesothelioma: experience with 62 cases in 9 years. ***Arch Bronconeumol*** 2004; 40 (5): 203- 8.
3. Lopes C, Sotto-Mayor R, Teixeira E, Almeida A. Malignant mesothelioma: A ten years experience. ***Rev Port Pneumol*** 2005; 11 (6 Suppl 1): 16- 8.
4. Takahashi K. Emerging health effects of asbestos in Asia. In: Proceedings of the Global Asbestos Congress, Tokyo, 2004: 2. 19–21
5. Peto J, Hodgson JT, Matthews FE, Jones JR. Continuing increase in mesothelioma mortality in Britain. ***Lancet*** 1995; 345 (8949): 535- 9.
6. Hubbard R. The aetiology of mesothelioma: are risk factors other than asbestos exposure important? ***Thorax*** 1997; 52 (6): 496- 7.
7. McDonald JC. Health implications of environmental exposure to asbestos. ***Environ Health Perspect*** 1985; 62: 319- 28.
8. Yates DH, Corrin B, Stidolph PN, Browne K. Malignant mesothelioma in south east England: clinicopathological experience of 272 cases. ***Thorax*** 1997; 52 (6): 507- 12. Erratum in: ***Thorax*** 1997; 52 (11): 1018.

9. Elmes PC, Simpson JC. The clinical aspects of mesothelioma. ***Q J Med*** 1976; 45 (179): 427- 49.
10. Hillerdal G. Malignant mesothelioma 1982: review of 4710 published cases. ***Br J Dis Chest*** 1983; 77 (4): 321- 43.
11. Renshaw AA, Dean BR, Antman KH, Sugarbaker DJ, Cibas ES. The role of cytologic evaluation of pleural fluid in the diagnosis of malignant mesothelioma. ***Chest*** 1997; 111(1):106-9.
12. Boutin C, Rey F. Thoracoscopy in pleural malignant mesothelioma: a prospective study of 188 consecutive patients. Part 1: Diagnosis. ***Cancer*** 1993; 72 (2): 389- 93.
13. Scott B, Mukherjee S, Lake R A, Robinson BWS. Malignant mesothelioma. In: Hanson H, ed. Textbook of lung cancer. London: Martin Dunitz , 2000:273-93.
14. Pantanowitz L, Otis CN. Malignant mesothelioma. ***N Engl J Med*** 2006; 354 (3): 305- 7.
15. Robinson, Lake. R. A. Advanced in Malignant Mesothelioma. ***NEJM*** 2003; 353: 1591-1603.
16. Goldberg M, Luce D. Can exposure to very low levels of asbestos induce pleural mesothelioma? ***Am J Respir Crit Care Med*** 2005; 172 (8): 939- 40.
17. Hillerdal G. Mesothelioma: cases associated with non-occupational and low dose exposures. ***Occup Environ Med*** 1999; 56 (8): 505- 13.
18. de klerk NH , Musk AM .Epidemiology of mesothelioma. In: Robinson B W S, ChAhnian P eds. Mesothelioma London: Martin Dunitz, 2002: 339-50.