Print ISSN: 2321-6379
Online ISSN: 2321-595X

Original Article

Prevalence of Malignant Pleural Mesothelioma in Pleural Effusion Patients in Thanjavur Medical College Hospital: A Pilot Study

G. Selvamani[1], A. Manimaran[2], R. Venkatesan[3]

[1]Associate Professor, Department of Thoracic Medicine, Thanjavur Medical College and Hospital, Thanjavur, Tamil Nadu, India, [2]Senior Resident, Department of Thoracic Medicine, Thanjavur Medical College and Hospital, Thanjavur, Tamil Nadu, India, [3]Associate Professor, Department of Physiology, Government Medical College, Pudukkottai, Tamil Nadu, India

Abstract

Background: The incidence of malignant pleural mesothelioma (MPM) has increased for some decades and was expected to peak between 2010 and 2020. The prevalence of MPM in India is unclear. No such study is available regarding MPM in India.

Materials and Methods: After obtaining proper informed consent, patients presenting with pleural effusion were subject to pleural biopsy, and the samples were then sent to histopathological confirmation of malignancy.

Results: Histopathological evidence confirmed two cases of MPM of the 12 cases. Five of them were diagnosed with tuberculosis pleuritis, while two cases had inflammatory pathology and two cases were confirmed to have been metastatic tumors.

Conclusions: The present findings show that the prevalence of MPM is rather high at about 16%. A more comprehensive study is warranted based on our findings.

Key words: Prevalence, Malignant pleural mesothelioma, Pleural biopsy

INTRODUCTION

The term "mesothelioma" was first used in 1921 by Eastwood and Martin[1] to describe primary tumors of the pleura. Malignant pleural mesothelioma (MPM) is the most common neoplasm of pleura.[2] It is a malignant proliferation of mesothelial cells that involve a large extent of pleural cavity.[3]

Asbestos

A strong etiological correlation with asbestos exposure is well proven.[2,4] Asbestos fibers that reach the respiratory bronchioles and alveoli are subject to different fates. Chrysotile fibers can undergo fragmentation by organic acids, and progressive clearance, whereas amphibole fibers may remain unchanged for decades.[5] High concentrations of asbestos fibers in the lung are associated with asbestosis and bronchial carcinoma.[6] In patients with these conditions, asbestos bodies, mostly formed on amphibole fibers, are usually found in lung sections and bronchoalveolar lavage fluid.[7] Fibers may also migrate toward the periphery of the lung, especially the lower lobes,[8] into mediastinal lymph nodes[9] and the pleura.

Access this article online

www.ijss-sn.com

Month of Submission : 01-2019
Month of Peer Review : 02-2019
Month of Acceptance : 02-2019
Month of Publishing : 03-2019

Simian Virus 40 (SV40)

The DNA virus, SV40, has been associated with malignant mesothelioma and has been suggested as a causal cofactor. The most likely route of human infection by SV40 is through contaminated polio vaccines until the late 1970s.[10] SV40 inactivates tumor suppressor genes and has demonstrated oncogenic potential in animal experimentation.[11] It has a predilection for mesothelial cells and is found in human mesothelioma specimens. It is not, however, present in all mesotheliomas.[12]

Long Latency

The latency of mesothelioma that is the time elapsed between first exposure to asbestos and the diagnosis

Corresponding Author: Dr. R Venkatesan, A-2, Teaching Staff Quarters, GMC, Pudukkottai–622 004, Tamil Nadu, India. Phone: +91-7402277812/+91-7010003512. E-mail: arvees99@yahoo.co.in

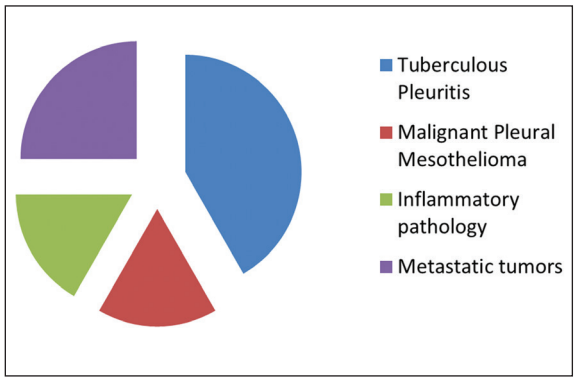

Figure 1: Break-up of Diagnosis

Table 1: Pleural Biopsy reports

Tuberculous pleuritis	MPM	Inflammatory pathology	Metastatic tumors
5	2	2	3

MPM: Malignant pleural mesothelioma

of disease is long. Investigators in New South Wales, Australia, reported an average latency of 42.8 years for cases diagnosed between 1972 and 2004, without gender difference. Peritoneal disease had a significantly shorter latency than pleural disease. Longer latency periods were evident in more recent diagnoses.[13]

A second study, from Italy, reported a mean latency of 44.6 years in 2544 cases diagnosed in the period of 1993–2001, with shorter latency in those cases with occupational exposure.[14] There is some evidence that disease latency has an inverse relationship with duration or degree of asbestos exposure.

Objectives

The aim of this study was to find out the prevalence of MPM in patients having pleural effusion in Thanjavur Medical College.

MATERIALS AND METHODS

This descriptive study was conducted in the Department of Thoracic Medicine, Thanjavur Medical College, Thanjavur, over a period of 6 months from June 2018 to December 2018. Pleural biopsy was taken in all of concerned cases presenting with pleural effusion and sent for histopathological examination. Patients were informed about the study and proper informed consent was given by them.

OBSERVATION AND RESULTS

As seen in Figure 1 a total of 12 patients were included in the study. It was observed that of the 12 patients presenting with pleural effusion, two were confirmed to have MPM. Five of the cases were confirmed to have been diagnosed as tuberculosis pleuritis, two cases had metastatic tumors, and two had inflammatory pathology. Diagnosis of MPM was based on the presence of cancerous mesothelial cells in the biopsy.

Diagnosis Based on Pleural Biopsy Reports

As shown in Table-1, based on pleural biopsy reports, it was confirmed that 5 cases had tuberculous pleuritis, 3 cases had metastatic tumours, 2 cases had mesothelioma and a further 2 cases had inflammatory pathology.

DISCUSSION

MPM is a very rare tumor. The incidence in men ranges from 7 to 13 per million per year. In population unexposed to asbestos, it is still rarer, with reported incidence of 1–2 per million per year.[15,16]

Mesothelioma is difficult to detect at an early stage. Nevertheless, early detection is the key to prolonged survival. All possible diagnostic modalities must be applied to achieve this end. Thoracoscopy and pleural biopsy appear to be the most effective diagnostic techniques.

MPM usually occurs in males with a male-to-female ratio of 2.6:1. In our study, we found the distribution to be of the ratio 1:1. It is usually related to asbestos exposure, though rarely, it can occur in patients not exposed to asbestos. In such cases, the postulated correlation is the operation of other carcinogens, genetic factors, and viral infections.[17]

Patients usually present with pleural effusions. Radiographic investigations reveal pleural effusion (exudative/hemorrhagic), pleural nodular shadows (diffuse or localized), or involvement of lungs, ribs, spine, etc.[18] Pleural fluid cytology may sometimes reveal the diagnosis, but usually, definitive diagnosis is based on histological evidence on examination of pleural tissue. In our study, we confirmed the diagnosis based on histological evidence.

In our pilot study, we found out that the prevalence of mesothelioma was a rather high 16%. Exact prevalence in India is unclear. However, Park *et al.*[19] described a "hidden burden of disease" of approximately 39,000 cases in the 15-year period to 2008, predominantly in Russia, Kazakhstan, China, India, and Thailand.

High asbestos consumption in developing countries, particularly in Asia, is likely to cause additional future disease; however, this is difficult to quantify.[20]

The continued distribution and consumption of asbestos products ensure that the toll of asbestos exposure will

continue well into the 21st century. The large future caseload underlines the ongoing importance of research directed toward early diagnosis and disease management.[21]

CONCLUSIONS

MPM is a rare disease, but the continued use of asbestos sheets makes it likely that its incidence is going to increase in the near future. Hence, we suggest a comprehensive study to ascertain its prevalence involving a large population sample.

ACKNOWLEDGMENT

The authors thank the staff of the Department of Thoracic Medicine and Cardiothoracic Surgery, Thanjavur Medical College and Hospital who helped a lot to carry out this study. They also acknowledge the immense help received from the scholars whose articles are cited and included in the references of this article. Special gratitude goes to the patients who willing took part in this pilot study.

REFERENCES

1. Eastwood EH, Martin JP. A case of primary tumour of the pleura. Lancet 1921;1:172.
2. Patel SN, Kettner NW. Malignant pleural mesothelioma: A case report. J Manipulative Physiol Ther 2005;28:724-9.
3. Nadgouda UG, Soppimath SS, Datta KS, Shiggaon UN, Babu KR. Malignant pleural mesothelioma. J Assoc Physicians India 2001;49:1208-9.
4. Bruce WS, Robinson MD, Lake RA. Advances in malignant mesothelioma. N Engl J Med 2005;353:1591-601.
5. Churg A, DePaoli L. Clearance of chrysotile asbestos from human lung. Exp Lung Res 1988;14:567-74.
6. Anttila S, Kadalainen A, Taikina-aho O, Kyyrönen P, Vainio H. Lung cancer in the lower lobe is associated with pulmonary asbestos fiber count and fiber size. Environ Health Perspect 1993;101:166-70.
7. De Vuyst P, Dumortier P, Moulin E, Yourassowsky N. Asbestos bodies in bronchoalveolar lavage reflect lung asbestos body concentration. Eur Respir J 1988;1:362-7.
8. Teschler H, Konietzko N, Schoenfeld B, Ramin C, Schraps T, Costabel U. Distribution of asbestos bodies in the human lung as determined by bronchoalveolar lavage. Am Rev Respir Dis 1993;147:1211-5.
9. Roggli VL, Benning TL. Asbestos bodies in pulmonary hilar lymph nodes. Mod Pathol 1990;3:513-7.
10. Cutrone R, Lednicky J, Dunn G, Rizzo P, Bocchetta M, Chumakov K. Some ora poliovirus vaccines were contaminated with infectious SV40 after 1961. Cancer Res 2005;65:10273-9.
11. Cicala C, Pompetti F, Carbone M. SV40 induces mesotheliomas in hamsters. Am J Pathol 1993;142:1524-33.
12. Hirvonen A, Mattson K, Karjalainen A, Ollikainen T, Tammilehto L, Hovi T, *et al*. Simian virus 40 (SV40)-like DNA sequences not detectable in finnish mesothelioma patients not exposed to SV40-contaminated polio vaccines. Mol Carcinog 1999;26:93-9.
13. Hyland RA, Ware S, Johnson AR, Yates DH. Incidence trends and gender differences in malignant mesothelioma in New South Wales, Australia. Scand J Work Environ Health 2007;33:286-92.
14. Marinaccio A, Binazzi A, Cauzillo G, Cavone D, Zotti RD, Ferrante P, *et al*. Analysis of latency time and its determinants in asbestos related malignant mesothelioma cases of the Italian register. Eur J Cancer 2007;43:2722-8.
15. Miller BH, Rosado-de-Christenson ML, Mason AC, Fleming MV, White CC, Krasna MJ. Malignant pleural mesothelioma: Radiologic-pathologic correlation. Radiographics 1996;16:613-44.
16. Hansen J, Klerk NH, Musk AW, Hobbs MS. Environmental exposure to crociodolite and mesothelioma: Exposure response relationship. Am J Respir Crit Care Med 1998;157:69-75.
17. Fraser RC, Colman N, Pare PA. Synopsis of Diseases of Chest. 3rd ed. Elsevier India Pvt. Ltd.; 2006.
18. Wang ZJ, Reddy GP, Gotway MB, Higgins CB, Jablons DM, Ramaswamy M, *et al*. Malignant pleural mesothelioma: Evaluation with CT, MR imaging and PET. Radiographics 2004;24:105-19.
19. Park EK, Takahashi K, Hoshuyama T, Cheng TJ, Delgermaa V, Le GV, *et al*. Global magnitude of reported and unreported mesothelioma. Environ Health Perspect 2011;119:514-8.
20. Park EK, Takahashi K, Jiang Y, Movahed M, Kameda T. Elimination ofasbestos use and asbestos-related diseases: An unfinished story. Cancer Sci 2012;103:1751-5.
21. Robinson BM. Malignant pleural mesothelioma: An epidemiological perspective. Ann Cardiothorac Surg 2012;1:491-6.

How to cite this article: Selvamani G, Manimaran A, Venkatesan R. Prevalence of Malignant Pleural Mesothelioma in Pleural Effusion Patients in Thanjavur Medical College Hospital: A Pilot Study. Int J Sci Stud 2019;6(12):151-153.

Source of Support: Nil, **Conflict of Interest:** None declared.