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

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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 Martin¹ to describe primary tumors of the pleura. Malignant pleural mesothelioma (MPM) is the most common neoplasm of pleura.[ii] It is a malignant proliferation of mesothelial cells that involve a large extent of pleural cavity.[iii]

Asbestos

A strong etiological correlation with asbestos exposure is well proven.[i,iv] 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.[v] High concentrations of asbestos fibers in the lung are associated with asbestosis and bronchial carcinoma.[vi] In patients with these conditions, asbestos bodies, mostly formed on amphibole fibers, are usually found in lung sections and bronchoalveolar lavage fluid.[vii] Fibers may also migrate toward the periphery of the lung, especially the lower lobes,[viii] into mediastinal lymph nodes[ix] and the pleura.

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.[x] SV40 inactivates tumor suppressor genes and has demonstrated oncogenic potential in animal experimentation.[xi] It has a predilection for mesothelial cells and is found in human mesothelioma specimens. It is not, however, present in all mesotheliomas.[xii]

Long Latency

The latency of mesothelioma that is the time elapsed between first exposure to asbestos and the diagnosis
Selvamani, et al.: Prevalence of Malignant Pleural Mesothelioma in Pleural Effusion

![Figure 1: Break-up of Diagnosis](image)

**Table 1: Pleural Biopsy reports**

<table>
<thead>
<tr>
<th>Tuberculous pleuritis</th>
<th>MPM</th>
<th>Inflammatory pathology</th>
<th>Metastatic tumors</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

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.[13]

**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 tuberculosis 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.\textsuperscript{[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.

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**REFERENCES**