Malignant pleural mesothelioma: Presentation of a case report

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A B S T R A C T

Malignant pleural mesothelioma (MPM) is a rare and highly aggressive intrathoracic neoplasm that typically offer poor prognosis. Early diagnosis of MPM is primarily compromised by the extremely long latency period pertaining to the development of the tumor [1]. Radiological features such as unilateral pleural effusion, nodular thickening of pleura and interlobar fissure thickening are suggestive of MPM [2,3]. Histopathology in tandem with immunohistochemical (IHC) staining is essentially required to confirm the diagnosis. Distinguishing MPM from other malignancies such as metastatic adenocarcinoma can be highly confounding, particularly for small amount of tissue samples (e.g., sample from needle biopsies) [4]. Similarly, identifying the histopathological subtypes of MPM i.e., the epithelial, the sarcomatoid (fibrous), and biphasic (mixed) also presents a diagnostic challenge [5,6]. For IHC, expression of calretinin, WT-1 and cytokeratin 5/6 in the absence of Ber-EF4 is considered as most sensitive markers for diagnosis of MPM [6,7]. Beside diagnostic challenges, effective treatment of MPM is also limited for most patients [4,6]. Multimodality therapeutic approach comprising of surgery followed by radiation therapy and/or chemotherapy has shown limited survival benefit [8].

Herein, we have presented a case of 56-year-old female MPM patient, with emphasis on the radiological and histopathological features of this uncommon malignancy.

1. Introduction

Malignant pleural mesothelioma (MPM) is a rare intrathoracic neoplasm that typically offer poor prognosis. Early diagnosis of MPM is primarily compromised by the extremely long latency period pertaining to the development of the tumor [1]. Radiological features such as unilateral pleural effusion, nodular thickening of pleura and interlobar fissure thickening are suggestive of MPM [2,3]. Histopathology in tandem with immunohistochemical (IHC) staining is essentially required to confirm the diagnosis. Distinguishing MPM from other malignancies such as metastatic adenocarcinoma can be highly confounding, particularly for small amount of tissue samples (e.g., sample from needle biopsies) [4]. Similarly, identifying the histopathological subtypes of MPM i.e., the epithelial, the sarcomatoid (fibrous), and biphasic (mixed) also presents a diagnostic challenge [5,6]. For IHC, expression of calretinin, WT-1 and cytokeratin 5/6 in the absence of Ber-EF4 is considered as most sensitive markers for diagnosis of MPM [6,7]. Beside diagnostic challenges, effective treatment of MPM is also limited for most patients [4,6]. Multimodality therapeutic approach comprising of surgery followed by radiation therapy and/or chemotherapy has shown limited survival benefit [8].

Herein, we have presented a case of 56-year-old female MPM patient, with emphasis on the radiological and histopathological features of this uncommon malignancy.

2. Case report

A 56-year-old female presented to us complaining of chest pain, cough, shortness of breath, weight loss and headache. Hematology analysis revealed marked decrease in platelets (i.e., 94,000/mm³). The patient performance status on the scale of Eastern Cooperative Oncology Group (ECOG) was one. Initial chest x-ray of the patient showed right pleural thickening and obliteration of cardio-phrenic and costo-phrenic angles. Additional radiological work-up, i.e., Computed Tomography (CT) study of chest revealed right sided pleural effusion with circumferential pleural thickening and loss of lung volume, as shown in Fig. 1A. Soft tissue density area in retroareolar region of left breast was also observed. Surgery (radical or pleurectomy) was not possible due to high tumor burden. The patient remained at home without any management for 03 months. Thereafter, CT-guided plural incisional biopsy (specimen size = 2.5 × 2 × 1 cm) revealed infiltrating neoplastic lesion composed of sheets, nests and cluster of cells with focal glandular pattern having cells with round to polygonal morphology and having moderate to abundant eosinophilic cytoplasm and hyperchromatic, pleomorphic nuclei with prominent nucleoli. Scattered multinucleated cells were also identified. Special stain PAS/AB highlighted glycogen in the tumor cells. IHC staining showed the following patterns: calretinin, cytokeratin 5/6, cytokeratin CAM 5.2, Wilms tumour antigen-1 (WT-1) and cytokeratin 7 were positive while cytokeratin 20, CDX2, MR and P63 were negative. All these morphologic and IHC features (Fig. 2), in tandem with radiological findings, (summarized in Table 1) were indicative of MPM.

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Additional analysis showed that other biochemical measures were within normal limits. Pelvic ultrasound also demonstrated no abnormality.

3. Discussion

Malignant pleural mesothelioma (MPM) is a rare tumor, with highest incidence rates reported from UK (i.e., for men 3.3–3.6 per 100,000 and for women 0.5–0.7); the trends of global MPM epidemics has been reported comprehensively [9,10]. However, no cohort of MPM has been reported from Pakistan yet [9]. In this context, we have initiated a centralized registry program for rare tumors, such as MPM. Indeed, we have begun to implement the program [11,12]; this study which reports the first case of MPM from Pakistan is part of the mentioned project. We believe that this program would ascertain a reliable database of rare tumors, enabling the assessment and comparison of our rare tumor epidemics. Moreover, the project would ultimately provide insight into the treatment protocols of these rare tumors and their outcomes, with particular emphasis on the local and individual patient circumstances, and patient values.

Asbestos exposure presumably remains the major factor that modulates the pathogenesis of MPM [13], particularly in older patients while younger patients have been reported to exhibit higher susceptibility of non-asbestos related MPM [14,15]. However, there was no history of asbestos exposure in our 56-year-old patient. Alternatively, it is likely that genetic predisposition may increase the risk of MPM manifestation. Indeed, the risk of MPM development has been previously linked with mutations in the germline BRCA1 associated protein-1 (BAP1) [16–18]. Our patient did not cooperate to carry out a comprehensive study of genetic susceptibility. Nevertheless, we found that the two most sensitive markers of MPM (i.e., calretinin and cytokeratin 5/6) were positive on IHC [6,7]. Overall, it appears that the diagnosis of MPM can be difficult and requires knowledge of the clinical presentation of the disease.

The prognosis of MPM is usually very poor, most probably due to the long latency period [1] and highly aggressive nature of the disease. The reported crucial prognostic factors for MPM includes performance status, age, sex, white blood cell (WBC) and platelet counts, lactate dehydrogenase (LDH), weight loss, etc. [19–22].
It has been recommended that the decision of a particular clinical intervention (e.g., surgery, chemotherapy, radiotherapy or any combination of them) for the management of MPM should be correlated with the individual patient values and the local circumstances [1,23]. In particular, multimodality therapeutic approach comprising of surgery followed by radiation therapy and/or chemotherapy has shown limited survival benefit [8]. Specifically, the recommended first line chemotherapy agents are pemetrexed and cisplatin, while gemcitabine and carboplatin may be used as second line agents [7,24–26]. Carboplatin has been accepted as an alternative to cisplatin and, more importantly, may be better tolerated in the elderly patients [27,28].

4. Conclusion

In this study, we presented a case report of malignant pleural mesothelioma (MPM). Many studies have suspected a correlation between the history of asbestos exposure and development of MPM; however, our patient had no history of asbestos exposure. MPM is speculated to be a highly aggressive disease with poor prognosis, as seen in this study. Specifically, the patient remained at home without any management for 03 months, which substantially deteriorated the prognosis. Thereby, early diagnosis of MPM followed by a multimodality therapeutic approach may improve the prognostic index.

5. Conflict of interest

None

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