

Malignant Pleural Mesothelioma and Central Nervous System Metastases: Report of Two Cases

Malign Plevral Mezotelyoma ve Santral Sinir Sistemi Metastazı: İki Olgu Sunumu

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Abstract

At the time of diagnosis of malignant pleural mesothelioma (MPM), distant metastases are rare, but can occur through the hematogenous route or an adjacent route. Central nervous system (CNS) metastasis is rarely seen and the incidence is not known. Metastases occur more often in patients with relatively prolonged survival following aggressive treatment. Metastasis most often occurs in the cerebral cortex, cerebellum, intracranial meninges, or the spinal cord. CNS metastases can be seen in all histological types of MPM. Presently described are the cases of 2 patients diagnosed with malignant mesothelioma and in whom a rarely seen cranial metastasis was determined.

Key words: Malignant pleural mesothelioma, Central nervous system metastasis, survey.

In approximately 80% of patients with MPM, contact with asbestos plays a role in the etiology and this has begun to be seen as a significant type of cancer in the last 20 to 30 years in developed countries. Prognostic indicators of the tumor that can be used in routine clinical practice have still not been fully defined (1). Prognosis is poor, with

Özet

Malign plevral mezotelyoma (MPM)'de tanı esnasında uzak metastazlar nadiren görülür. Uzak metastaz hematojen yolla ya da komşuluk yoluyla olur. Santral sinir sistemi metastazı nadir görülür. Özellikle agresif tedaviler sonrasında nispeten surveyi uzayan hastalarda metastazlara daha sık rastlanır. Metastazlar sıklıkla serebral korteks, cerebellum, intrakranial meninksler ve spinal kordda görülür. MPM' nin bütün histopatolojik tiplerinde görülebilir. Nadir görülmeye nedeniyle kranial metastaz saptanan malign mezotelyoma tanısı olan 2 olgumuzu sunmayı amaçladık.

Anahtar Sözcükler: Malign plevral mezotelyoma, santral sinir sistemi, survey.

a mean survival of 12 months (2-4). It is usually a locally invasive tumor, but distant hematogenous metastasis may occur.

The aim of presenting these 2 case reports was to illustrate the rare finding of cranial metastasis determined in patients diagnosed with malignant mesothelioma.

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CASE

Case 1: A 42-year-old male presented at the polyclinic with complaints of cough, chest pain, and pressure in the chest, which had been ongoing for 2 months. The patient had no history of smoking and worked as a teacher. There was a history of exposure to environmental asbestos. On a chest X-ray, pleural fluid was observed in the right lung. Thoracentesis sampling determined exudate. Thorax computed tomography (CT) revealed right hilar, subcarinal lymphadenopathy, pleural fluid in the right hemithorax, and areas of collapse and consolidation, which had acquired the appearance of a contoured mass with sporadic notching that was more evident in the lower zone of the right lung segments, patchy ground-glass infiltration, and scattered nodular densities 1 cm in diameter. Right-sided video-assisted thoracoscopic surgery (VATS) and a pleural biopsy were performed on the patient. As a result of the pathology examination, biphasic malignant mesothelioma was reported in October 2013. The tumor consisted of epithelioid and sarcomatoid areas. The epithelial areas were positive for calretinin, cytokeratin 5/6, and WT-1. The sarcomatoid areas were positive for WT-1 only. The tumor was negative for the carcinoembryonic antigen. Positron emission tomography-computed tomography (PET-CT) images taken for grading purposes indicated no distant metastasis. A brain magnetic resonance imaging (MRI) was normal when the patient diagnosed. Treatment of 6 cycles of pemetrexed-cisplatin chemotherapy and tomotherapy were applied. In August 2014, the patient presented with clouded consciousness and a brain CT was performed. A heterogeneous, nodular, hyperdense lesion, 3 cm in size, was determined in the right frontal lobe, surrounded by wide areas of edema and suspected relatively hyperdense, bilateral nodular lesions, 1 of which was 16 mm in size and more evident in the left frontal vertex (Figure 1). Palliative cranial radiotherapy was planned but the patient's family refused the treatment. Anti-edema therapy was started. Exitus occurred in September 2014.

Case 2: A 52-year-old male presented with complaints of shortness of breath with effort, cough, listlessness, and abdominal swelling. The patient had a 25 packet/year smoking history and exposure to environmental and occupational asbestos. A chest X-ray revealed pleural fluid, so thoracentesis was performed and exudate of a hemorrhagic appearance was found. On a thorax CT, there was scattered, limited, massive pleural effusion, and heterogeneous nodular pleural thickening, reaching a size of 6.5 cm, with the appearance of a nodular mass in the

basal segment. PET-CT used for grading purposes indicated no distant metastasis. A brain MRI was normal. Right-sided VATS and pleural biopsy were performed on the patient. The pathology examination report indicated a result of epithelial malignant mesothelioma in March 2014. The tumor consisted of sheets and tubular epithelioid tumor cells (Figure 3a). Some areas had deciduoid features (Figure 3b). The tumor cells were positive for calretinin, cytokeratin 5/6, and WT-1 (Figures 3c, d, and e). Treatment of 6 cycles of pemetrexed-cisplatin chemotherapy was initiated. On a follow-up CT taken after treatment, progression was determined. Five cycles of a second round of chemotherapy with vinorelbine-gemcitabine was applied. On presentation for the sixth cycle, the general condition of the patient had deteriorated, and he was admitted to the infection clinic. A PET-CT scan determined progression. The patient suffered an epileptic attack and a brain CT was performed. In March 2015, a lesion of hyperdense structure surrounded by edema, 2.5 cm in size, was determined in the right parietal vertex (Figure 2). Brain metastasis was confirmed and anti-edema treatment was initiated. Palliative cranial radiotherapy was planned but the patient suffered respiratory arrest and expired.

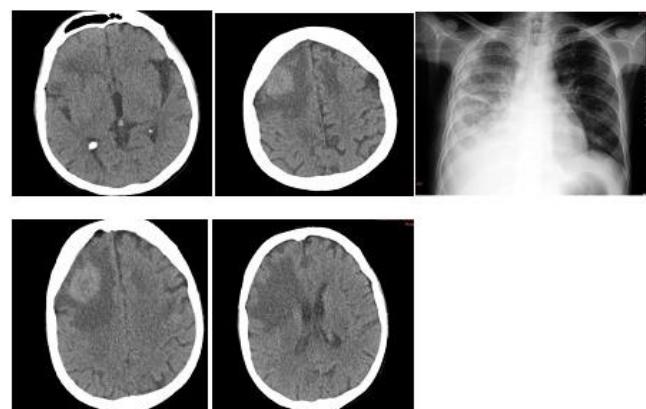


Figure 1: Case-1 CT images of cranial metastasis and Chest-X-ray

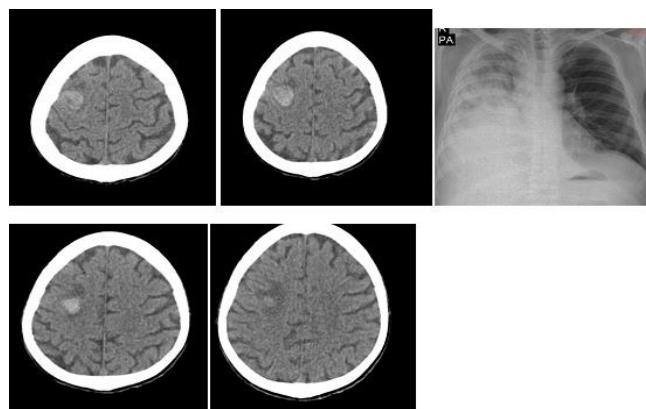


Figure 2: Case-2 CT images of cranial metastasis and Chest-X-ray

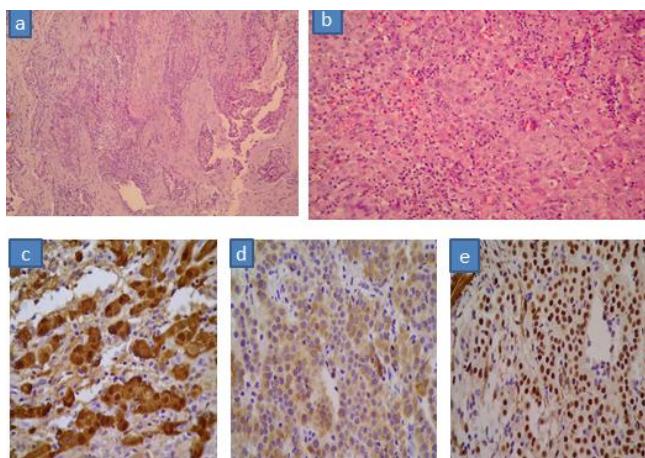


Figure 3: Case 2-Pathology images. (a) Epithelioid malignant mesothelioma with trabecular pattern (HEX100), (b) Epithelioid malignant mesothelioma with deciduoid features (HEX200), (c) Tumour showed diffuse nuclear and cytoplasmic calretinin positivity (calretininX400), (d) Tumour showed diffuse cytoplasmic cytokeratin 5/6 positivity (cytokeratin 5/6 X400), (e) Tumour showed diffuse nuclear WT-1 positivity (WT-1X400)

DISCUSSION

MPM is a tumor with a poor prognosis and low treatment success. Environmental and occupational asbestos exposure has generally played a role. It is usually seen around the age of 60 years, but may appear earlier due to asbestos exposure. In Turkey, the rates of male and female patients with MPM associated with asbestos exposure are similar; the risk indicator does not differ between genders (1). In the early stages, the survival period is better.

Distant metastases are rarely seen at the time of diagnosis. In the advanced stages, metastases may be seen in the contralateral lung, the brain, and extra-thoracic sites (5). Metastases are usually seen in cases with a relatively longer survival following aggressive treatment. Distant metastasis can occur through the hematogenous route or an adjacent route. CNS metastasis is rare. Metastases are often determined in postmortem studies. In 7 autopsy studies of 655 patients, the prevalence of CNS metastasis was 2.7% (6-9,10,11,12). CNS metastases are seen in all histological types of MPM. In a series of 59 cases, CNS metastasis was reported most often in sarcomatoid-type MPM, and at equal rates in biphasic and epithelial MPM (13). In cases with a CNS metastasis, the prognosis is worse and symptoms appear later. Metastasis most often occurs in the cerebral cortex, the cerebellum, the intracranial meninges, and the spinal cord. The midbrain, pons, and brainstem are less frequent sites of metastasis (13). Despite surgery and stereotactic treatments, rapid recurrences have been reported.

Both of the cases presented in this report were male and both had a history of exposure to environmental asbestos.

The histopathological type was biphasic in 1 case and epithelial in the other. One patient was lost 11 months after diagnosis, and the other at 12 months. At the time of diagnosis, CNS metastasis was not apparent in either case. CNS involvement was determined after 10 months in 1 case and after 11 months in the other. Both patients died after the CNS diagnosis.

CONCLUSION

Although CNS involvement in MPM is rare, it must be kept in mind in cases with neurological symptoms.

CONFLICTS OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Concept - B.A.Ö., Y.E., M.Ü., T.Ş.Ö., F.D., S.K.; Planning and Design - B.A.Ö., Y.E., M.Ü., T.Ş.Ö., F.D., S.K.; Supervision - B.A.Ö., Y.E., M.Ü., T.Ş.Ö., F.D., S.K.; Funding -; Materials - B.A.Ö., Y.E., M.Ü., T.Ş.Ö.; Data Collection and/or Processing - B.A.Ö., Y.E.; Analysis and/or Interpretation - B.A.Ö.; Literature Review - B.A.Ö.; Writing - B.A.Ö.; Critical Review -.

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REFERENCES

1. Türkiye Mezotelyoma Çalışma Grubu Malign Plevral Mezotelyoma Türkiye Standartlar Rehberi 2014.
2. Tanrikulu AC, Abakay A, Kaplan MA, Küçüköner M, Palancı Y, Eviyaoglu O, et al. A clinical, radiographic and laboratory evaluation of prognostic factors in 363 patients with malignant pleural mesothelioma. Respiration 2010; 80:480-7. [CrossRef]
3. Vogelzang NJ. Malignant mesothelioma: diagnostic and management strategies for 1992. Semin Oncol 1992; 19:64-71.
4. Schouwink H, Korse CM, Bonfrer JM, Hart AA, Baas P. Prognostic value of the serum tumour markers Cyfra21-1 and tissue polypeptide antigen in malignant mesothelioma. Lung Cancer 1999; 25:25-32.

5. Şenyiğit A. Clinical assessment and variations in clinical presentation at malignant mesothelioma. Malignant Pleural Mesothelioma: A Changing Paradigm of Care. Istanbul, 27-28 May 2011.
6. Hartmann CA, Schütze H. Frequency of metastases and survival in histologic subtypes of pleural mesothelioma. Autopsy study of 106 cases. Pathologe 1992; 13:259-68.
7. Hulks G, Thomas JS, Waclawski E. Malignant pleural mesothelioma in western Glasgow 1980-6. Thorax 1989; 44:496-500. [\[CrossRef\]](#)
8. Huncharek M, Muscat J. Metastases in diffuse pleural mesothelioma: influence of histological type. Thorax 1987; 42:897-8. [\[CrossRef\]](#)
9. Whitwell F, Rawcliffe RM. Diffuse malignant pleural mesothelioma and asbestos exposure. Thorax 1971; 26:6-22. [\[CrossRef\]](#)
10. Adams VI, Unni KK, Muham JR, Jett JR, Ilstrup DM, Bernatz PE. Diffuse malignant mesothelioma of pleura. Diagnosis and survival in 92 cases. Cancer 1986; 58:1540-51. [\[CrossRef\]](#)
11. Finn RS, Brims FJH, Gandhi A, Olsen N, Musk AW, Maskell NA, et al. Postmortem findings of malignant pleural mesothelioma: a two center study of 318 patients. Chest 2012; 142:1267-73. [\[CrossRef\]](#)
12. Schlienger M, Eschwege F, Blache R, Depierre. Malignant pleural mesothelioma. Study of 39 cases, 25 by autopsy. Bull Cancer 1969; 56:265-308.
13. Miller AC, Miettinen M, Schrump DS, Hassan R. Malignant mesothelioma and central nervous system metastases: Report of two cases, pooled analysis and systematic review. Ann Am Thorac Soc 2014; 11:1075-81. [\[CrossRef\]](#)