Pulmonary metastases from intracranial meningioma

Sir,

Meningioma is one of the most common intracranial tumors. Most meningiomas are benign and slowly growing (WHO grade-1), however atypical (WHO grade-2) and anaplastic (WHO grade-3) meningiomas show more aggressive biological behaviour with high risk of recurrence and metastases. Here we present an unusual case of multiple pulmonary metastases from recurrent intracranial meningioma in a 30-year-old male patient.

A 30-year-old male patient presented in April 2010 with complaints of headache since 1 month and two episodes of seizures. He underwent contrast-enhanced MRI of brain [Figure 1a] which showed an extra-axial, dural-based, enhancing mass lesion with areas of necrosis and perilesional edema in right frontal lobe adjacent to falx with minimal compression over right lateral ventricle suggestive of a meningioma. Total excision of the lesion was done and post operative HPE report was of a Grade-1 meningioma (fibroblastic).

He was asymptomatic for 1 year, but developed headache and vomiting in April 2011. Plain CT scan of brain [Figure 1b] showed recurrence of lesion and total excision of the lesion was done. The post operative HPE report [Figure 1c and d] showed spindle cells arranged in fascicles with marked pleomorphism and frequent mitosis suggestive of anaplastic meningioma (Grade-3) with Ki 67 labeling index 20%. He was given adjuvant radiation therapy and was under follow up.

In August 2013, he presented with complaints of cough and chest pain. Chest radiograph [Figure 2a] was done and showed multiple round soft tissue density lesions of varying sizes (Cannon ball lesions) in both lungs. CECT chest [Figure 2b] was done and showed multiple heterogeneously enhancing lesions in both lungs diffusely. CT-guided biopsy of lung lesion was done and HPE report was metastases from meningioma [Figure 2c and d] with EMA and Vimentin were positive, *P* 63 was focally positive, TTF was negative and Ki 67 labeling index was 7%. Chemotherapy was started and the patient is tolerating well.

Meningiomas are one of the most commonly encountered intracranial neoplasms and represent 14% to 19% of all intracranial neoplasms.[1] They originate from Arachnoid cap cells. They usually occur between 20 and 60 years of age with a peak incidence at 45 years.

According to WHO criteria, there are three grades of histopathological subtypes of meningioma present, Grade-1 is typical meningioma, Grade-2 is atypical meningioma and Grade-3 is anaplastic (malignant) meningioma. A report by WHO indicated that 94.3% of meningiomas are benign with 5 year recurrence rate of 3% as compared to 38% and 78% for atypical and anaplastic meningiomas, respectively.[2] Metastases from benign meningiomas are rare and usually associated with large intracranial tumors.[3] However, rate of metastases from atypical and anaplastic meningiomas are up to 5% and 30%, respectively[4] [Table 1].

Histological parameters that are used as indicators for aggressive behaviour and predictors of rapid recurrence and metastases are high mitotic index, hypercellularity, loss of architecture, tumor necrosis, nuclear pleomorphism and ability for brain invasion.[5] The routes of spread for meningioma are hematogenous, lymphatic and through cerebrospinal fluid.[6] The common sites for distant metastases are lungs (60%), pleura (9%), mediastinum (5%), liver, lymph nodes and bones.[7]

Some of the interesting facts regarding the metastatic nature of meningiomas are – (a) Meningiomas of more than WHO grade-1 have the greatest tendency to metastasize,[8] (b) a high rate of cellular proliferation is not essential for extracranial metastases,[9] (c) an individual meningioma of any type may metastasize including WHO grade-1[10] and the metastasis itself may also benign, (d) the time interval from diagnosis

Table 1: [2-4]Incidence of post operative recurrence and distant metastasis for meningiomas

Meningiomas	5-year recurrence rate (%)	Distant metastasis
Benign (Gr-1)	3	Rare
Atypical (Gr-2)	38	5%
Anaplastic (Gr-3)	78	30%

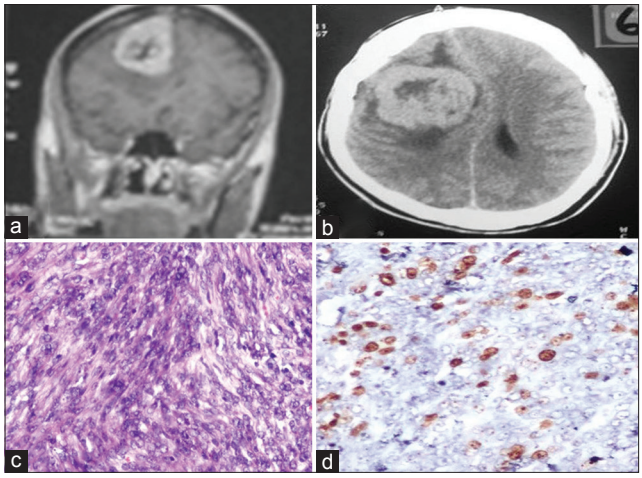

Figure 1: (a) Post contrast MRI of brain in coronal section shows a well-defined, extra-axial, dural-based, enhancing mass lesion with necrosis and perilesional edema in right frontal cortex in the parafalcine region causing a minimal mass effect over right lateral ventricle and falx. (b) Plain CT scan of brain axial image shows recurrence of the lesion. (c) H and E-stained section shows spindle cells arranged in fascicles with marked pleomorphism and frequent mitosis suggestive of anaplastic meningioma (Grade 3). (d) Ki-67 immunostaining with the MIB-1 antibody showing a labeling index of 20%

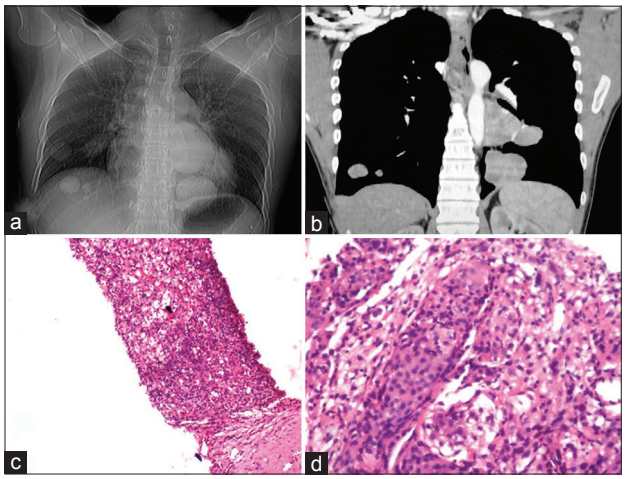

Figure 2: (a) Chest radiograph frontal view shows multiple round soft tissue density lesions of varying sizes (Cannon ball lesions) in both lungs. (b) Post contrast CT scan of chest in coronal section showing multiple heterogeneously enhancing lesions in both lungs. (c) H and E stain of lung biopsy showing replacement of lung parenchyma by lesion. (d) H and E-stained section shows spindle to polygonal cells arranged in sheets and whorls with scattered mitotic figures suggestive of metastases from meningioma

of the primary to the occurrence of the metastasis after complete control of the primary is variable and ranges from predating the primary tumor to 19 years after treatment of the primary.[11]

Regarding treatment, there is no standard treatment for the cure of metastatic meningioma and chemotherapy is the only option in the case of metastases.

In conclusion, in a patient with multiple cannon ball pulmonary lesions with a history of meningioma, especially with local recurrence, one of the differential diagnoses to be considered is metastatic meningioma.

Phani Chakravarty Mutnuru, Syed Fayaz Ahmed[1], Shantveer G Uppin[2], Pavan Kumar Lachi[1]

Departments of Radiology, [1]Radiation Oncology and [2]Pathology, Nizam's Institute of Medical Sciences, Hyderabad, Telangana, India

E-mail: phani_chakravarty@yahoo.co.in

REFERENCES

1. Wara WM, Sheline GE, Newman H, Townsend JJ, Boldrey EB. Radiation therapy of meningiomas. Am J Roentgenol Radium Ther Nucl Med 1975;123:453-8.
2. Jääskeläinen J, Haltia M, Servo A. Atypical and anaplastic meningiomas: Radiology, surgery, radiotherapy, and outcome. Surg Neurol 1986;25:233-42.
3. Uchibori M, Odake G, Ueda S, Yasuda N, Hisa I. Parapharyngeal meningioma extending from the intracranial space. Neuroradiology 1990;32:53-5.
4. Enam SA, Abdulrauf S, Mehta B, Malik GM, Mahmood A. Metastasis in meningioma. Acta Neurochir (Wien) 1996;138:1172-8.
5. de la Monte SM, Flickinger J, Linggood RM. Histopathologic features predicting recurrence of meningiomas following subtotal resection. Am J Surg Pathol 1986;10:836-43.
6. Wu JK, Kasdon DL, Whitmore EL. Metastatic meningioma to cervical vertebra: Case report. Neurosurgery 1985;17:75-9.
7. Stoller JK, Kavuru M, Mehta AC, Weinstein CE, Estes ML, Gephardt GN. Intracranial meningioma metastatic to the lung. Cleve Clin J Med 1987;54:521-7.
8. Pasquier B, Gasnier F, Pasquier D, Keddari E, Morens A, Couderc P. Papillary meningioma. Clinicopathologic study of seven cases and review of the literature. Cancer 1986;58:299-305.
9. Louis DN, Scheithauer BW, Budka H, Deimling VA, Kepes JJ. Meningiomas. In: Kleihues P, Cavenee WK, editors. World Health Organization Classification of Tumors. Lyon: IARC; 2007. p. 164-72.
10. Karasick JL, Mullan SF. A survey of metastatic meningiomas. J Neurosurg 1974;40:206-12.
11. Miller DC, Ojemann RG, Proppe KH, McGinnis BD, Grillo HC. Benign metastasizing meningioma. Case report. J Neurosurg 1985;62:763-6.

Access this article online

Quick Response Code:

Website: www.lungindia.com

DOI: 10.4103/0970-2113.168120