Meningioma metastases

Although meningiomas are usually benign, malignant meningiomas with distant metastases occur infrequently. There is little precise information in the literature regarding the frequency of metastases in meningiomas; their incidence has been vaguely reported to be less than 1 per 1,000. Furthermore, most of the previous studies have also included haemangiopericytomas which most recent authorities do not consider meningiomas.

Enam et al. published the management of 396 meningiomas over the past 18 years, 7 meningiomas were classified as malignant by defined histological criteria. After initially presenting as solitary intracranial neoplasms, three of the malignant meningiomas metastasized to extracranial tissues. Collectively, the metastases involved the vertebral bodies, liver, pelvis, long bones, and the spinal cord. This confers an incidence of metastases of 0.76% when considering all the meningiomas, and an incidence of approximately 43% when considering only malignant meningioma; both percentages are significantly higher than reported previously. This high incidence of metastases in the malignant meningioma indicates a worse prognosis than formerly assessed and also characterized the malignant meningioma as a primary central nervous system neoplasm with one of the highest rates of metastases. In addition, when malignant meningioma is classified by following strict criteria, the risk of metastases in the ensuing clinical course can be predicted with a higher reliability [1)].

Systemic imaging of patients with multiply recurrent meningioma or symptoms concerning metastases may identify extracranial metastases in a significant proportion of patients and can inform decision-making for additional treatments [2)].

Primary intracranial meningioma is typically reported as having low FDG uptake, because glucose metabolism in meningioma is similar to that of surrounding tissue [3)].

There have been a few isolated reports describing the imaging features of metastatic meningioma on FDG-PET imaging. Ghodsian et al., described a moderately hypermetabolic sacral metastatic mass by FDG-PET/CT. This was a Grade III malignant meningioma on histology [4)].

Meirelles et al., described a pulmonary meningioma that manifested as a solitary pulmonary nodule and had very high metabolic activity on PET scan. The current case also showed avid uptake of FDG; the SUV was >7 in each pulmonary lesion. The uptake was more avid in the periphery and slightly less in the centre of both lesions, corresponding to the central areas of low density on CT. It was useful to note that there were no other foci of abnormal FDG uptake elsewhere to suggest other metastases. It is reassuring to note that 10 months after the PET/CT with clinical follow-up, the patient remains asymptomatic with no evidence of local or distant spread. The diagnosis of pulmonary metastatic meningioma was confirmed histologically by CT-guided percutaneous biopsy, which has been previously reported [5)].

Case reports

A patient with multiply recurrent orbital meningioma with metastases to the neck was found

incidentally during neck exploration for composite resection and free tissue reconstruction.

Nguyen et al. performed a systematic review for all records pertaining to metastatic meningiomas to the cervical regions.

They found 9 previous reports of cervical metastatic meningiomas. Almost all cases underwent extensive local resection. There was no evidence of an association between the histological grade of the tumor and the risk of metastases to the neck. Cervical lymph node dissemination is more common in patients presenting after previous primary tumor resection.

In the context of a neck mass, the findings suggest that metastatic meningioma should be included in the differential diagnosis, especially in patients with previous resections [6].

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a 78-year-old man with a history of recurrent World Health Organization grade I meningioma managed who presented for evaluation of weakness and urinary retention. A computed tomography scan obtained in the emergency department revealed multiple scattered low-density liver lesions. Subsequent magnetic resonance imaging showed a 5.5-centimeter heterogeneous enhancing mass with 2 smaller enhancing lesions suspicious for a primary or secondary malignant neoplasm. Microscopic examination of a tissue sample obtained via liver biopsy demonstrated a metastatic spindle cell neoplasm with histologic features compatible with a diagnosis of World Health Organization grade I transitional meningioma. The patient was referred to hematology/oncology for systemic therapy [7].

A 54-year-old female who presented with an incidental liver mass by ultrasound. Her clinical history and physical examination were unremarkable. A partial hepatectomy revealed a meningioma on histology. Further investigation by imaging studies showed a frontal parasagittal dural mass which was confirmed to be a World Health Organization (WHO) grade 1 meningioma. To our knowledge, this is the first report of a clinically silent metastatic meningioma to the liver without either a concurrent or a previous history of meningioma. Precise diagnosis of this challenging case requires high clinical suspicion, histopathology, and immunohistochemistry [8].

A case of a 58 year old man who presented with a mobile mass within the left trapezius muscle. The patient had previously undergone surgery for a right frontal lobe high grade anaplastic meningioma. Histology of the soft tissue lesion showed metastatic anaplastic meningioma with clumps of pleomorphic tumour cells which expressed epithelial membrane antigen, cytokeratin and P63 but were negative for other epithelial and mesenchymal markers. A PET-CT scan revealed additional metastatic lesions in the left pleura, liver and iliac bone.

Conclusions: Metastatic malignant meningioma can very rarely present as a high grade pleomorphic malignant soft tissue tumour and needs to be distinguished from soft tissue sarcomas and metastatic carcinomas that express epithelial antigens [9].

Mutnuru PC, Ahmed SF, Uppin SG, Lachi PK. Pulmonary metastases from intracranial meningioma. Lung India. 2015 Nov-Dec;32(6):661-3. doi: 10.4103/0970-2113.168120. PMID: 26664187; PMCID:

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a patient who was treated for an atypical brain meningioma with multiple surgeries and multiple sessions of stereotactic radiosurgery with good control of his brain disease. Thirteen years after diagnosis, he developed bilateral large sacroiliac and abdominal metastases [10].

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a 37 year-old male underwent surgical resection for a left occipital intraventricular benign meningioma (WHO I). He was reoperated in February 2002 due to local recurrence. By the end on 2003 he developed progressively invalidating dorsolumbar pain. MRI studies revealed a T11 intraosseous mass. In March 2004, a percutaneous biopsy and vertebroplasty were performed. The pathological specimen was identified as adenocarcinoma and he initiated chemotherapy. Advice from a second pathologist was seeked, who suggested the diagnosis of intraosseous meningioma. Workup studies failed to reveal any primary tumor. In May 2004 the patient was admitted to our department and a new transpedicular biopsy confirmed the diagnosis. In June 2004 he underwent T11 total en bloc spondylectomy (Tomita's procedure), fusion with bone and calcium substitute-filled stackable carbon-fiber cages, and T9 to L1 transpedicular screw fixation. No postoperative complications ocurred and he is, so far, free from primary and secondary disease. Definite pathology: benign meningioma (WHO I).

Discussion: Distant metastases from intracranial meningiomas are rare entities, arising from benign lesions in, at least, 60% of cases. Enam et al proposed a specific pathological score to differentiate benign, atypic and malignant meningiomas. Such score correlates with the chance of metastatizing: more than 40% in malignant meningiomas compared to 3.8% of brain tumors overall. The ability to metastatize seems to be linked to vascular or lifatic invasiveness. Metastases ocurr more frequently in angioblastic, papillary and meningothelial variants. Hematogenous (especially venous; Batson's perivertebral plexus), linfatic and cerebrospinal fluid are the main routes involved in the spreading of the tumor. Craniotomy itself may also play a role, for the majority of patients have been previously operated on repeatedly. The interval between the onset of the intracranial disease and the appearance of the metastases varies from months to many years. The value of transpedicular biopsy is widely recognized (efficacy over 80%) and the suitability of the specimen for pathological examination improves when wide inner caliber trephines are used. In the case presented we applied the oncologic concept of vertebral en bloc resection. We believe this case represents a paradigmatic indication of this technique because it respects the concepts of radical resection and spinal stability, and offers an opportunity for the curation of the disease [11].

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