The Royal Society of Medicine

Journal of the Royal Society of Medicine Open;
8(7) 1–3
DOI: 10.1177/2054270417702567

A remote metastatic giant cell tumour to the skull

Aashish Kalani[1], Margaret Lovett[1], Lori Stewart[2], Snezana Popovic[3] and Akbar Panju[1]
[1]Department of Internal Medicine, McMaster University, Hamilton, ON, L8S 4K1, Canada
[2]Department of Diagnostic Imaging, McMaster University, Hamilton, ON, L8S 4K1, Canada
[3]Department of Anatomical Pathology, McMaster University, Hamilton, ON, L8S 4K1,Canada
Corresponding author: Aashish Kalani. Email: aashish.kalani@medportal.ca

Lesson
This case discusses an unusual presentation of remote metastatic giant cell tumour presenting as a seizure.

Keywords
Giant cell tumour, giant cell tumour of the bone, neoplasms

Introduction

This case discusses an unusual presentation of remote metastatic giant cell tumour, presenting as a seizure.

Case report

A 73-year-old woman presented to our hospital after an unwitnessed fall, suspicious for a seizure, in November 2015. Her medical history included giant cell tumour in the great toe of her right foot in 1993 which was amputated, followed by tarsal/metatarsal resection in 1994 for tumour recurrence. In 1995, she was diagnosed with breast cancer of the right breast which was treated with lumpectomy and radiation therapy. As well, she underwent diagnostic right lower lobe thoracotomy in 2006 for a suspicious granuloma that was found to be tuberculosis and subsequently treated appropriately.

Following this recent episode of transient loss of consciousness, the family reported that the patient had some evidence of post-ictal confusion and faecal incontinence. The patient also complained of pain in the back of her head that radiated down to her interscapular region. Her neurological examination did not reveal any focal signs. A basic metabolic panel was negative. An unenhanced computed tomography of the head was arranged and it demonstrated an aggressive expansile lytic lesion involving the right occiput extending into the posterior fossa. There was an associated extraosseous hyperdense soft-tissue mass (Figure 1). Signs of local mass effect were present on the adjacent cerebellar structures.

The differential diagnosis at this point included primary hyperparathyroidism, multiple myeloma, plasmacytoma and osteosarcoma given the patient's age. As well, given her previous history, tuberculosis of the skull, metastatic breast cancer and metastatic giant cell tumour were also entertained.

Subsequently, this patient was started on dexamethasone to reduce cerebral oedema. Phenytoin was also initiated for seizure prophylaxis. A computed tomography of the chest abdomen and pelvis was ordered to rule out other metastases that revealed innumerable tiny lucencies within the vertebrae, sacrum, pelvic bones, proximal femora, sternum and left scapula. The patient underwent biopsy and histopathology of the occiput lesion (Figure 2), which demonstrated giant cell tumour of bone composed of osteoclast-type multinucleated giant cells (black arrow) in a background of mononuclear stromal cells (*). Haemosiderin pigment was noted (arrow head). There were areas of recent and remote haemorrhages with haemosiderin pigment deposits. She tolerated the procedure well and her course in hospital was otherwise uneventful.

Later, in January 2016, she was scheduled for occipital and suboccipital craniectomy. Intraoperatively, the giant cell tumour was found to be extracranial, and successful resection was performed followed by cranioplasty with bone cement. Based on recent follow-up visits in June 2016, the patient has demonstrated no recurrent seizures or neurological deficits. A bone scan to re-assess the lytic lesions in the spine was negative for any malignancies. Furthermore, a follow-up computed tomography was negative for any tumour recurrence, and there are considerations for adjuvant radiotherapy.

Case discussion

This case demonstrates recurrence of giant cell tumour in the head 20 years after initial presentation in the right foot, presenting as a seizure. In one study of 1195 patients with first-onset seizures, intracranial

Figure 1. Unenhanced computed tomography demonstrating an aggressive expansile lytic lesion involving the right occiput extending into the posterior fossa with an associated extraosseous hyperdense soft-tissue mass.

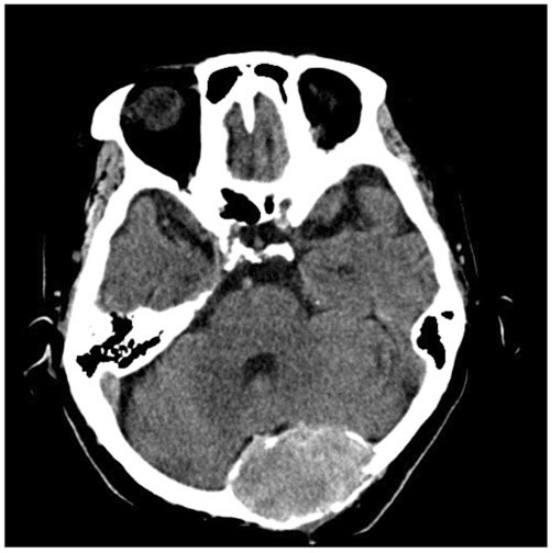
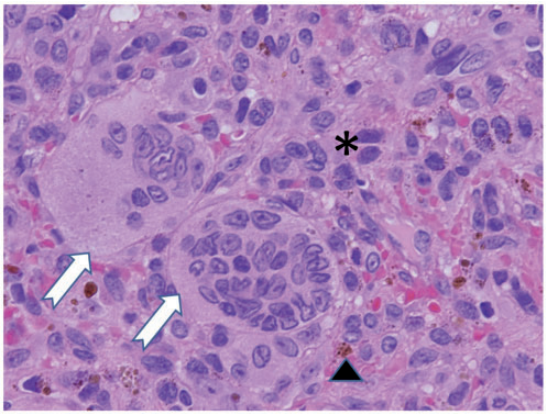


Figure 2. Pathohistology demonstrating giant cell tumour of bone composed of osteoclast-type multinucleated giant cells (black arrow) in a background of mononuclear stromal cells (*). Haemosiderin pigment was noted (arrow head), H&E × 400.



tumours were responsible in 6% of cases.[1] These events can herald the initial diagnosis, especially in low-grade tumours.[2] Low-grade tumours are often more epileptogenic which may be mediated by the longer time allowed to establish aberrant pathways to facilitate seizures. As well, low-grade tumours may isolate and deafferentate normal tissue from malignant tissue, thereby preventing regulation.[2] Otherwise, seizures may complicate the later course of high-grade tumours.

Seizures in patients with intracranial tumours usually present as focal seizures, but sometimes have features of secondary generalisation. Beyond other common causes of seizures including metabolic and infectious causes, tumour type and location play a key role in the incidence of seizures in these patients. For example, patients with astrocytic brain tumours are particularly prone to seizures because of the dysregulation of adenosine kinase in the peritumoral region.[3] In general, patients with primary cortical lesions in the parietal, temporal and frontal lobes are more likely to have seizures.[2] As well, metastases involving both the brain and leptomeninges in patients with metastatic disease are at an increased risk of seizures.[2]

Giant cell tumours are benign but locally aggressive osteolytic malignancies comprising approximately 5% of all skeletal tumours.[4] Occurrence in small bones, such as the first metatarsal as in this case, occurs in less than 1% of cases.[5] Clinical presentation usually involves pain, swelling and limited movement with extra-axial tumours or neurological symptoms in cases of axial tumours.[6] They are known to have unpredictable courses, with metastases occurring in 1–9% of cases.[7] The probability of metastasis is believed to be higher in patients with more aggressive features radiographically, particularly those with soft-tissue extension.[7] Primary sites with a tendency to metastasize include the radius, femur and sacrum.[7]

Local recurrence at the initial site of the primary giant cell tumour usually occurs before distant metastasis.[6,7] Pathologically, the metastatic tumour is usually identical to the original neoplasm.[6] Metastasis usually occurs to the lungs, with case reports of recurrence in lymph nodes, skin and breast.[6] Some cases have been reported of metastasis to other long bones and rarely the skull, where the sphenoid bone is most commonly involved.[4,8] Nevertheless, intracranial extension causing neurological deficits – such as the seizures demonstrated in this case – is not often reported.[9]

Typically, the latency between onset or primary tumour and pulmonary metastasis is between 0 and 10 years; approximately 2–3 years on average.[7] This case series included a patient with pulmonary metastases diagnosed 24 years after initial diagnosis.[7] Although this time frame is slightly longer than the latency period in our patient, pulmonary metastases are often asymptomatic and detected incidentally on routine follow-up.[7] In our patient, the 22-year difference is even more remarkable given the incredible size and obvious mass effect of this intracranial tumour.

Surgery is gold standard for resection of both primary and metastatic giant cell tumours.[10] In poor surgical candidates or cases of inaccessible tumours, radiation therapy can be another consideration for.[10] Interestingly, there is a risk of sarcomatous degeneration with irradiation which can make the decision of adjuvant radiotherapy debatable.[10] There is little evidence on the role of chemotherapy in giant cell tumours.[10]

Declarations

Competing Interests: None declared.

Funding: None declared.

Ethics approval: Written informed consent for publication was obtained from the patient.

Guarantor: AK.

Contributorship: All authors have contributed to the production of this manuscript. AK and ML wrote the manuscript which was subsequently reviewed by LS, SP and AP. LS provided radiographical images for the manuscript while SP provided the pathological images.

Acknowledgements: None.

Provenance: Not commissioned; peer-reviewed by Heather Harris.

References

1. Sander J, Hart Y, Johnson A and Shorvon S. National General Practice Study of Epilepsy and Epileptic Seizures: newly diagnosed epileptic seizures in a general population. *Lancet* 1990; 336: 1267–1271.
2. Breemen MSV, Wilms EB and Vecht CJ. Epilepsy in patients with brain tumours: epidemiology, mechanisms, and management. *Lancet Neurol* 2007; 6: 421–430.
3. Groot MD, Reijneveld JC, Aronica E and Heimans JJ. Epilepsy in patients with a brain tumour: focal epilepsy requires focused treatment. *Brain* 2011; 135: 1002–1016.
4. Mirra JM, Picci P and Gold RH. *Bone tumors: Clinical radiological and pathological correlations*, Vol. 2. Philadelphia: Lea and Febiger, 1989, pp.941–1020.
5. Ropars M, Kaila R, Cannon S and Briggs T. Primary giant cell tumours of the digital bones of the hand. *J Hand Surg* 2007; 32: 160–164.
6. Viswanathan S and Jambhekar NA. Metastatic giant cell tumor of bone: are there associated factors and best treatment modalities? *Clin Orthop Relat Res* 2010; 468: 827–833.
7. Tubbs WS, Brown LR, Beabout JW, Rock MG and Unni KK. Benign giant-cell tumor of bone with pulmonary metastases: clinical findings and radiologic appearance of metastases in 13 cases. *Am J Roentgenol* 1992; 158: 331–334.
8. Bertoni F, Unni KK, Beabout JW and Ebersold MJ. Giant cell tumor of the skull. *Cancer* 1992; 70: 1124–1132.
9. Findlay JM, Chiasson D, Hudson AR and Chui M. Giant-cell tumor of the middle cranial fossa. *J Neurosurg* 1987; 66: 924–928.
10. Harris AE, Beckner ME, Barnes L, Kassam A and Horowitz M. Giant cell tumor of the skull: a case report and review of the literature. *Surg Neurol* 2004; 61: 274–277.