recovered, usually within one week, as also reflected by normalization of CSF cell count. While re-challenge with cetuximab with dose reduced to 250 mg/m^2 was possible in two patients [5], recurrent aseptic meningitis was reported in another [4].

A search in the World Health Organization Global Database of Individual Case Safety Reports (ICSR) with the search terms 'cetuximab AND aseptic meningitis' identified 21 patients from 2005–2014 from a total of 15,456 ICSRs involving cetuximab but no further information about clinical presentation, recovery or CSF results was available.

4. Conclusion

Aseptic meningitis must be recognized as a rare and self-limiting adverse event that usually occurs within a few hours of the first cetuximab administration. The combination of sudden headache, neck stiffness and high fever should prompt immediate CSF analysis including a broad search for bacterial, fungal or viral infections. Whereas the initial CSF inflammatory response is severe, a remarkably fast normalization of the CSF cell count accompanied by a rapid reduction of CSF protein is characteristic. Based on five published patients and 21 others in the ICSR database, aseptic meningitis seems to be a very rare event after cetuximab treatment. The crossing of cetuximab, an immunoglobulin G, over the blood–brain barrier might play a role in its pathogenesis [4]. Drug induced meningitis as a diagnosis of exclusion has been reported with other therapeutic antibodies too, most frequently with the administration of intravenous immunoglobulins (IVIg) [6,7]. Slowing the infusion rate, reducing the dose and premedication with steroids has been proposed [5] for the administration of IVIg [6,7]. This approach has been associated with lack of recurrence in only two of three patients.

In summary, because of its characteristic clinical presentation, close temporal association to the first cetuximab administration and negative CSF cultures/serologies, the clinician can identify this rare and self-limiting adverse event reliably. While antibiotic and virostatic treatment is initially advised, symptomatic treatment is sufficient as soon as CSF cultures/serologies return negative. Prognosis is usually good, with complete recovery within 1–2 weeks. The decision for re-challenge with cetuximab must be made on an individual basis, but bears the risk of recurrence.

Conflicts of Interest/Disclosures

The authors declare that they have no financial or other conflicts of interest in relation to this research and its publication.

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Spinal cord compression due to brown tumor

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ABSTRACT

We report a rare case of a vertebral brown tumor causing spinal cord compression and resulting in progressive paraparesis in a 27-year-old female with end-stage renal failure, managed with hemodialysis. Urgent neurosurgical intervention and gross total resection resulted in complete resolution of the symptoms.

1. Introduction

Brown tumors are rare, non-neoplastic, osteolytic, bone lesions occurring as a result of excessive parathyroid hormone production in the context of uncontrolled primary or secondary hyper-

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parathyroidism. The most commonly involved sites include the pelvis, ribs, mandible [1], and metacarpals and the central medullary shafts of long bones [2]. Management is usually conservative with treatment of the underlying hyperthyroidism resulting in complete resolution of the lesion and bone remineralization. However, in the rare case of spinal column involvement, rapid neurologic deterioration due to spinal cord compression or vertebral body fracture may occur, and may require urgent surgery to decompress the spinal cord and stabilize the vertebral column.

We report a case of a brown tumor in a 27-year-old woman who presented with symptoms of progressive spinal cord compression due to tumor involvement of the T10 vertebral body, and review the relevant literature for this unusual condition.

2. Case report

A 27-year-old woman was referred to the neurosurgery clinic with a 3-month history of progressive low back pain radiating to the right lower limb. During the week prior to her admission the patient experienced progressive paraparesis. She denied sphincter dysfunction. The patient's past medical history was significant for bilateral nephrectomy following a motor vehicle accident 10 years earlier. As a result, 1 year after the accident she had undergone renal transplantation, which was complicated by renal graft rejection 1 year prior to the onset of her back pain. Following transplant rejection, she had been managed with hemodialysis.

The CT scan of the thoracolumbar spine and MRI of the thoracic spine were significant for a T10 osteolytic bone lesion associated with severe spinal cord compression (Fig. 1). Lytic bone lesions of the left sixth rib and left iliac wing were also visible. Physical examination at admission was significant for diffuse bilateral lower limb weakness, more pronounced on the left, and limited ambulation; however, there was no Babinsky sign and anal tone was good. Blood parathyroid hormone (PTH) concentration was 178.9 pmol/L (normal range 1.26–6.84 pmol/L).

At surgery, spinal cord decompression and gross total resection of the tumor were achieved via a right transpedicular approach to T10 followed by T5–T12 dorsolumbar fusion (Fig. 2). Histopathology confirmed the diagnosis of a brown tumor of the vertebra. During her hospitalization, the patient demonstrated improved gait and lower limb strength. She was discharged on postoperative day five with further physiotherapy. At her 3-month follow-up, she reported minimal back pain managed with analgesics. At her 6 month follow-up visit she was ambulatory with no neurological deficit.

3. Discussion

Brown tumors, or osteoclastomas, are non-neoplastic, reactive, osteolytic, bone lesions occurring in the setting of poorly controlled primary or secondary hyperparathyroidism. This rare entity occurs in approximately 3% of patients with primary hyperparathyroidism and in 1.5–1.7% of those with secondary

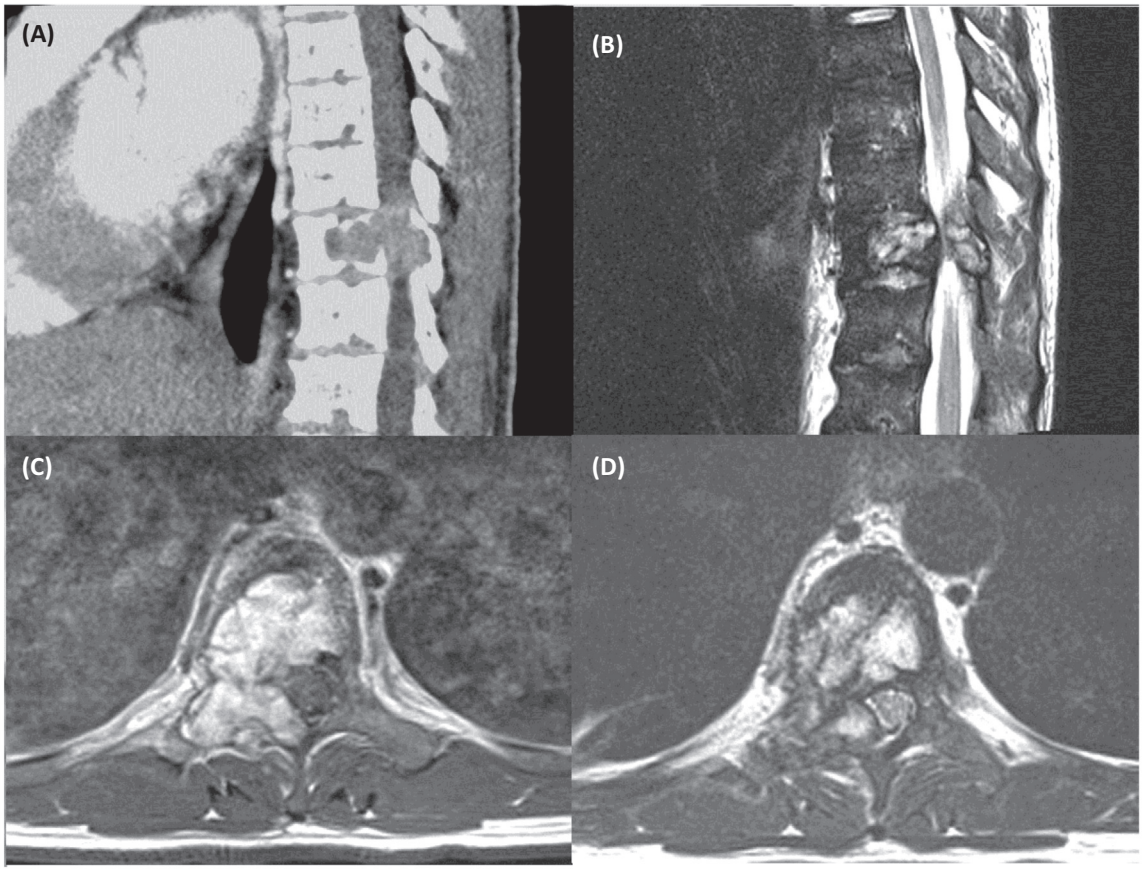

Fig. 1. (A) Sagittal reconstruction of whole body CT scan in a 27-year-old woman with end-stage renal failure managed with hemodialysis, who presented to the neurosurgery clinic with a 3-month history of progressive low back pain radiating to the right lower limb and progressive paraparesis over the prior week. An osteolytic space-occupying lesion is seen at T10. (B) Sagittal T2-weighted MRI. (C) axial T1-weighted MRI with gadolinium, and (D) T2-weighted MRI demonstrate marked cord compression.