CASE REPORT

A quintessential syndrome with a rare marvelling aetiology: Rosai-Dorfman disease presenting as Conus-Cauda syndrome

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Accepted 6 February 2018

SUMMARY

A 19-year-old woman presented with a history of severe lower backache and asymmetric proximal lower limb weakness during the past 3 months. In addition, she also suffered from lower motor neuron-type bladder and bowel symptoms. On examination, paraparesis was noted. Further, sensory examination suggested patchy asymmetric sensory loss in both lower limbs with saddle anaesthesia and areflexia. A clinical diagnosis of Conus-Cauda syndrome was made and contrast-enhanced MRI of the lumbar and sacral spine was done, which confirmed the presence of a mass lesion within the spinal canal involving the cauda equina extending up to the sacral level. She underwent partial resection of the lesion following which the neurological deficits and lower backache resolved. Histopathological evaluation and immunohistochemical analyses uncovered Rosai-Dorfman disease. There was no evidence of disease elsewhere in the body. Since the patient improved significantly following surgery and exhibited no further neurological worsening, she remains under close follow-up.

BACKGROUND

Rosai-Dorfman disease (RDD) is a rare disorder of histiocyte proliferation manifesting most often as massive cervical lymphadenopathy. Extranodal involvement is present in approximately 40% with central nervous system (CNS) involvement representing a mere 5% of the extranodal cases.^{1 2} Isolated CNS involvement, without evidence of nodal involvement is extremely rare. Here in, we present the case of a young woman with RDD without nodal involvement manifesting as Conus-Cauda syndrome.

CASE PRESENTATION

A 19-year-old woman presented with a history of progressively increasing lower backache during the past 3 months. The pain was radicular in character with radiation to both lower limbs. In addition, she noticed difficulty while climbing a flight of stairs and difficulty in standing from a seated position. The weakness was asymmetric with her left lower limb being significantly weaker than the right. She also suffered from bowel and bladder symptoms in the form of constipation, urinary hesitancy and frequency since the last 5 months. On examination, paraparesis was noted with the power of Medical Research Council (MRC) score 2/5 in the

proximal muscles of the left lower limb and 4/5 in the muscles of the right lower limb. Sensory examination suggested patchy asymmetric sensory loss in both lower limbs with saddle anaesthesia and loss of tone of the anal sphincter. Knee and ankle reflexes were absent bilaterally. However, there was no girdle-like sensation, Lhermitte's phenomenon or fasciculations. There was no weakness in the upper limbs and the cranial nerves, higher mental functions and cerebellar functions were within normal limits. Examination of other systems was unremarkable. No cervical or axillary nodes were palpable. Considering the history and clinical findings, a clinical diagnosis of Cauda-Conus syndrome was made.

INVESTIGATIONS

For determining the aetiology of the Cauda-Conus syndrome, a contrast-enhanced MRI (CEMRI) of the lumbar and sacral spine showed a mass lesion involving the nerve roots of the cauda equina extending up to the sacral level within the spinal canal ([figure 1](#)). Other investigations showed a normocytic, normochromic anaemia, haemoglobin level of 10 g/dL with normal leucocyte count, normal platelet count and an elevated erythrocyte sedimentation rate (67 mm/hour). MRI of the brain as well as contrast-enhanced CT of the neck, chest and abdomen were normal and did not show any evidence of any additional/satellite lesions.

DIFFERENTIAL DIAGNOSIS

A possibility of a schwannoma was kept and an excision was planned.

TREATMENT

Surgery uncovered a soft, yellow dural-based tumour intermingled with the nerve roots. A subtotal resection of the lesion was successful and subsequent histopathological examination suggested a histiocyte-rich lesion with lymphoplasmacytic infiltrate ([figure 2A](#)). The histiocytes demonstrated eosinophilic cytoplasm and characteristic emperipolesis ([figure 2A](#)). Further immunohistochemical examination showed positivity for CD68, S100 and CD1a negativity ([figure 2B–D](#)), all suggesting a diagnosis of RDD.

OUTCOME AND FOLLOW-UP

No adjuvant radiotherapy or chemotherapy was required as the patient had significant resolution

To cite: Chhabria BA, Nampoothiri RV, Nambiyar K, et al. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-222398

Figure 1 Axial image of contrast-enhanced MRI of the lumbosacral spine demonstrating an ill-defined T2-weighted isointense to hyperintense lesion (arrow) involving the cauda equina with extension up to sacral level within the spinal canal.

of all symptoms and neurological deficits like weakness, sensory loss and deficits of the bowel and bladder. She remains under close clinical follow-up.

DISCUSSION

RDD is a rare, non-malignant, idiopathic disorder of histiocyte proliferation. Originally described by Destombes in the 1960s, it was characterised as a distinct entity by Rosai and Dorfman 4 years later.³ Typically patients with RDD present with fever, leucocytosis and non-painful cervical lymphadenopathy. RDD is not often suspected and is a close lymphoma mimic. Diagnosis is established only after the histopathology examination with immunohistochemical analysis.

Extranodal involvement in RDD is seen in up to 40% of the cases, with the most common sites being the skin, the orbit, eyelids, upper respiratory tract, CNS and the gastrointestinal tract.¹ Craniospinal involvement is seen in <5% of the patients with RDD.²

RDD involving the CNS presents most often as a dura-based extra-axial lesion of the cranium. Spinal cord involvement is

exceedingly rare. According to Sandoval-Sus *et al*,⁴ 210 cases of craniospinal RDD have been reported in the English medical literature up to 2014. Isolated CNS involvement was seen in 174 cases while 36 cases had disseminated disease. In addition, 24 (11.4%) had only spinal cord involvement and 10 (9%) had both spinal and cranial involvement. Two cases (1%) had intramedullary spinal involvement while the rest had extramedullary (intradural and extradural) spinal lesions.

While RDD occurs most frequently in men in the second or third decade, RDD affecting the CNS occurs a decade or two later than nodal RDD with similar preponderance in men.⁵ The neurological symptoms and signs depend on the location of the lesions. Patients commonly present with headaches, seizures, focal neurological deficits and paraparesis when the CNS is affected. Conus-Cauda syndrome usually presents with bladder bowel abnormalities, saddle anaesthesia and asymmetric weakness in accordance to the nerve root involvement. To the best of our knowledge, after extensive literature review, this is the third case of RDD presenting as Conus-Cauda syndrome. We ran a PubMed search with keywords 'Rosai Dorfman disease and Cauda Equina syndrome' and 'Rosai Dorfman disease and Conus Medullaris syndrome'. Search results suggested only two cases akin our case. The first case, a 50-year-old woman with clinical myelopathy and MRI revealing two lesions, one at the T4 level and the second at L1 level adherent to the conus medullaris and cauda equina.⁶ The second case was a 62-year-old man with sudden onset of buttock pain and inability to urinate with MRI confirming involvement of the cauda equina.⁷ The patients were diagnosed with RDD following excision biopsy and crush cytology, respectively.

On imaging, CNS RDD presents as an extra-axial dural-based lesion. These lesions are isointense on T1-weighted sequences and isointense to hypointense or possess mixed intensities on T2 weighted and fluid-attenuated inversion recovery MRI sequences. Therefore, meningioma is the most important differential diagnosis prior to surgery. Calcification is important in differentiating the two, with the presence of calcification favouring meningioma.⁸ Other mimics include lymphoma,

Figure 2 (A) Histiocyte-rich lesion admixed with multinucleated giant cells showing evident emperipolesis. Many lymphocytes, plasma cells and eosinophils are also noted (H&E, $\times 400$). (B) Immunohistochemistry (IHC) image showing histiocytes positive for S100 ($\times 400$). (C) IHC image showing histiocytes positive for CD68 ($\times 400$). (D) IHC image showing histiocytes negative for CD1a ($\times 400$).

Patient's perspective

I kept having severe lower back pain and an embarrassing difficulty with my urination and defecation. The doctors told me after my MRI that I could be having a cancer in my nerves and they needed to do a surgery. After surgery, I am totally relieved of my pain and I have full control over my bowel and bladder. The doctors tell me now that I have a rare tumour of lymph nodes in the nerves. They also tell me that although I have some tumour left in my back, I do not need to take any drugs or further surgery for the same. I am glad because now I am pain free and relieved because it did not turn out to be a cancer of my nerves.

Learning points

- ▶ Extranodal involvement is common but less recognised in Rosai-Dorfman disease (RDD).
- ▶ Central nervous system involvement is rare constituting 5% of the cases with extranodal involvement in RDD.
- ▶ The diagnoses can be achieved only with a high index of suspicion following the resection with expert histopathological and immunohistochemical analyses.

plasma cell granuloma, Langerhan's cell histiocytosis,⁸ subdural haematoma, ependymoma and Lhermitte-Duclos disease. Hence achieving a diagnosis is inconceivable short of surgery, histopathology and immunohistochemical examination.

On histopathology, the lymph nodes demonstrate massive sinusoidal dilation with histiocytic and lymphoplasmacytic infiltrate. Emperipolesis within histiocyte cytoplasm is the morphological hallmark of RDD.³ In addition, the lymph nodes demonstrate reactive follicles in the cortices and increased plasma cells and small lymphocytes in the medulla.⁹ The histiocytes are usually positive for CD68, CD163, S100 and negative for CD1a.

Differential diagnosis considered in lesions with lymphohistiocytic infiltrate include juvenile xanthogranuloma, Langerhans cell histiocytosis, IgG4-related disease and leprosy. Characteristic morphological findings in conjunction with immunohistochemical and special stains will aid in differentiating these entities from RDD. Although, mixed inflammatory cells rich in histiocytes are seen in juvenile xanthogranuloma, the presence of haemophagocytosis and S100 immunostain positivity made juvenile xanthogranuloma unlikely in our case. The presence of evident haemophagocytosis, the absence of ovoid nuclei and nuclear grooving and negative CD1a excluded the diagnosis of Langerhans cell histiocytosis. IgG4-related disease shows characteristic storiform fibrosis and obliterative phlebitis, which were lacking in the present case. Haemophagocytosis is also not a feature of IgG4-related disease or leprosy.

Surgery is the mainstay of therapy in CNS RDD. It is also unparalleled in establishing diagnosis and relieving the patients of the neurological symptoms. Depending on the accessibility of the lesion, surgery may involve a partial or complete resection, with recurrence more likely with the former.⁵ Residual symptoms and recurrence may be tackled with radiotherapy (conventional

low-dose fractionated radiotherapy or stereotactic radiosurgery) and/or chemotherapy with alkylating agents and/or steroids.

Contributors BAC: collected patient data, drafted and revised the manuscript. RVN: patient management, drafted and revised the manuscript. KN: interpretation of the histopathology, drafted and revised the manuscript. DL: conceived the idea, patient management, collected patient data, drafted and revised the manuscript.

Funding This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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REFERENCES

- Hollowell JP, Wolfla CE, Shah NC, *et al.* Rosai-Dorfman disease causing cervical myelopathy. *Spine* 2000;25:1453–6.
- Foucar E, Rosai J, Dorfman R. Sinus histiocytosis with massive lymphadenopathy (Rosai-Dorfman disease): review of the entity. *Semin Diagn Pathol* 1990;7:19–73.
- Rosai J, Dorfman RF. Sinus histiocytosis with massive lymphadenopathy. A newly recognized benign clinicopathological entity. *Arch Pathol* 1969;87:63–70.
- Sandoval-Sus JD, Sandoval-Leon AC, Chapman JR, *et al.* Rosai-Dorfman disease of the central nervous system: report of 6 cases and review of the literature. *Medicine* 2014;93:165–75.
- Adeleye AO, Amir G, Fraifeld S, *et al.* Diagnosis and management of Rosai-Dorfman disease involving the central nervous system. *Neurol Res* 2010;32:572–8.
- de Oliveira Lima GL, da Costa AC, de Paula Goes BH, *et al.* Double compression caused by isolated spinal Rosai-Dorfman disease. *Spine J* 2016;16:e521–e522.
- Chen KT. Crush cytology of Rosai-Dorfman disease of the central nervous system. A report of 2 cases. *Acta Cytol* 2003;47:1111–5.
- Joshi SS, Joshi S, Muzumdar G, *et al.* Cranio-spinal Rosai Dorfman disease: case series and literature review. *Br J Neurosurg* 2017:1–8.
- Dalia S, Sagatys E, Sokol L, *et al.* Rosai-Dorfman disease: tumor biology, clinical features, pathology, and treatment. *Cancer Control* 2014;21:322–7.

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