

Case Report

A case report: Bilateral reconstruction of C2 lateral masses with expandable titanium cages following axis (C2) solitary plasmacytoma resection with 2-year follow-up

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ABSTRACT

Background: Solitary plasmacytoma (SP) caused the collapse/destruction of the C2 vertebral body in a 78-year-old male. To provide sufficient posterior stabilization, the patient warranted lateral mass fusion to supplement the bilateral pedicle/screw rod instrumentation.

Case Description: A 78-year-old male presented with neck pain alone. X-rays, computed tomography, and magnetic resonance studies documented C2 vertebral collapse with the complete destruction of both lateral masses. The surgery required a laminectomy (i.e., bilateral lateral mass resection), plus placement of bilateral expandable titanium cages from C1 to C3 to supplement the screw/rod occipitocervical (O-C4) fixation. Adjuvant chemotherapy and radiotherapy were also administered. Two years later, the patient remained neurologically intact and radiographically had no evidence of tumor recurrence.

Conclusion: In patients with vertebral plasmacytomas and bilateral lateral mass destruction, posterior occipital-cervical C4 rod/screw fusions may warrant the additional bilateral placement of titanium expandable lateral mass cages from C1 to C3.

Keywords: Case report, Lateral mass, Solitary plasmacytoma, Spinal reconstruction, Titanium expandable cage

INTRODUCTION

Novel approaches are available for lateral mass reconstruction following vertebral destruction attributed to a tumor, trauma, or iatrogenic injuries.^[2-6,8,10] Lytic single-site vertebral solitary plasmacytomas (SPs) can cause compression and/or vertebral instability.^[7,9] Here, a 78-year-old male presented with a C2 plasmacytoma that warranted occipital-cervical decompression/rod/screw stabilization, and bilateral lateral mass C2 stabilization using expandable titanium cages.

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Figure 1: Computed tomography scan (a-d) and magnetic resonance imaging (e: T1, f: T2, g: Short tau inversion recovery, and h: Gadolinium-enhanced) of the occipitocervical spine.

PRESENTATION OF CASE

A 78-year-old male presented with 2 months of neck pain and a positive left-sided Hoffman's sign. The computed tomography (CT) showed a single lytic C2 hypodense bone lesion. On the magnetic resonance (MR), the lesion was markedly enhanced with gadolinium. The angiogram showed the vertebral artery (VA) was encased bilaterally at the C2 level [Figures 1 and 2]. Surgery consisted of midline exposure from theinion to C5, and under fluoroscopic guidance, a C2-C3 laminectomy was followed by ligation/excision of both C2 nerve roots. The VA, encased bilaterally at C2, was microscopically skeletonized/separated from the C1 to C3 transverse foramina. A temporary unilateral occipital plate – C4 rod was applied. Next, Titanium expandable cages filled with allograft were placed between C1 and C3 levels just medial to the VA. They were then gradually expanded under microscopic/fluoroscopic visualization until proper fixation (i.e., good bone-cage approximation) was achieved. The bilateral occiput to C4 rods was then permanently affixed and tightened [Figure 3].

Adjuvant therapies and 2-year follow-up

Adjuvant therapies were included in the study: a bone marrow aspiration/biopsy, total spine diffusion-weighted MR imaging, immunoelectrophoresis, and free kappa and lambda light chain assessment. As the free kappa assay showed an increase without other systemic involvement, a course of radiation therapy (RT) (without systemic treatment) was administered following which the free kappa



Figure 2: Vertebral artery subtraction angiogram (a: Right, b: Left), showing no anatomic variations.

assay normalized. Notably, thrombocytosis occurred despite local tumor control, and a JAK2 mutation was documented. The patient, who was 78-years-old (i.e., above age 65), was therefore additionally placed on both hydroxyurea and aspirin to avoid hypercoagulation. Two years later, the patient was asymptomatic, the cervical construct remained stable, and platelet levels were normal [Figure 4].

DISCUSSION

As pathology of the lateral masses of C1-C2 can be destabilizing, special attention has recently been given to the reconstruction of the lateral masses/facet joints at this level.^[1-9] Some have used titanium mesh cages to bridge the intact articular processes, while others have employed expandable cages.^[6,10] Here, we placed bilateral expandable

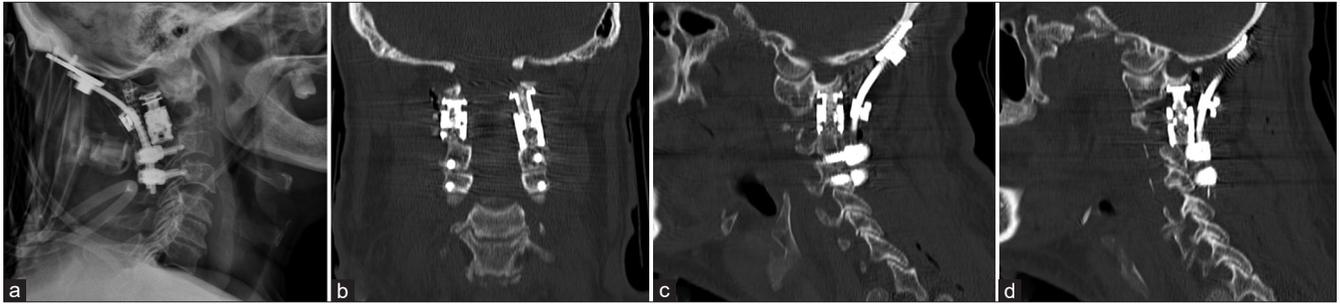


Figure 3: Immediate postoperative lateral craniocervical X-ray (a) and computed tomography scan (b: Coronal, c: Right parasagittal, and d: Left parasagittal).



Figure 4: Follow-up X-rays after 2 months (a: Anteroposterior, b: Lateral). 6-month postoperative magnetic resonance imaging showed no compression on the dural sac in the (c) Short tau inversion recovery and (d) T2-weighted sequences. Computed tomography scan 2-year postoperation (e: Right, f: Left parasagittal, and g: Coronal).

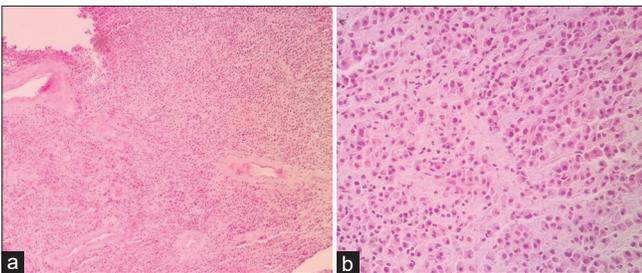


Figure 5: Plasmacytoma; sheets of cells composed predominantly of mature-looking plasma cells (a: $\times 10$, b: $\times 40$, H&E).

cages between the articular surfaces of C1 and C3 and achieved adequate bilateral stabilization when combined

with occipital-cervical C4 rod/screw fusion. Following RT, free kappa levels normalized as did the plasma cell disorder. The persistent thrombocytosis was successfully managed with Hydroxyurea and Aspirin. Two years later, the patient remains asymptomatic and disease free.

Pathology/histology; Final diagnosis kappa monocytic plasmacytoma

Our final histological diagnosis was Kappa monocytic plasmacytoma. The histology revealed sheets of neoplastic cells composed predominantly of plasma cells, the majority of which showed abundant eosinophilic cytoplasm, eccentrically placed nuclei, mild nuclear atypia, and binucleation

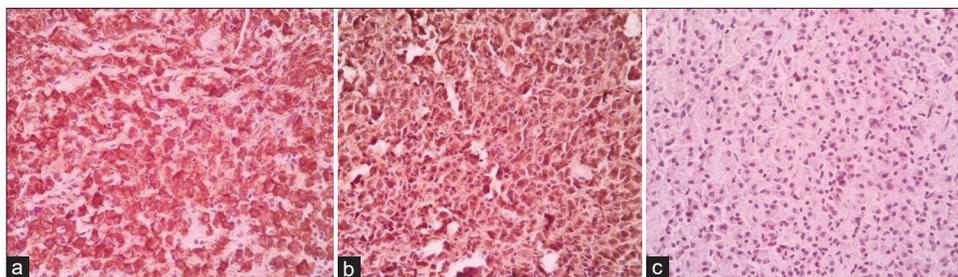


Figure 6: Plasmacytoma; immunohistochemistry with positive staining for CD138 (a) and the kappa light chain (b), and negative staining for the lambda light chain (c), $\times 40$.

[Figure 5]. Immunohistochemistry showed diffuse positivity for CD 138 and the kappa light chain, but failed to stain for the lambda light chain [Figure 6].

CONCLUSION

A 78-year-old male's X-rays, CT, and MR documented C2 vertebral collapse with the complete destruction of both lateral masses due to a biopsy-proven plasmacytoma. He was successfully managed with a C2 laminectomy/partial vertebrectomy, C1-C3 bilateral lateral mass/cage reconstruction, and occipital-C4 screw/rod fusion along with adjuvant radiation/chemotherapies.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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