

Traumatic spondyloptosis at the cervico-thoracic junction without neurological deficits

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Abstract

Background: There have been rare cases of traumatic cervical spondyloptosis without neurological compromise. We report another case and provide a review of the literature, with a focus on appropriate management.

Case Description: A 60-year-old male rode his bicycle into a stationary semi-truck. He reported initial bilateral upper extremity paresthesias that resolved. Imaging demonstrated C7 on T1 spondyloptosis. Traction did not achieve reduction and a halo was applied. Subsequently, he underwent posterior decompression C6-T1, reduction via bilateral complete facetectomies at C7, and fixation from C4 to T2 fixation. Afterward, an anterior C7-T1 fixation occurred, where exposure was performed through a midline sternotomy. Postoperatively, he woke up with baseline motor and sensory examination in his extremities. He did exhibit voice hoarseness due to paralysis of the left vocal cords. He was discharged home 3 days after surgery. At 6 months follow-up, there was a progressive improvement of the left vocal cords to slight paresis; dynamic X-rays demonstrated no instability with good fusion progression.

Conclusion: Traumatic cervical spondyloptosis without neurological compromise is a rare and challenging scenario. There is a concern for neurologic compromise with preoperative traction, but if specific posterior elements are fractured, the spinal canal may be wide enough where the concern for disc migration is minimal. For patients who have not been reduced preoperatively, a posterior approach with initial decompression to widen the canal, before reduction, appears safe. This scheme may avoid an initial anterior approach for decompression, necessitating a 3-stage procedure if circumferential stabilization is pursued.

Key Words: Fracture dislocation, neurologically intact, spondyloptosis

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INTRODUCTION

Spondyloptosis leads to severe spinal cord compression and neurological deficits. Here, we report another case of cervical spondyloptosis where the patient remained neurologically intact and provided a review of the literature, focusing on appropriate management.

CASE PRESENTATION

Clinical presentation and neurodiagnostic studies

A 60-year-old male presented to the hospital after riding his bicycle into a stationary semi-truck. He reported initial bilateral upper extremity paresthesias that resolved before presentation. A computed tomography (CT) scan of the cervical spine demonstrated C7 on T1 spondyloptosis, with fractures of both C7 pedicles, C7/T1 facets, and C7 lamina [Figure 1]. CT angiography of the neck was negative for a vascular injury. The cervical magnetic resonance imaging documented severe canal compromise but no increased signal in the cord at the C7/T1 level [Figure 2].

Treatment strategies

Cervical traction of 10 pounds was applied with tongs but failed to reduce the subluxation. A halo was placed; the next day the patient underwent a posterior decompression (inferior C6 laminectomy, bilateral C7 laminectomy, superior T1 laminectomy), with reduction of the fracture/dislocation utilizing bilateral complete facetectomies at C7, and fusion from C4 to T2. Intraoperatively, the O-arm documented adequate reduction. Subsequently, on the same day, an anterior C7-T1 fusion was performed through a midline sternotomy.

Intraoperative monitoring

Intraoperative monitoring (somatosensory evoked potentials [SSEPs], motor evoked potentials [MEPs], electromyography) was employed for both procedures; after reduction of the fracture via the posterior approach, SSEPs improved. At the end of the anterior procedure, SSEP and MEP remained normal. Postoperatively, he was neurologically intact.

Left-sided recurrent laryngeal nerve injury

Postoperatively, the patient was hoarse. This was attributed to the anterior C7/T1 exposure, which involved moderate retraction of the recurrent laryngeal nerve. He had paralysis of the left vocal cords. Six months later, this was just a mild paresis.

Six-month outcome and dynamic X-rays

Six months postoperatively, the patient was intact, and dynamic X-rays demonstrated no instability (e.g., adequate fusion) [Figure 3].

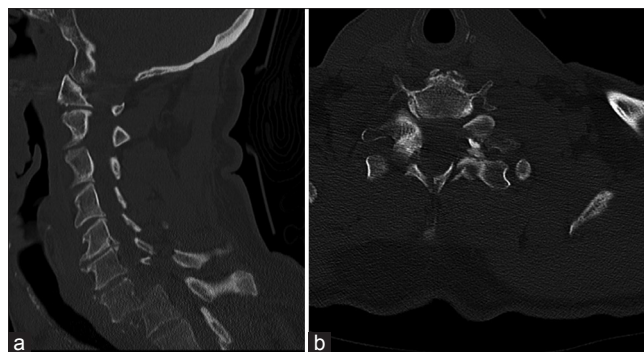


Figure 1: (a) Sagittal computed tomography cervical spine, (b) axial computed tomography cervical spine

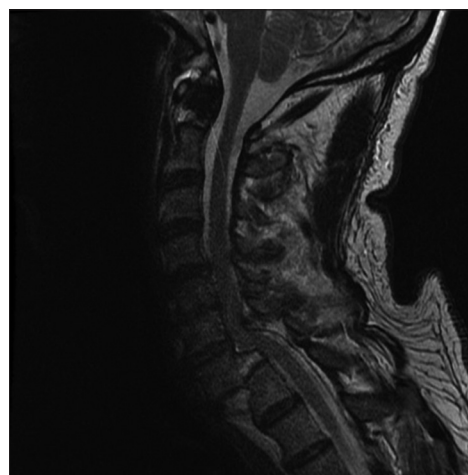


Figure 2: Sagittal magnetic resonance T2

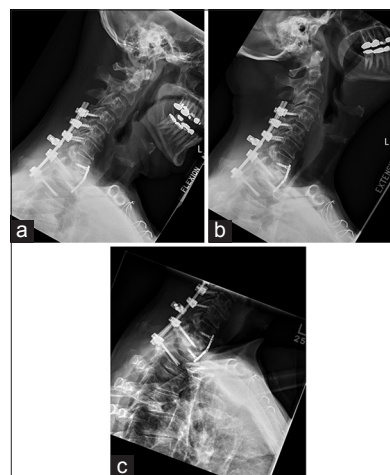


Figure 3: Six months follow-up (a) flexion, (b) extension, and (c) Swimmer's view

DISCUSSION

Spondyloptosis is more common within the lumbar spine than the cervical spine.^[9] Etiologies include traumatic,^[11] congenital,^[4,10] inflammatory,^[4] and

Table 1: Review of literature

Literature	Year	Age	Gender	Level	Mechanism	Traction	Surgery
Acikbas and Gurkanlar ^[1]	2010	42	Male	C7-T1	MVA	Yes, reduction observed on 5 th day	A (C7-T1 discectomy, fixation) P (C4-T3 fixation)
Dahdaleh <i>et al.</i> ^[2]	2013	51	Male	C7-T1	MVA	Yes, 45 lbs traction, reduced to 25% lithesis	P (C4-T2 fixation)
Gasco <i>et al.</i> ^[3]	2013	45	Male	C4-C5	MVA	Yes, no reduction	A (C4-C5 corpectomies) P (C3-C6 fixation) A (strut graft, C3-C6 fixation)
Jayakumar <i>et al.</i> ^[6]	2008	58	Male	C2-C3	Assault	Yes, no reduction, 1 week traction	P (occipito-C5 fixation)
Menku <i>et al.</i> ^[7]	2004	35	Male	C6-C7	Traffic accident	No	A (C6 disc material removed) P (reduction, C4-C7 fixation) A (C6 corpectomy, C5-C7 fixation)
Munakomi <i>et al.</i> ^[9]	2015	56	Female	C7-T1	Fall from tree	Yes, reduction in OR	A (C7-T1 discectomy) P (C6-T1 fixation) A (C7-T1 fixation)
Ramieri <i>et al.</i> ^[11]	2014	55	Female	C6-C7	MVA	Yes, halo traction 9-20 pounds over 9 days, with partial realignment	P (C3-T2 fixation) P (C6-T1 fixation)A (C7-T1 fixation)
Srivastava <i>et al.</i> ^[13]	2010	35	Male	C3-C4	Fall	Yes, reduction in OR	A (C3-C4 discectomy, fixation)
Tumialán and Theodore ^[14]	2009	48	Male	C7-T1	MVA	Yes, for 6 h, CT cervical spine confirms reduction	A (C7-T1 discectomy, fixation) P (C5-T2 fixation)
Current case	2015	60	Male	C7-T1	Bike versus stationary semi-truck	Yes, 10 pounds, no reduction	P (C4-T2 reduction, fixation) A (C7-T1 fixation)

MVA: Motor vehicle accident, A: Anterior approach, P: Posterior approach, CT: Computed tomography, OR: Operating room

neoplastic^[5] conditions. The majority of traumatic cases that involve the cervical spine result in devastating neurological injuries (e.g., acute myelopathy and quadriplegia).^[12] There are only rare cases where patients remained neurologically intact [Table 1]. This is likely due to spontaneous decompression at the level of the decompression attributed to “fractures along the posterior elements, including bilateral pedicular fractures and posterior arch fractures.”^[8]

Management of cervical spondyloptosis

The management of cervical spondyloptosis for patients with severe deficits involves reduction, and fusion, which can occur anteriorly and/or posteriorly.^[12] Menku *et al.*,^[7] reported the first patient with cervical spondyloptosis without a neurological deficit and cautioned against cervical traction; their patient exhibited disc material behind the spondyloptic body, and traction could have led to acute spinal cord compression. However, traction was attempted in all the subsequent cases with variable success, but without neurological compromise [Table 1].

Spontaneous decompression of the fracture level with bilateral pedicle, facet and laminar fractures and timing of reduction

The fractures of bilateral pedicles and posterior elements reduce the threat of cord compromise in these patients with C7/T1 spondyloptosis. However, prolonged dislocation may result in stasis of blood flow within the vertebral arteries, leading to thrombus formation;

subsequent reduction may restore blood flow and dislodge the thrombus, leading to ischemic events.^[15]

Surgical goals

Surgical goals include vertebral realignment and stabilization. Overall, preoperative reduction is only rarely, safely, and feasible. Most surgeons, therefore, advocate circumferential stabilization.^[1,3,7,9,11,13] Several authors have described a 3-stage approach, involving anterior decompression (discectomy and/or corpectomies), posterior reduction and fixation, and anterior fixation.^[3,7,9]

Maneuvers in this case to treat C7/T1 spondyloptosis

In the case presented, as traction failed to achieve the reduction, the patient required the placement of a halo device and subsequently underwent posterior decompression/fusion followed by anterior cervical surgery (decompression/fusion). Three of the prior reported cases^[2,6,11] employed the posterior approach initially.

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Conflicts of interest

There are no conflicts of interest.

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