Sympathetic conjoined lumbosacral nerve root in safe Kambin's triangle during transforaminal endoscopy: A case report

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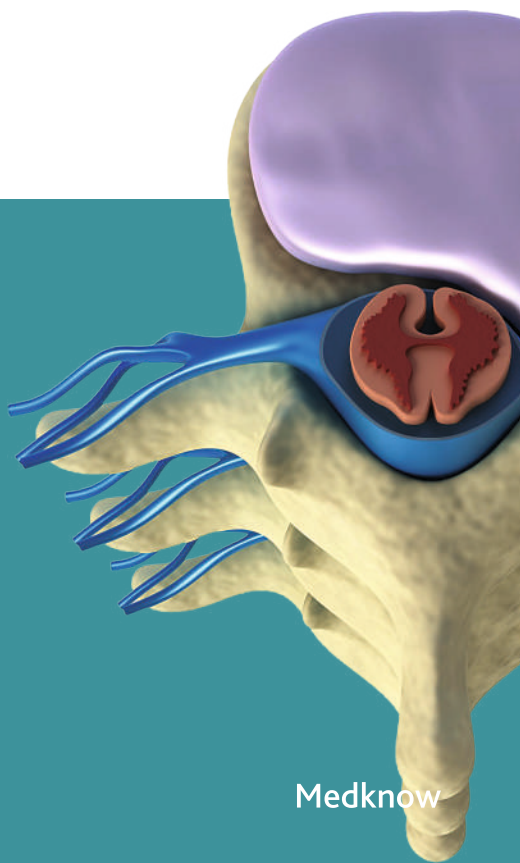

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Case Report

Sympathetic Conjoined Lumbosacral Nerve Root in Kambin's Triangle during Transforaminal Endoscopy

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Abstract

Kambin's triangle is a safe corridor for transforaminal endoscopic approach as it is devoid of any neurovascular structure. We came across an interesting case where we encountered a large conjoined lumbosacral nerve root (CNR) in Kambin's triangle during transforaminal endoscopic spine surgery. Patient had intraoperative sympathetic shock which recovered after administering atropine. A 50-year-old female presented with low back pain with bilateral lower limb radiculopathy for 3 years. Magnetic resonance imaging revealed left L4-5 foraminal annular fissure. Radiculopathy was in L5 dermatomal pattern which was confirmed by diagnostic discography and lateral recess block. Left-sided L4-5 transforaminal endoscopic lumbar discectomy was done where we encountered a large CNR in safe zone of Kambin's triangle. Transforaminal endoscopic spine surgery done under monitored anesthesia care with patient in awake and aware state allows identification, diagnosis, and prevention of injury to anomalous neural structure in Kambin's triangle to avoid incidence of failed back syndrome.

Keywords: Conjoined lumbosacral nerve root, failed back syndrome, Kambin's triangle, sympathetic nerve, transforaminal endoscopic discectomy

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INTRODUCTION

In endoscopic spine surgery, Kambin's triangle is considered a reliable and safe anatomical corridor to perform various endoscopic surgical procedures.[1] This triangle is usually devoid of any neurovascular structures and provides the adequate space for endoscopic instruments. Interestingly, we encountered one case, where a large conjoined lumbosacral nerve root (CNR) lies in this safe corridor. The patient had intraoperative sudden hypotension and bradycardia which was a very unusual clinical presentation associated with a conjoined nerve at the lumbosacral region.

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CASE PRESENTATION

A 50-year-old female presented to us with low back pain and bilateral lower limb radiculopathy which was more on left as compared to right side for 2 years. On examination, bilateral passive straight leg raising test was positive at 45°. Magnetic resonance imaging (MRI) showed degenerative disc disease at L4-5 and L5-S1 level with left foraminal annular fissure at L4-5 without any obvious compressive element [Figure 1]. There were no signs of instability on dynamic X-rays. Considering clinicoradiological diagnosis of internal disc derangement with chemical radiculitis, evocative discography and lateral recess block (LRB) were

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done at L4-5 and L5-S1 level from the left side. Immediately after left L4-5 discography, she had concordant pain which was relieved with LRB. Ten days post-LRB, the patient had complete relief in low back pain and right lower limb radiculopathy but left-sided symptoms persisted. Hence, evocative discography and transforaminal endoscopic lumbar discectomy (TELD) at left L4-5 under monitored anesthesia care (MAC). On discography at L4-5 level, dye leak was only

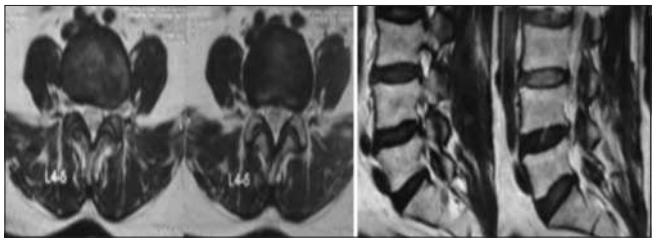

Figure 1: Axial and sagittal cuts showing left foraminal annular fissure at L4-5

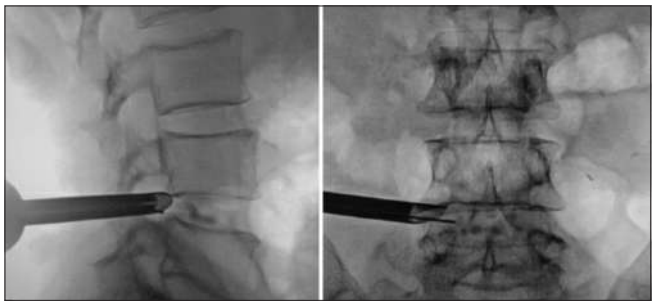

Figure 2: Anteroposterior (AP) and lateral Fluroscopic image showing positioning of working channel in Kambin's triangle

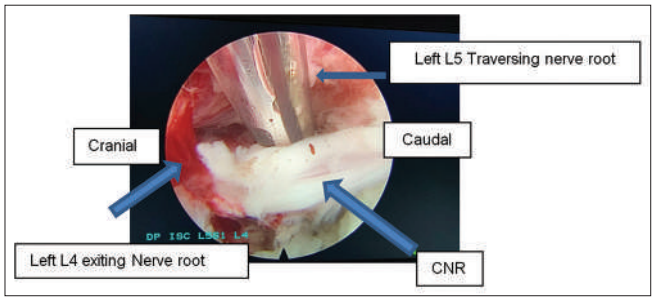

Figure 3: Kambin's triangle showing conjoined lumbosacral nerve root (CNR)

along left L4 exiting nerve root. When dilator was inserted over guide wire through Kambin's triangle for making annular window at mid-pedicle line on anteroposterior view, the patient had excruciating pain in left lower limb associated with bradycardia and hypotension which was reversed after administering atropine 0.6 mg followed by 20 ml saline [Figure 2]. Hence, we executed outside in TELD using twenty-five degree endoscope. We encountered a large CNR in Kambin's triangle [Figures 3 and 4]. The CNR was approximately 4 mm in diameter arising from the L4 exiting nerve and travelling along L5 traversing nerve and thecal sac medial to left L5 pedicle. It was lying ventral and lateral to L5 traversing nerve root and thecal sac. The patient had repeated episodes of severe neuralgic pain and bradycardia while navigating around the CNR to access intradiscal space for thermal annuloplasty. Primary foraminoplasty by burring of superior articular process was done to widen the base of Kambin's triangle for adequate visualization of L5 traversing nerve root and CNR. Adhesiolysis of CNR and thecal sac was done followed by thermal annuloplasty. Left L5 traversing, L4 exiting, and CNR in Kambin's triangle were decompressed at the end of procedure. At present, at the 6-month follow-up mark, the patient is completely asymptomatic both for back and leg pain.

DISCUSSION

Congenital anatomical anomalies of nerve roots in lumbosacral region are rare.[2] In general, these anomalies are identified on neuro-radiological examination, intraoperatively, or during autopsy study.[3,4] Cannon *et al.* classified nerve root anomalies into three fundamental types of lumbosacral nerve root anomalies, namely confluent type, anastomotic type, and transverse type.[5] Neidre and MacNab classified CNR into three major types. Types 1 and 2 are further divided into two subtypes based on appearance in dura.[6] CNRs are one of the most common unidentified nerve root anomalies. They are responsible for many failed back surgeries and inadvertent intraoperative neural injury.[7] Even though radiological signs have been described to identify CNR on MRI, it is very challenging

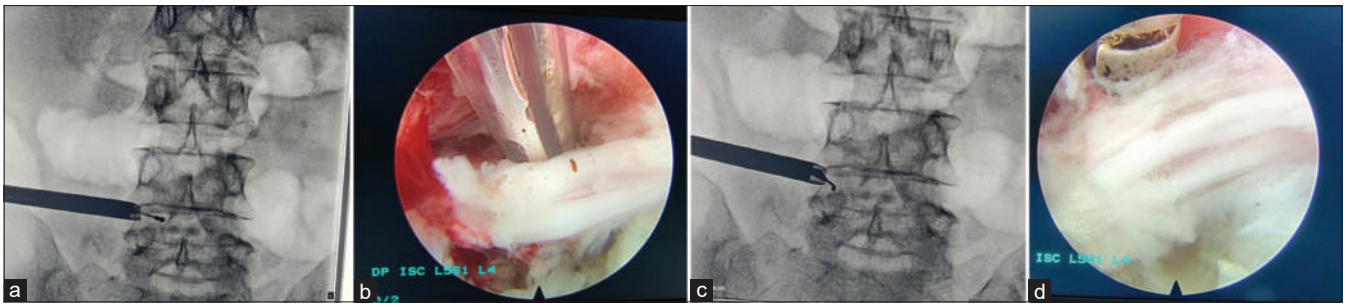

Figure 4: (a and b) shows medial extent of conjoined lumbosacral nerve root (CNR) and (c and d) shows lateral extent CNR

to identify and label CNRs in open as well as endoscopic surgeries.[8,9]

Kambin's triangle is generally a safe zone and is a routine approach for endoscopic surgical procedures. In our case, we encountered large anastomotic type of CNR at left L4-5 level in Kambin's triangle.[10] Clinical presentation due to CNR involvement is usually in the form of lumbosciatic radicular pain due to overcrowding in foramen or lateral recess.[7] Interestingly, in our case, CNR behaved clinically as a sympathetic nerve root as there was bradycardia up to 16/min and hypotension up to 80/40 mmHg intraoperatively. Very limited data is available about hemodynamic changes occurring in elective lumbar surgical procedures. Negative chronotropic effect due to lumbar spine surgery is correlated with surgical manipulation of the dura. Chowdhury and Schaller postulated spinal cardiac reflex with efferent arc originating from medulla oblongata and afferent arc consist of sympathetic chain and sinuvertebral nerves.[11] Only one case of lumbar fusion surgery in which nerve root handling causing bradycardia and hypotension was documented. Negative chronotropic effect causing bradycardia and hypotension due to handling of CNR in endoscopic spine surgery has not been described in literature.

CONCLUSION

During TELD, there is a possibility of encountering anomalous neural structures in Kambin's triangle which can be sympathetic nerve as well. This possibility is even more in the cases of failed back syndrome (FBS). Transforaminal endoscopic spine surgery done under MAC with patient in awake and aware state allows identification, diagnosis, and prevention of injury to anomalous neural structure in Kambin's triangle to avoid the incidence of FBS. One should not introduce endoscopic instrument just under radiological guidance if any neurological and sympathetic alteration appears intraoperatively in beginning of procedure. Primary foraminoplasty must be done to widen the base of the Kambin's triangle.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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