

Case Report

Post-Traumatic Brachial Plexus Root Avulsion: A Case Report

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Abstract: Root avulsion corresponds to the tearing of the roots of the spinal cord by stretching during a trauma. The most incriminated etiologies are road accidents and obstetric trauma. It results clinically in total or partial paralysis of the limb concerned or neuropathic pain. MRI is the key diagnostic test. Here we report a case of post-traumatic brachial plexus root avulsion in a 61-year-old patient following a road accident. The MRI of the cervical plexus, performed one month after the trauma, revealed a pre-foraminal fluid-like lesion on the left next to the D1 conjugation hole, suggestive of a pseudomeningocele. MRI is the key diagnostic imaging tool. In fact, it establishes the lesion topography, whether pre or post-nodal, and enables the search for associated lesions.

Keywords: Root avulsion, MRI, pseudomeningocele, pre-foraminal, brachial plexus, post-traumatic lesion.

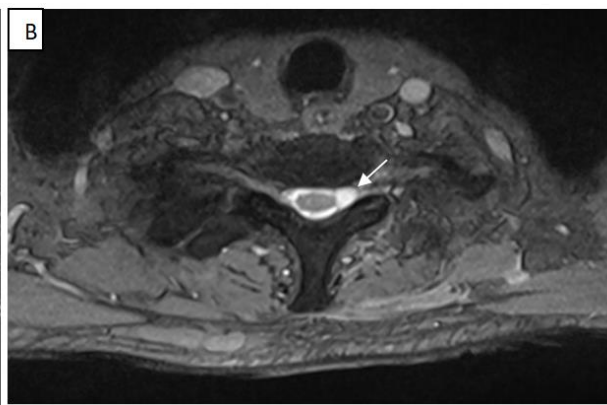
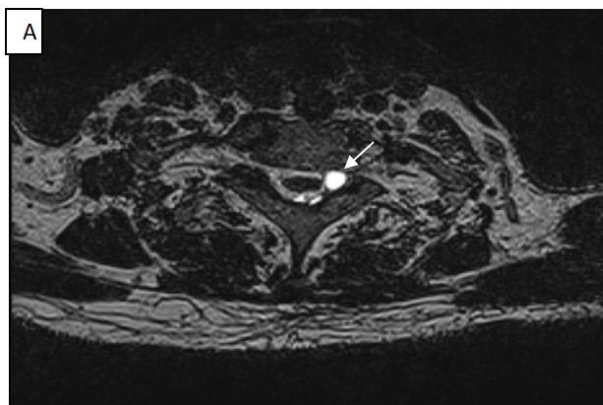
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INTRODUCTION

Root avulsion corresponds to the tearing of the roots of the spinal cord due to stretching during a trauma. The most incriminated etiologies are road accidents and obstetric trauma. It results clinically in total or partial paralysis of the concerned limb or neuropathic pain. MRI is the key diagnostic test. Here, we report a case of brachial plexus root avulsion to emphasize the importance of the role of MRI in diagnosis.

CASE REPORT

61-year-old patient, a truck driver, with no notable medical history, consulted for monoparesis of the left upper limb following a road accident. Standard radiographs of the left shoulder and cervical spine showed no notable abnormality. After symptomatic treatment, the patient underwent an MRI of the cervical plexus one month after the trauma. The MRI revealed a pre-foraminal fluid-like lesion on the left, next to the D1 conjugation hole, suggestive of a pseudomeningocele.



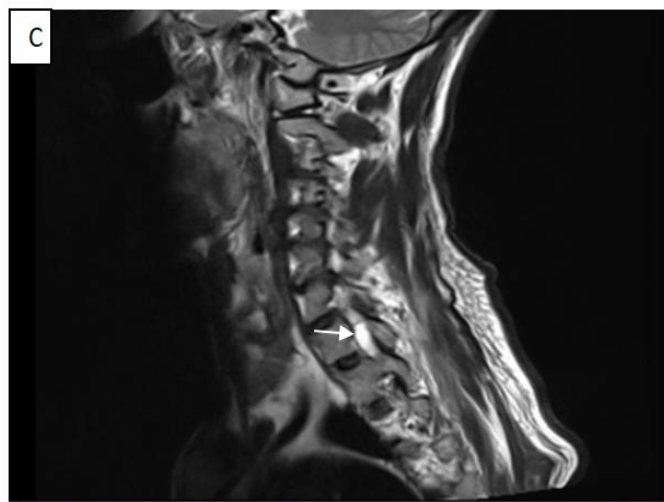


Fig. 1: Post-traumatic avulsion of the left anterior and posterior roots of D1. Axial sections; CISS (A) and T2-weighted (B) and Sagittal T2 (C) sequence highlighting the pseudo-meningocele (white arrow)

DISCUSSION

Root avulsion is the tearing of the roots of the spinal cord due to stretching during a trauma [1]. It usually occurs in young adults of 20-30 years. The main etiologies are road accidents (particularly motorcycles) and obstetrical trauma [2]. Clinically, it results in total or partial paralysis of the limb concerned limb or neuropathic pain [3].

MRI is the key diagnostic test [4, 5]. It helps in establishing the lesion topography, pre or post-nodal and enables the search for associated lesions [1, 2]. The protocols may vary in the literature but they always include exploration of the spinal cord in sagittal sections in T2 and T1 weighting, fine axial sections in T2, oblique frontal sections in the axis of the brachial plexus in STIR. The distal part of the brachial plexus can also be explored by oblique sagittal T1 views, perpendicular to the brachial plexus.

When the lesion is pre-ganglionic, direct signs are found, in particular, a solution of continuity with the absence of individualization of the anterior and posterior roots in thin sections. However, most often, indirect signs are found, in particular, the pseudomeningocele, which is present in 80% of cases [2-4]. It results from the extravasation of CSF through a breach with the formation of an unencapsulated fluid pocket. Although valuable, this sign is not pathognomonic [6]. Indeed, one can observe pseudomeningoceles with intact roots due to isolated rupture of the dural sleeve [7]. Other signs are in favor of pre-nodal involvement, in particular, spinal edema, lateral displacement of the spinal cord, syringomyelia, intracanal hematoma or secondary denervation of the paraspinal muscles. The latter can be acute, resulting in edema in T2 and STIR hypersignal and intense contrast enhancement of the affected muscles, abnormalities considered sensitive and specific to root avulsion. Denervation can also be chronic with amyotrophy and

fatty degeneration of the muscles [2, 3]. When the lesion is post-nodal (supra or infraclavicular), there is generally a thickening of the root with T2 hypersignal. In our case, the involvement was pre-nodal, as evidenced by the pseudomeningocele. Pre-ganglionic lesions have a poor prognosis because they cannot be sutured and do not heal because they cannot regenerate [1]. Their treatment involves nerve transposition or neurotization [8]. Post-ganglionic lesions can be sutured and therefore have a better prognosis.

CONCLUSION

Root avulsions of the brachial plexus are lesions with a very poor prognosis. MRI is the key diagnostic test. It makes it possible to establish the lesion topography, pre or post-nodal and also makes it possible to look for associated lesions.

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