

Post-traumatic cervical pseudomeningocele: A case report

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ABSTRACT

Introduction: The traumatic lesions of the brachial plexus mainly are due to stretching, tearing, bruising, or direct sores accentuated by a hematoma or the presence of a foreign body. Stretching of the brachial plexus can lead to avulsion and/or pseudomeningocele.

Case Report: It is a case of a 12-year-old child who was admitted to the emergency room after a public road accident for the management of an open arm fracture, for which he received stabilization by screw plate fixation. Evolution was marked with anesthesia in the area of the musculocutaneous nerve. Magnetic resonance imaging (MRI) showed a left C7 pseudomeningocele with root avulsion. The patient underwent surgery but unfortunately did not recover his neurological deficit. Late electroneuromyography (ENMG) showed distal nerve damages which can explain the failure of surgery. **Conclusion:** If MRI distinguishes a preganglionic lesion from proximal postganglionic involvement, it ignores distal lesions. Electroneuromyography and MRI are therefore complementary in the determination of the reversibility or not of lesions of the brachial plexus and in the choice of the most appropriate treatment.

Keywords: Brachial plexus, Electroneuromyography, Magnetic resonance imaging, Pseudomeningocele, Root avulsion

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INTRODUCTION

The traumatic lesions of the brachial plexus mainly are due to stretching, tearing, bruising, or direct sores accentuated by a hematoma or the presence of a foreign body. Stretching of the brachial plexus can lead to avulsion and/or pseudomeningocele.

CASE REPORT

It is a case of a 12-year-old child with no significant pathological history. He was admitted to the emergency room after a public road accident for the management of an open arm fracture, for which he received a stabilization by screw plate fixation. One month later, the patient reconsidered the surgeon for persistent sensory disturbances of the upper member. Clinical examination showed anesthesia in the area of the musculocutaneous nerve without associated motor deficit. Since the cervical scan did not show abnormalities, an MRI of the cervical spine was performed to complete the lesional assessment (Figure 1A and B).

Cervical MRI showed a very limited cystic lesion with a C7/D1 foraminous topography, homogeneous, well-defined, communicating with the subarachnoid spaces,

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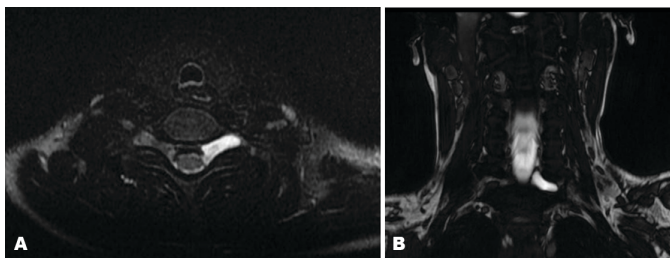


Figure 1: (A) Axial T2 weighted sequence shows a left cystic foraminal lesion communicating with the epidural space. (B) Coronal T2 weighted sequence showing a C7/D1 left pseudomeningocele.

associated with an avulsion of the C7 roots suggesting a pseudomeningocele. There was no fracture or anomaly of the medullary signal.

Microsurgical sutures were performed and duraplasty was performed with synthetic graft. In the postoperative period, symptoms did not resolve. An ENMG was lately indicated, and showed distal nerve damage explaining failure of surgery.

DISCUSSION

The traumatic lesions of the brachial plexus mainly concern young adults aged between 20 and 30 years, mostly following motorcycle accidents. They are due to stretching, tearing, bruising, or direct sores accentuated by a hematoma or the presence of a foreign body. Stretching of the brachial plexus can lead to avulsion and/or pseudomeningocele. This type of trauma is often associated with other vascular lesions or fractures, which can aggravate the prognosis and delay treatment [1, 2]. Pseudomeningocele are associated to avulsion in about 80% of cases [3].

Clinically, pseudomeningocele is generally asymptomatic but may be associated to spinal hernia within meningocele. Radicular involvement can lead to a definitive neurological deficit and to total paralysis of the limb [4, 5].

The progress of restorative microsurgery requires a precise and rapid diagnosis of the pre- and/or postganglionic localization of the lesion. This assessment was long based on the long-term ENMG, which does not confirm a coexisting avulsion with a severe postganglionic lesion [6]. Myelogram CT scan is currently replaced by MRI. Indeed, MRI with myelo MRI sequence allows the simultaneous evaluation of roots, trunks, and bundles, and to appreciate the existence of a myelopathy, as well as the state of the muscles thanks to its high spatial resolution [7].

In addition to the usual MRI sequences [T2 and short-TI inversion recovery (STIR)], the use of 3D FIESTA (GE)/CISS (SIEMENS) may be useful for the analysis of root abnormalities thanks to its excellent signal-to-

noise ratio. On the other hand, although MRI is the most sensitive imaging method for detecting trunk and bundle lesions, it does not yet allow the differentiation between edema (potentially reversible lesion) and demyelization (Irreversible in the acute phase). Moreover, it does not allow, contrary to the ENMG, to appreciate and to locate very distal lesions of the plexus [8].

If MRI distinguishes a preganglionic lesion from proximal postganglionic involvement, it ignores distal lesions. The association of ENMG and MRI allows defining the site and the lesional mechanism [8, 9]. Electroneuromyography and MRI are therefore complementary in the determination of the reversibility or not of lesions of the brachial plexus and in the choice of the most appropriate treatment [8, 9].

Pseudomeningoceles can be surgically treated and the radiologist has an important role in guiding the surgeon to the site of injury.

Postganglionic injuries have a favorable prognosis due to persistence of anterior horn cells in the spinal cord. Therefore, if continuity is established with surgery then chance of recovery can be improved [10].

Repair of the dural fistula is performed first, while nerve transplants represent a promising avenue for correcting nerve impulses in the future [11]. Late diagnosis of distal nerve lesions can explain failure of surgery in our patient. Late complications may occur, such as spinal cord herniation into pseudomeningocele. It is an extremely rare complication, poorly documented, that should be considered in the differential diagnosis of patients presenting with delayed myelopathy or Brown–Sequard syndrome [12].

CONCLUSION

If MRI distinguishes a preganglionic lesion from proximal postganglionic involvement, it ignores distal lesions. Electroneuromyography and MRI are therefore complementary in the determination of the reversibility or not of lesions of the brachial plexus and in the choice of the most appropriate treatment.

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Author Contributions

Fatima Zahrae Laamrani – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Mohamed Lahkim – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Ouidad Azdad – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation

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Guarantor of Submission

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Authors declare no conflict of interest.

Data Availability

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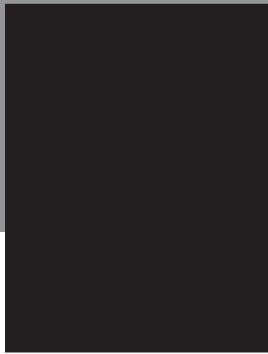
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