

Giant Pseudomeningocele due to a Traumatic Avulsion Of the Brachial Plexus: Case Report and Literature Review

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Received: December 20, 2023 **Accepted:** December 25, 2023 **Published:** January 13, 2024

Citation: *BELGACEM I., HABCHI N., DJOUADI Y., and AIT BACHIR M.
Giant Pseudomeningocele due to a Traumatic Avulsion of the Brachial Plexus: Case Report
and Literature Review. OLCIA Journal. Vol.1 (2).*

Abstract:

It is well known that a traction injury to the brachial plexus can produce tears in the root sheaths, resulting in pseudomeningoceles, which are, in most cases, small and not noticed by the patient. We report an unusual case of a three-year-old girl who had brachial plexus damage during a traffic accident, resulting in giant pseudomeningocele and presenting with left brachial monoplegia without impairment of sensitivity. The cerebro-cervical MRI showed a partial avulsion of the roots of the left brachial plexus with a giant pseudomeningocele. The EMG did one month of the trauma, returning in favor of partial damage to the left C5 and C6 roots without signs of severity. The patient had started her functional rehabilitation, focusing on the motor skills of the left upper limb, with a clear improvement in muscle testing; however, close consultations were recommended to monitor the pseudomeningocele.

Key words: *brachial plexus, pseudomeningocele, avulsion, functional rehabilitation.*

Introduction:

Avulsion of the roots of the brachial plexus constitutes a particular case of peripheral nerve trauma (1). for anatomical and biomechanical reasons; Sunderland and Mansat proposed two mechanisms explaining root avulsions: the first is called "peripheral," in which the avulsion is accompanied by rupture of the dura mater at the level where it normally joins with the arachnoid to prevent the release of the CSF. A post-traumatic diverticulum, or meningocele, is thus formed. The second is called "central," where no meningocele is found. The two mechanisms can be combined. Namely, the anterior roots, which have weaker rupture traction, are more frequently affected than the posterior roots(1,2).

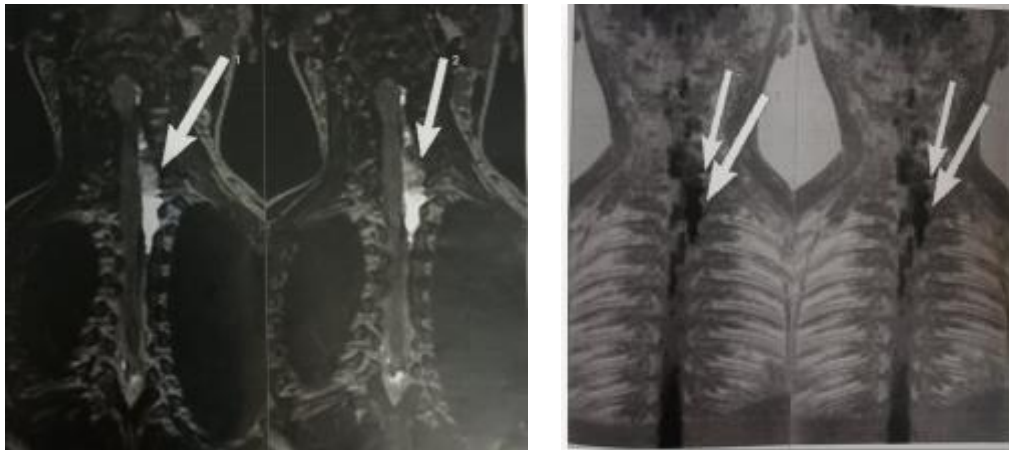
Case report:

It is R.D., a three-year-old girl with no particular pathological history, who was the victim of a traffic accident that caused cranio-cervico-facial trauma in her. Following receipt of the front airbag triggering, she was transferred in less than an hour to the neurosurgical emergency center. The patient was drowsy, scored at 14/15, with plegia of the left upper limb with preservation of sensitivity to all modes, a reduction in bicipital and radial pen reflexes, the radial pulse was present, and there was no sensory-motor deficit in the rest of the body. After conditioning the patient with immobilization of the cervical spine, an imaging assessment was carried out on a cerebro-cervical scan; no abnormality was reported. The little one was referred to the pediatric surgical emergency unit, where an emergency was eliminated. Faced with the radio-clinical discordance and the persistence of the motor deficit, a cervical MRI was requested, returning without anomaly. After a month of functional motor rehabilitation, an MRI was done again (Fig. 1).

Pre-ganglion lesions include a partial anterior avulsion of the roots extending from C4 to T3 in the left brachial plexus (FIG.01.a and b), a large pseudomeningocele (67mm x 12 mm), and a slight atrophy of the muscles of the shoulder girdle.

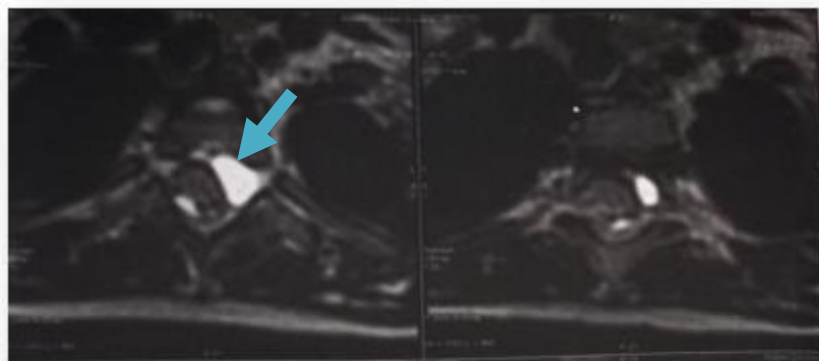
One month after the trauma, an electromyogram was requested to predict the prognosis of the injury, which resulted in partial damage to the left C5 and C6 without signs of severity. The

patient continued her functional rehabilitation, and a clear motor recovery was detected, going from a rating of 2/5 to 3/5; however, the elevation of the arm had not yet recovered.



A

B



C

Figure 1: Spinal MRI

A and B: Total removal of the anterior rootlets next to the pseudomeningocele (ARROWS). (3D stir sequence)

C: Left lateral peri-medullary polylobed cystic formation at the height of the C3-T3 space opposite the emergence of the nerve roots repressing the cord on the right

Discussion:

The first description of pseudomeningocele following brachial plexus trauma was introduced by Murphy et al. in 1947. Since then, its presence has been considered a typical sign of cervical nerve root avulsion, although there are studies showing pseudomeningocele without nerve root avulsion. Fewer than eight cases have been described in the literature (1).

In the majority of cases, pseudomeningoceles are small, presenting in the form of multiple lesions from C3 or C4 to T1 or T2 (C3-T3 in our case) (2), and remain asymptomatic, as is the case of our patient. indicating only a poor prognosis with respect to recovery of brachial plexus function to the corresponding level.

These explain the scarcity of treatment proposals in the literature for these cases (3). However, when the pseudomeningocele are giant, they can produce symptoms of intracranial increase, hence the importance of long-term monitoring recommended for the patient. The mechanism of formation of the pseudomeningocele is well known; the lesion caused by brachial plexus traction could produce tears in the root sleeves with pseudomeningocele formation. The latter enlarges due to a continued increase in CSF pressure, leading to increased CSF flow to extraspinal tissues. When it is symptomatic, treatment of a giant pseudomeningocele may be necessary (4). However, let us remember that the exploration and treatment of traumatic avulsions of the brachial plexus is a relative emergency (5), emphasizing the essential role of the preoperative period (< 6 months) in functional recovery.

Conclusion:

Giant pseudomeningoceles after brachial plexus trauma are considered extremely rare. Post-traumatic avulsions are generally irreversible, and surgical attempts at anastomosis of this avulsed nerve to the cord have not been successful.

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