

Complete brachial plexus paralysis, a rare complication of clavicular fractures: a case report

Dahmane Elhairech ^{1,2,3},MD, Saloua Kanazy ^{1,2},MD, Bouchra Rherissi³, PhD, Nadia El Kadmiri ³,PhD, Mohamed Lmejatti ^{1,2}, MD

¹Neurosurgery Department, Souss Massa University Hospital, Agadir City, Morocco²Division of Neurosurgery, Mbarara Regional Referral Hospital, Mbarara, Uganda.

²Faculty of Medicine and Pharmacy of Agadir, IBN ZOHR University, CF49+F65, Agadir 80000, Morocco.

³Laboratory of Cellular Biology and Molecular Genetics, Faculty of Sciences, IBN ZOHR University, Agadir, Morocco.

⁴ Molecular Engineering, Biotechnology and Innovation Team, Engineering, Geo-Bio-Environment, Innovation Laboratory, Polydisciplinary Faculty of Taroudant, IBN ZOHR University, Taroudant City, Morocco ⁵Duke University Global Health Institute, Durham, NC, USA.

Abstract:

Purpose: Collar bone fractures complicated by complete brachial plexus palsy are rare.

Case Report: We report the observation of a young man aged 30 who presented following a road accident with a left midclavicular fracture with shifted fragments and a small ipsilateral acromioclavicular diastasis.

Conclusion: The course was marked by recovery in the first months with sequelae mono paresis.

KEYWORDS: *Brachial plexus paralysis, clavicular fractures*

Introduction

Partial lesions of the terminal branches of the brachial plexus are recognized as neurological complications that can arise from clavicular fractures. In this case report, we present a rare case that was admitted to our institution involving a mid-clavicular fracture with acromioclavicular diastasis. This injury was further complicated by complete paralysis of the infra- and retro-clavicular segments of the brachial plexus.

Corresponding author:

Dahmane Elhairech, MD

Neurosurgery Department, HASSAN II
University Hospital

Agadir City, Morocco

Email: dahmaneelhairech@gmail.com

Case presentation

Clinical history

A 30-year-old patient with no particular pathological history presented with a closed trauma of the left clavicle A clavicle following a traffic accident, resulting in functional impotence of the left upper limb.

Clinical examination

The clinical examination showed adduction and internal rotation of the limb, with total paralysis of the left upper limb, both motor and sensory, without vascular disorder or Claude-Bernard-Horner syndrome. The examination of the trapezius and serratus major muscles was normal.

Investigations

X-ray of the shoulder showed a left medio-clavicular fracture with offset fragments and a small homolateral ipsilateral

acromioclavicular diastasis. The shoulder was immobilized with a figure-of-eight bandage with persistent limb paralysis after reduction. An MRI of the brachial plexuses performed in the second week showed thickening and contusional hyperintensity hyper signal of the left lower brachial plexuses from their emergences testifying to axonal injuries (Figure 1).

Management and assessment

The shoulder was immobilized with a figure-eight bandage while preserving muscle retraction and joint deformity with physical therapy. The evolution was marked by a recovery from distal to proximal with restoration of finger flexion after six weeks. An Electromyogram (EMG) performed in the tenth week showed recovery of nerve conduction in the median nerve territory. After one year, the patient had residual mono paresis with recovery of flexion and extension of the fingers, wrist, and elbow.

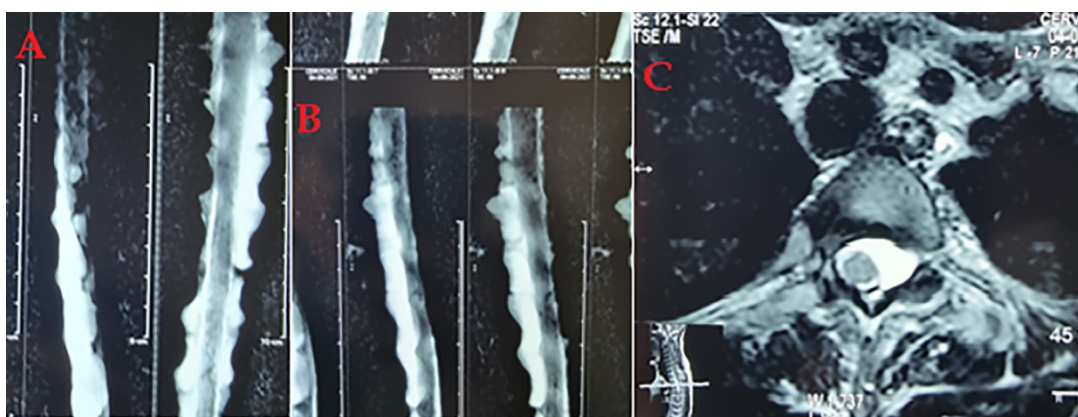


Figure 1. MRI of the brachial plexuses, in 3D STIR (a), sagittal T2 DIXON (b) and axial T2 (c) sequences, showing thickening and contusional hyper signal hyperintensity of the left inferior brachial plexuses with extensive axonal lesions and an epidural thickening corresponding to a meningeal detachment.

Discussion

The brachial plexus originates from the nerve roots of the last four cervical and the first dorsal nerve. Running immediately above the supraclavicular region, the brachial plexus can be affected by any trauma to this region, yet these neurological complications remain rare¹. Its frequency varies between 5 and 14%^{2,3}. The lesions mainly concern the primary trunk because of its location in the supraclavicular region. Traction causing more proximal elongation lesions may explain the lesions of the terminal branches⁴. A post-traumatic vascular lesion responsible for a compressive hematoma may be a lesion mechanism in some cases⁵. It should be noted that all lesion associations are possible, from infraclavicular lesions to end-branch involvement⁶.

For the recommended para-clinical examinations, MRI of the plexus was indicated as a matter of priority, and may show early on a neuroma justifying surgical intervention within the first six months after the trauma. Myelotomodensitometry coupled with cervical myelography had no place in the first line of treatment because of the infra-clavicular location of the injury. EMG should be performed from the eighth week onwards in the absence of any clinical recovery. However, it was of little interest immediately after the trauma³.

The therapeutic aspect was based on rehabilitation to avoid sequential stiffness. Truncal and plexus injuries generally have a good prognosis, unlike proximal injuries which only recover after 18 months to 2 years. The indication for surgery was not relevant as an emergency, except in the case

of associated vascular lesions with a risk of ischemia⁷.

Authors	Year	Number of Cases	Age (Years)	Cause of Injury	Type of Fracture	Paralysis Description	Diagnostic Tools	Treatment	Outcome
Yip et al.	1996	1	35	Shoulder fracture-dislocation	Midclavicular fracture	Complete brachial plexus	X-ray, MRI, Electromyography (EMG)	Immobilization, Rehabilitation	Immobilization, Rehabilitation
Cleeman and Flatow	2000	2	28, 32	Sports injury	Clavicle fracture	Complete brachial plexus	X-ray, MRI	Surgical intervention, Rehab	Partial recovery, residual deficits
Nash et al	1984	1	25	Traumatic shoulder dislocation	Clavicle fracture	Neuropraxia due to hemorrhage	X-ray, MRI	Hematoma evacuation, Rehab	Complete recovery
Gutkowska et al.	2020	3	29, 34, 40	Various (Traffic, Sports)	Clavicle fracture	Brachial plexus injuries	X-ray, MRI, CT, EMG	Rehabilitation, Surgical in some	Varies, some residual deficits
Current Case (Elhairech et al.)	2024	1	30	Traffic accident	Midclavicular fracture with acromioclavicular diastasis	Complete brachial plexus	X-ray, MRI, EMG	Immobilization, Physical Therapy	Complete recovery

Table 1. Summary of previous cases

Conclusion

Collar bone injuries complicated by complete brachial plexus paralysis are rare. Early rehabilitation seems necessary to prevent muscle retraction and joint deformation.

Conflicts of interest

All authors declared that there are no conflicts of interest

Ethical consideration

Informed consent was obtained from patient and his family.

References

1. Yip KM, Hung LK, Maffulli N, et al. Brachial plexus injury in association with fracture-dislocation of the shoulder. *Bull Hosp Jt Dis N Y N* 1996;55:92–4.
2. Cleeman E, Flatow EL. Shoulder dislocations in the young patient. *Orthop Clin North Am* 2000;31:217–29.
3. Palma AFD. *Surgery of the Shoulder*. 3rd edition. Philadelphia: Lippincott Williams & Wilkins; 1983.
4. Perlmutter GS, Apruzzese W. Axillary nerve injuries in contact sports: recommendations for treatment and rehabilitation. *Sports Med Auckl NZ* 1998;26:351–61.
5. Nash E, Soudry M, Abrahamson J, et al. Neuropraxis secondary to hemorrhage in a traumatic dislocation of the shoulder. *J Trauma* 1984;24:546–7.
6. Gutkowska O, Martynkiewicz J, Urban M, et al. Brachial plexus injury after shoulder dislocation: a literature review. *Neurosurg Rev* 2020;43:407–23.
7. Jamal L, Bousbaa H, Cherrad T, et al. Les instabilités antérieures de l'épaule: à propos de 73 cas. *Pan Afr Med J* 2016;24:211.