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(CASE REPORT)

Crutch-induced wrist drop following traumatic patellar ligament tear: A rare case report from Tumbi Regional Referral Hospital, Pwani, Tanzania

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Abstract

Crutch-induced radial nerve palsy is an uncommon but potentially serious condition that can lead to undesirable outcomes if not addressed promptly. This case report highlights the importance of providing thorough education on the proper use of axillary crutches to prevent radial nerve compression. A 44-year-old male with a traumatic patellar ligament tear developed right radial nerve paralysis due to improper crutch use. Immediate discontinuation of crutches and initiation of rehabilitation were crucial for treatment and prevention of long-term disability. This case underscores the need for careful patient education and regular assessment during follow-up visits to mitigate the risk of crutch-induced nerve injuries.

Keywords: Radial nerve palsy; Crutch palsy; Radial neuropathy; Wrist drop; Compressive neuropathy; Nerve conduction study; Axillary crutch injury; Peripheral nerve injury; Rehabilitation; Motor traffic accident

1. Introduction

The radial nerve (RN) arises from the posterior cord of the brachial plexus (C5–Th1). It initially descends from the axilla posterior to the brachial artery and heads between the long and medial heads of the triceps brachii. Next, it takes course in the radial groove towards the lateral side of the arm, simultaneously passing from the posterior to the anterior compartment (1). In the primary care setting, radial neuropathy is the third most common compressive neuropathy syndrome of the peripheral nerves (2).

Crutch palsy is a rare compressive neuropathy but it may occur in some people who use crutches improperly, causing prolonged and excessive compression on the axial region (10).

A patient with radial neuropathy may present holding their affected extremity with the ipsilateral (normal) hand. He or she may complain of decreased or absent sensation on the dorso-radial side of their hand and wrist with an inability to extend their wrist, thumb, and fingers. With the hand supinated, and the extensors aided by gravity, hand function may appear normal. However, when the hand is pronated, the wrist and hand will drop. This is also referred to as "wrist drop (3)."

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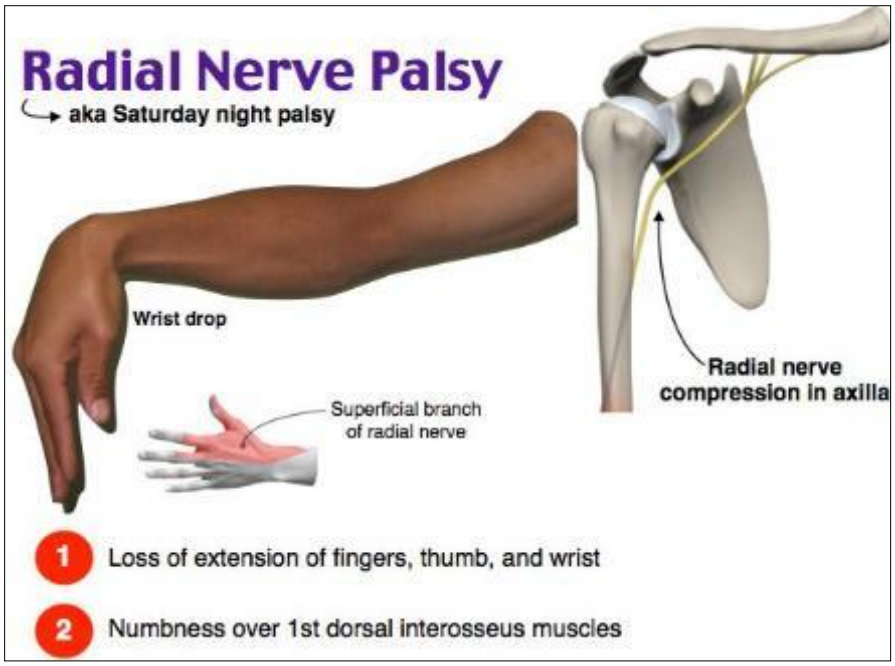
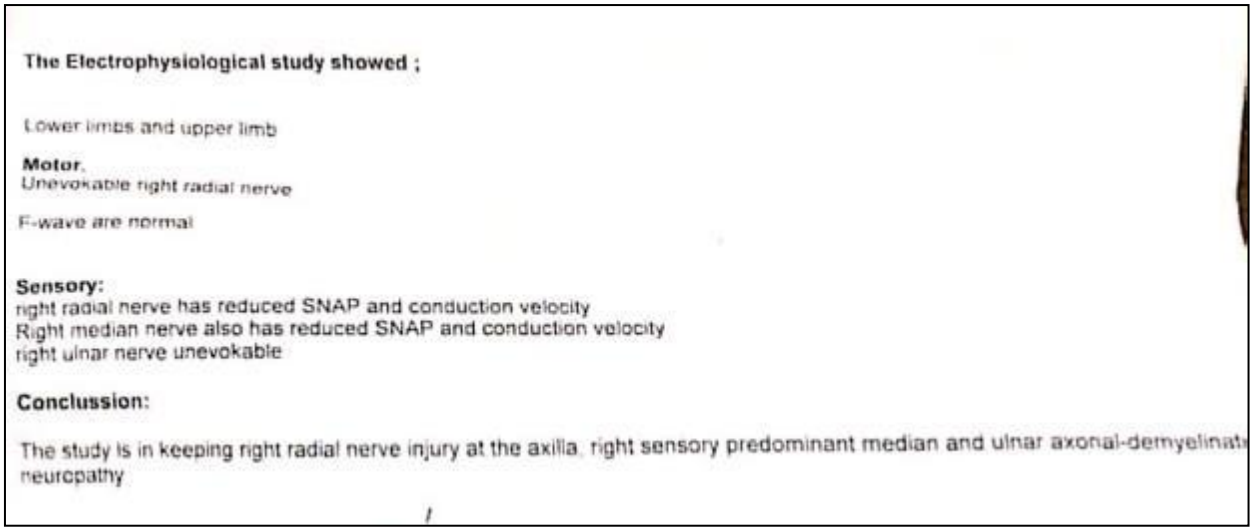


Figure 1 Topographic presentation of symptoms of radial nerve palsy

If damaged at the axilla, there will be a loss of extension of the forearm, hand, and fingers. Thus, this usually presents with a wrist drop on physical examination. There will be a sensory loss in the lateral arm. There will also be a sensory loss in the posterior aspect of the forearm, radiating to the radial aspect of the dorsal hand and digits. This is seen commonly with "Saturday night palsy" and improperly using crutches (crutch palsy) (3).

2. Case

A 44-year-old male, involved in motor traffic accident and sustained injury to the left leg that was diagnosed as a left patella ligament tear following an orthopedic consult. He was managed accordingly and provided with axillary crutches bilaterally. Five weeks later, the patient presented with a week history of numbness that was marked on the right thumb, followed by difficulties in holding objects with his right hand. Furthermore, he reported to raise his right upper limb above the head with no difficulties and comparably to the left upper limb. However, denied loss of speech, mouth deviation or weakness on the lower limbs. On further inquiry, the patient admitted to have been leaning more on his right side of the crutch due to significant pain upon stepping on the left leg. Upon motor examination of the upper right limb; hypotonia was noted at the wrist joint, power of extensors of forearm 4/5 whereas at wrist fingers extensors 1/5. A loss of fine and crude touch was remarkable at the C6 and C7 dermatomes on the forearm of the right upper limb. Cranial nerves and other systemic examinations were unremarkable. A diagnosis of right radial nerve paralysis was made clinically and a nerve conduction test was ordered. The study results are a presented at figure 2 below. The patient was started on physiotherapy and a follow up clinic of four weeks was set.


The Electrophysiological study showed ;

Lower limbs and upper limb

Motor.
Unevokable right radial nerve

F-wave are normal

Sensory:
right radial nerve has reduced SNAP and conduction velocity
Right median nerve also has reduced SNAP and conduction velocity
right ulnar nerve unevokable

Conclussion:

The study is in keeping right radial nerve injury at the axilla, right sensory predominant median and ulnar axonal-demyelinat
neuropathy

Figure 2 Nerve conduction test of the patient in discussion

3. Discussion

Radial compression neuropathy may be caused by extrinsic or intrinsic compression, and can occur at various locations along the course of the radial nerve. Crutch palsy is a particularly rare form of radial compressive neuropathy, and occurs when improper use of crutches causes prolonged and excessive compression of the radial nerve at the axilla (4). Diagnosis of crutch palsy can usually be done clinically by obtaining a detailed history and neurological examination. Improper use of crutches can result in a seven-fold increase in the force on the axilla (5). It is of paramount importance to ascertain the patient has adequately been trained on the use of axillary crutches as well as ensuring the crutch tops have been well cushioned.

A proximal compression of radial nerve mostly results in weakness of wrist extensors, finger extensors and sensory symptoms along the radial nerve distribution (6). Similarly, our patient noted numbness along the radial nerve distribution with loss of power that was remarkable at the wrist joint. The mechanism behind the nerve injury involves compression of the nerve due to application of differential pressure along the nerve trunk causing invagination of the nodes of ranvier, rather than nerve ischemia as suggested in early studies (7). The patient admitted to have been leaning heavily on his right axilla to alleviate pain in his injured left leg, leading to improper crutch use and resulting in compression of the right radial nerve.

Recovery following radial nerve compression varies from case to case with literature documenting a range of nine weeks to nine months (8). In other studies, it has been reported that the longer the compression the poor the neurological outcomes. Supportive care through physiotherapy has been the mode of treatment. However, some cases with prolonged compression may require surgery if not responding to anti-inflammatory drugs and rehabilitation to relieve from permanent damage (9). In the same way, the presented case above was linked with rehabilitation department for physiotherapy.

Mirroring the presented case, a prescription of axilla crutches to a patient should go hand in hand with a thorough education on its use. Nevertheless, the patient should be educated to support himself using his/her arms and forearms rather than allowing the axilla to touch the crutch top. It is recommended at an upright position; the crutches top to leave at least one to two inches from the armpit. A good history and physical examination are useful in making a diagnosis. In addition, nerve conduction test may add value to the diagnosis formulation. Discontinuation and rehabilitation are essential for recovery. Crutch palsy has a fairly good prognosis with complete recovery within several weeks when adequate measures are taken timely.

4. Conclusion

Crutch palsy is an uncommon yet preventable cause of radial nerve compression that can significantly affect upper limb function. This case highlights the importance of proper crutch use, particularly in patients with lower limb injuries who may inadvertently place excessive pressure on the axilla. A thorough clinical assessment, supported by nerve

conduction studies, is essential for timely diagnosis. Early intervention with physiotherapy and education on correct crutch technique can lead to full recovery in most cases. Therefore, clinicians should emphasize proper crutch fitting and usage as part of the initial management plan to prevent avoidable complications like radial nerve palsy.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflicts of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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