Bilateral Radial Nerve Crutch Palsy-A Rare Case Report

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ABSTRACT

We present a rare case report of bilateral radial nerve palsy in a man with tibia fracture who used axillary crutches for mobility. Upon diagnosis axillary crutches were discontinued, fracture stabilized with nail and wrist supports given immediately, followed by physical and occupational therapy. About 12 weeks after his first presentation, radial nerve function was fully recovered bilaterally. Radial nerve function loss due to improper use of crutches requires prompt diagnosis and treatment to have early and full recovery. Demonstration of proper use of crutches and proper fitting can prevent its complications. Patients should be well informed in unequivocal terms not to put weight on axillary bars directly. We report a case of an uncommon entity of both sides wrist drops in a patient of tibia fracture who was using axillary crutches for mobility for longer period.

Key words: Axillary crutches, bilateral radial nerve palsy, compressive neuropathy.

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INTRODUCTION

Axillary crutches are used temporarily or permanently to assist ambulation of patients in Orthopedics for relieving weight-bearing on operated or injured legs. The “great extensor nerve” or radial nerve innervates all extensors of wrist and elbow is vulnerable to injury in proximal arm. Rarely mobilization with axillary crutches present with complications, but when they do, diagnosis could be late requiring a very high index of suspicion. PubMed search showed three reported cases of bilateral radial nerve`s crutch-palsy over the past 60 years. Radial nerve paralysis due to crutches is the third common neuropathy.[1] The probable causes of this pathology is either ill fitting crutches or improper use or prolonged use of axillary crutches.

CASE REPORT

A male patient of 38 years age presented at our outpatient clinic with complaints of inability to bear weight on his left leg and difficulty of holding on to his crutches because of weakness of handgrip bilaterally. He had road traffic accident and close tibia fibula fracture. He has had platting tibia nine days after injury somewhere else and discharged home three days after surgery.

He developed pain at operative site eight days after operation and reported back. He was noticed to have developed wound infection. Plate was removed and external fixator was applied. Five weeks after second surgery external fixator was removed and patient was discharged. The patient had been using axillary crutches for three months after second surgery and he observed gradual difficulty in extending his fingers and his wrist due to muscle weakness (Fig.I). He was unable to hold to his crutches. On observation while walking with crutches patient was noticed to be totally weight bearing on the bars of long axillary crutches.

Fig. I: Drop wrist deformity of both hands.

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During physical examination, on attempted active grasping against gravity with the forearms in supination both wrists went into flexion giving an objective evidence of bilateral radial nerve palsy (Fig. II). Power of elbow extension was 3/5 bilaterally and power of extension of wrist was 1 / 5 on the left and 3/5 on the right. The patient also had significant bilateral impairment of light touch and pinprick on dorsum of the first web. Electromyography(EMG) and nerve conduction studies(NCS) could not be done because of non-availability in our city.

Fig. II: Patient is making an unsuccessful attempt to grasp against gravity. Both wrists go into flexion instead of extension giving an objective evidence of bilateral radial nerve palsy.

Based on the neurologic examination a diagnosis of bilateral paralysis of radial nerve with more weakness on the left side in comparison to the right side secondary to compression from axillary crutches was made. Patient was admitted, and axillary crutches were immediately discontinued. For tibial fracture he was operated with intramedullary nail and bone grafting followed by patellar tendon bearing brace (PTB).

He was mobilized on a single elbow crutch on right side. Patient was put on neurotonics. In hospital physiotherapy was started and continued after discharge with follow up on monthly basis. At one month follow up visit he showed significant improvement (triceps and wrist extensors power 4/5 bilaterally). Improvement in sensation was also noted. By third month complete recovery of wrist and elbow extension was noted on both sides.The patient gave permission for publication of his data and photographs.

DISCUSSION

Paralysis of radial nerve due to usage of crutches is a rare.[2] Axillary crutches when not used properly causes a seven fold increase pressure on axilla and radial nerve.[3] Axillary crutches are widely used in orthopedics. These are simple rehabilitative tools to relieve weight bearing on injured or operated limb and to assist in ambulation of patients. Misuse of these devices can result in rare crutch induced repetitive trauma due to direct and inappropriate placement of body weight on the axillary pads leading to catastrophic neurovascular complications. These complications include aneurysm of axillary artery leading to life threatening embolism, and long thoracic and radial nerve palsies.[4,5] Electrophysiological findings and mechanism of injury from crutch palsy have a resemblance to that acute squeezing neuropathies caused by pneumatic tourniquet.[6] It is proposed that invagination of Nodes of Ranvier due to compression of the nerve is the cause of neuropathy rather than ischemia.[7] Electrophysiological study is not mandatory for diagnosis soon after injury. EMG & NCS may become useful after three months in estimating role of conservative or surgery.[8]

Variable recovery time for this neuropathy has been reported in the literature. The longer the period of compression the longer the time needed for full recovery or bad prognosis.[9]

Discontinuation of axillary crutches, initiation of physical and or occupational therapy intervention facilitated recovery and prevented stiffness and contractures. Neither any patient having crutch palsy in the reported cases nor in our patient required surgery. Early and full recovery is possible if diagnosis is made early and treatment is given immediately.

Injuries induced by axillary crutches are preventable if patients are informed and educated about the risk of putting weight inappropriately on the bars of the devices. The person who advice the crutch should demonstrate proper use of crutches. Clear instructions should be given in climbing and descending stairs and the technique how to sit and stand.[10]

CONCLUSION

Radial nerve palsy can occur due to ill fitting and incorrect use of crutches. Prompt diagnosis and treatment leads to full recovery. Patients requiring

crutches for mobility should have demonstration and expert supervision of proper use of crutches.

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REFERENCES

1. Latinovic R, Gulliford MC, Hughes RA. Incidence of common compressive neuropathies in primary care. J Neurol Neurosurg Psychiatry 2006; 77: 263-265.
2. Poddar SB, Gitelis S, Heydemann PT, Piasecki P .Bilateral Predominant Radial Nerve Crutch Palsy. A Case Report. Clin Orthop Relat Res1993; 297: 245-246.
3. Rudin LN, Levine L. Bilateral Compression of the Radial Nerve (Crutch Paralysis). Phys Ther Rev 1951;31: 229-231.
4. Danese CA, Voleti DC, Baron MG, Waye JD, Jacobson JH Jr. Recurrent embolism from an occult crush aneurysm of the axillary artery. Surg 1969; 66: 860-2.
5. Murphy MT, Journeaux SF. Case reports: long thoracic nerve palsy after using a single axillary crutch. Clin Orthop Relat Res 2006; 447: 267-9.
6. Subramony SH. Electrophysiological findings in crutch palsy. Electromyogr clin Neurophysiol 1989; 29: 281-285.
7. Ochoa J, Fowler TF, Gilliatt RW. Anatomical changes in peripheral nerves compressed by a pneumatic tourniquet. J Anat 1972; 113: 433-455.
8. Jebsen RH. Use and abuse of ambulation aids. JAMA 1967; 199: 5-10.
9. Goh JC, Toh SL, Bose K. Biomechanical study on axillary crutches during single-leg swing-through gait. Prosthet Orthot Int 1986; 10: 8995.
10. Levin P. Ambulatory assistance devices in orthopaedic: uses and modifications. J Am Acad Orthop Surg 2010; 18:315-6.

Authorship and contribution Declaration

Muhammad Amin Cheema, Conception and design of the study, final approval of the version for publication
Usman Saeed Bajwa, Drafted the manuscript
Haider Amin Cheema, Revised the manuscript critically for important intellectual content