Case Report

Back Pack Palsy as an Unusual Cause of Shoulder Pain and Weakness–A Case Report

Mansoor S.N[1], Rathore F. A[2], Fahim Muhammad[3]

Abstract

Heavy back packs carried for prolonged durations can cause different musculoskeletal and neurological problems especially in the untrained and physically vulnerable individuals. They can cause postural disorders, gait abnormalities, muscular strains, pains and injuries to the brachial plexus and nerves resulting in significant morbidity and at times permanent disability. We report a case of brachial plexus injury in a young soldier wearing back pack for prolonged period. He developed weakness and pain in right shoulder which was not relieved with rest and analgesics. On examination he had weakness in deltoid, biceps and scapular muscles along with numbness in axillary nerve area. Brachial plexus injury (upper trunk) was suspected and confirmed by electrodiagnostic evaluation. His baseline investigations were normal. He was advised rest and avoidance to lift heavy weight. He was managed with electrical muscle stimulation for weak muscles, strengthening exercises and analgesics. He responded well to the treatment and had minimal residual weakness at the end of the six weeks' treatment

Back pack palsy should be suspected in people carrying back packs and presenting with pain, weakness and numbness in the upper limbs. It can be prevented by education in the use of back packs, its weight limits, physical fitness and frequent breaks with changing positions.

Key words : **Back pack, brachial plexus.**

Introduction:

Back pack is commonly worn by soldiers, skiers, adventurers, scouts and even children. Over weight back packs worn for prolonged times and poor quality along with compromised physical health can cause significant disability at times[1]. Weakness, pain and numbness are the most frequent symptoms and it is commonly labelled backpack palsy. The exact incidence of back pack palsy is not known but has been reported to be around 53.7 per 100,000 in a study carried out among recruits in Finland[2].

We report a case of back pack palsy in a young soldier after a night long operation in a mountainous terrain.

Author's affiliations:

[1] *MBBS, FCPS*,Consultant/Asst Prof PMR, Department of Rehabilitation Medicine, CMH Kohat, KPK, Pakistan

[2] *MBBS,FCPS*,Consultant/ Asst Prof, Spinal Unit, Armed Forces Institute of Rehabilitation Medicine,,Rawalpindi, Pakistan

[3] *MBBS*, Senior Registrar, Spinal Unit, Armed Forces Institute of Rehabilitation Medicine, Rawalpindi, Pakistan

Cite as:

Mansoor S.N, Rathore F. A, Fahim Muhammad. Back Pack Palsy as an unusual cause of Shoulder pain and Weakness: A case report. IJPMR September 2012; Vol **23 (3):** 120-2.

Correspondence:

Dr Sahibzada Nasir Mansoor, Department of rehabilitation medicine, CMH Kohat, KPK, Pakistan,Tel: 00923329448818,
Email: drnasirmansoor@gmail.com

Received on 12/03/2012, Revised 13/07/2012, Accepted on 11/09/2012.

Case Report:

Twenty-eight years old previously healthy old soldier presented with weakness and pain in the right shoulder region. He had participated in an operation the night before during which, he had to carry his 30 kg back pack along with heavy weapon on his shoulder for ten hours. He was managed symptomatically but didn't improve. Over the next two weeks the weakness worsened and he was unable to participate in the daily military routine. He was referred to our department with a provisional diagnosis of adhesive capsulitis. He had no previous history of trauma or infection. He had stable vital signs. There was slight wasting of deltoid, supraspinatous and Infraspinatous on the right side. He was unable to abduct his shoulder (Fig 1), and there was numbness in axillary nerve distribution. On motor examination he had weakness in biceps 4/5, supraspinatous, infraspinatous, subscapularis and teres minor 3/5 each. The biceps and brachioradialis reflexes were depressed on the right. A provisional diagnosis of

brachial plexus injury secondary to lifting heavy weight on shoulders was made. Baseline investigations including blood complete picture, erythrocyte sedimentation rate, C reactive protien, alanine transaminase, urine routine examination, renal and liver function tests were normal. X-ray right shoulder and cervical spine revealed no abnormality (Fig 2). Electro-diagnostic evaluation was done. The right axillary nerve was not recordable; there were reduced compound motor action potential (CMAP) of musculocutaneous nerve, (1.4mV on the right side as compared to 7.5 mV on the left side). Electromyography (EMG) revealed neuropathic pattern in right deltoid, biceps and extensor digitorum communis with large polyphasic motor unit action potentials and a discrete (reduced) recruitment and interference pattern, there were no fibrillation potentials or positive sharp waves. This was suggestive of upper trunk involvement the right brachial plexus. He was managed with electrical muscle stimulation for deltoid muscle having a muscle power of 0/5 and strengthening exercises for scapular muscles and biceps. He was advised not to lift heavy weights. NSAIDs were prescribed for pain relief, carbamazapine for the neuropathic pains along with vit B12. The pain and numbness gradually improved, and over a period of 6 weeks he made significant recovery in his muscle strength (Fig 3).

Fig 1- *Weakness in Abduction at Presentation*

Fig 2- *Radiograph of the Right Shoulder Joint Did Not Reveal Any Abnormality*

Fig 3- *Recovery after Six Weeks*

Discussion:

Back pack, is a bag carried on the back, and the weight is transmitted to the shoulders through the straps around the axilla. It also transmits some of the weight to the back and hips and hence is ideal to carry weights for long distances comfortably. Incorrect strapping, over weight backpacks, poor fitness and posture, congenital anomalies, uneven hilly terrain and prolonged wearing time put the individual at greater risk of injury[3].

It has been reported all around the globe especially in young recruits and soldiers who have to carry heavy back packs in hilly terrains for long time. The permissible weight to prevent backpack palsy varies from individual to individual depending on age, weight, physical build and fitness level. It is roughly between 25% to 35% of body weight. In our case, cause of palsy was heavy weight, 30kg, around 40% of his body weight and prolonged duration (10 hours) of carrying heavy backpack in a mountainous terrain.

Back pack palsy denotes a variety of neurological disorders originating due to wearing heavy back packs

for prolonged period of time. It usually present as weakness in elbow flexors, extensors and scapular muscles after carrying heavy weights. Numbness if present is more marked in the axillary region followed by lateral arm and forearm. Significant atrophy can develop over a period of time in severe cases. It can result in injury to the individual named nerves like suprascapular nerve, axillary nerve, median nerve, long thoracic nerve or musculocutaneous nerve[4]. It can also involve the posterior cord and upper trunk of brachial plexus, rarely lateral cord or complete plexus can be damaged. The damage is usually unilateral but occasionally bilateral. The severity of the injury varies from pain, weakness and numbness in the involved region to complete paralysis. The causative factors include the weight of the back pack, duration of wearing, quality of the back pack, type of terrain, physical fitness of the individual and congenital anomalies of the neuromuscular systems in susceptible individuals. Back pack palsy can be diagnosed using electrodiagnostic evaluations apart from clinical examination. Nerve conduction studies and electromyography can confirm diagnosis as well as the exact site and severity of the injury that will help in prediction of prognosis. In our study, CRP, ALT, RFTs and LFTs were done as baseline routine investigations and to rule out other associated causes of weakness. CRP was done to rule out polymyalgia rheumatica or other acute inflammatory causes. Electrodiagnostic studies were done in our case to confirm our clinical diagnosis.

The prognosis is good with almost complete recovery in 80% of the patients[3], two-thirds within two to five months of injury, however recovery keeps coming up to two years in certain individuals. A small number have incomplete recovery and residual significant disability. The standard treatment protocol depends upon the severity of injury, usually conservative management including physical modalities, therapeutic exercises, weight lifting restrictions and symptomatic medications lead to complete recovery.

In a follow-up study carried out over a mean period of 4.5 years after the injury. Nylund *et al*[5] found that there was complete recovery in 79% of the cases in a mean time of 3.2 months, more severe injury was observed in cases whom lifted heavy weights (>30 kg average).

Back packs without waist support increases the risk of nerve compression while pack frames have been reported to decrease the occurrence of compression neuropathy. Bessen *et al*[6] reported a reduction in occurrence in compression neuropathy among basic trainees using pack frames compared to those whom did not use it.

Similar case of backpack palsy was also reported from India[7] with involvement of complete brachial plexus and subsequent complete recovery in 10 weeks in a military recruit.

Conclusion:

Despite good prognosis for recovery, brachial plexus injuries due to backpacks should be kept in mind while training and treating people involved in carrying heavy back packs to prevent a disabling injury. It should include standardisation of back pack weights, duration of wearing, hilly terrain adjustments and physical fitness and most importantly end user education.

References:

1. Knapik JJ, Reynolds KL, Harman E. Soldier load carriage: historical, physiological, biomechanical and medical aspects. *Mil Med* 2004; **169:** 45-56.
2. Makela JP, Ramstad R, Mattila V, Philajamaki H. Brachial plexus lesions after backpack carriage in young adults. *Clin Orthop Relat Res* 2006; **452:** 205-9.
3. De Luigi, Arhtur J, Pasquina P,Dahl E. Rucksack induced plexopathy mimicking a lateral antebrachial cutaneous neuropathy. *Am J Phy Med Rehabil* 2008; **87:** 773-5.
4. Seçer M, Altýntoprak F, Dalgýç. A Brachial Plexus Injury Related To Carrying A Rucksack: *Two Cases Report J.Neurol. Sci.* 2009, **26:** 505-8.
5. Nylund T, Mattila VM, Salmi T, Pihlajamäki HK, Mäkelä JP. Recovery of brachial plexus lesions resulting from heavy backpack use: A follow-up case series. *BMC Musculoskeletal Disorders* 2011, **12:** 62
6. Bessen R, Belcher V, Franklin R. Rucksack paralysis with and without rucksack frames. *Mil Med.* 1987; **152:** 372-5.
7. Maurya S, Singh M , Bhandari PS, Bhatti TS. Backpack brachial plexus palsy. Case report. *Indian Journal of Neurotrauma (IJNT).* 2009; **6:** 153-4.