Case Report

Electrodiagnosis of Medial Pectoral Nerve Mononeuropathy

Sunny Gupta[1], Mitesh Patel[2], Anupam Sinha[3], Charles Wow Karech[4]

Abstract

With an increased awareness to maintain physical fitness, weight training has become increasingly popular. Neurologic injuries are one of many injuries which can occur accidentally or with improper technique. We present a case of an isolated right medial pectoral nerve mononeuropathy in a 48-year-old male weightlifter.

Key words: **Electrodiagnosis, medial pectoral nerve, mononeuropathy.**

Introduction:

Neurologic injury can result from weight training and other related strength training activities. We have started to see neurologic injuries present in individuals who decide to engage in weight training and other related practices. Most of these cases are predominantly peripheral nervous system injuries caused by improper athletic technique or accidental injury resulting in overstretching or crushing of the nerve. This can result in muscle atrophy and weakness as well as paraesthesia and pain. In many cases, spontaneous reinnervation can result in a good prognosis when the injury is accurately diagnosed and managed.

Case Report:

A 48-year-old right hand dominant male patient presented for evaluation of right chest area loss of muscle mass for six months. He reported a history of shoveling snow and weight lifting. He denied any specific trauma or injury, however he noticed an insidious onset of weakness in his right pectoral area. This was especially evident when doing push-ups or chest exercises. He also noticed right pectoralis muscle atrophy. He was seen in an urgent care facility and diagnosed with a muscle strain. He then consulted an orthopaedic sports medicine physician who recommended physical therapy. He engaged in this for several weeks but did not experience any improvement. An MRI of his right shoulder was normal. He denied any numbness, tingling, or weakness in his upper limbs. He also denied any prior history of injuries or surgeries to his chest or right upper limb.

His past medical history was significant for alcohol abuse. He was not taking any medications. Initial review of systems was positive for muscle aches in the right chest.

On physical examination, there was obvious atrophy of the right pectoralis. There was no ecchymosis, bruising, oedema, or focal tenderness. There were no palpable defects or signs of tendon rupture. Gross strength testing of his chest muscles was normal. Examination of the right shoulder was also normal.

An MRI of his chest was ordered and revealed slight thinning of the right pectoralis major muscle as compared to the left (Fig 1). The right pectoralis major muscle had a thickness of 2.9 cm compared to 3.3 cm on the left side. There was no evidence of fatty atrophy of the right pectoralis major muscle. The right and left pectoralis minor muscles were symmetric. There was no axillary or mediastinal lymphadenopathy. No muscle oedema or muscle strain was evident.

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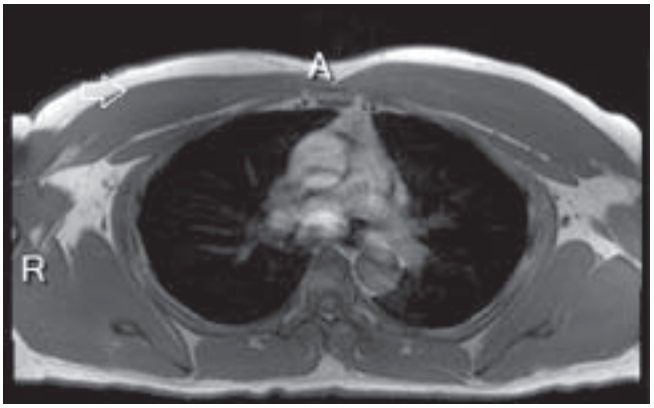

Fig 1 - MRI of the Chest Wall Revealing Thinning of the Right Pectoralis Muscle (White Arrow)

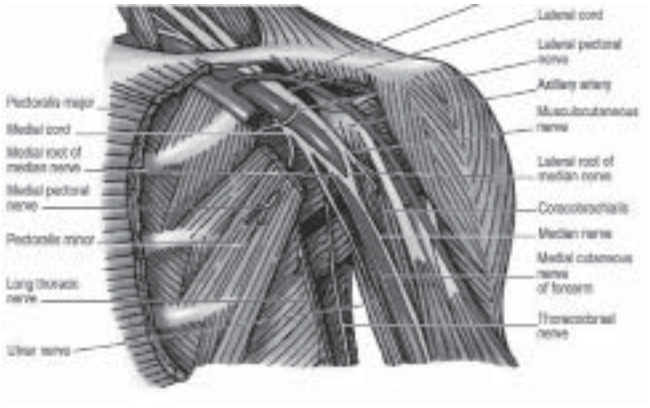

Fig 2 - Anatomy and Innervations of the Medial Pectoral Nerve

Upon review of these findings, he was referred for electrodiagnostic testing and advised to resume physical therapy.

The patient was seen for an electrodiagnostic evaluation approximately 7 months after symptom onset. At that time, he reported gradual improvement in his right pectoral weakness. No significant weakness was noted on manual muscle testing, and no significant atrophy was noted on inspection. Sensation and reflexes in the upper limbs were normal.

Motor nerve conduction studies of the right median and ulnar nerves revealed normal distal motor latencies, compound muscle action potential (CMAP) amplitudes and conduction velocities. Sensory nerve conduction studies of the right median, ulnar, radial, medial antebrachial cutaneous and lateral antebrachial cutaneous nerves revealed normal peak latencies and peak-to-peak sensory nerve action potential (SNAP) amplitudes.

Needle electromyography (EMG) of the sternal head of the pectoralis major revealed nascent polyphasic motor units. No abnormal insertional or spontaneous activity was noted, and the patient was able to generate a full interference pattern. EMG of the clavicular head of the pectoralis major, along with the deltoid, biceps brachii, triceps brachii, flexor carpi radialis and first dorsal interosseous revealed normal findings.

The electrodiagnostic impression was that of a right medial pectoral mononeuropathy with evidence of reinnervation. As there was no abnormal spontaneous activity in the pectoralis major and as the patient reported improvement in his weakness, he was advised to return to gentle strengthening exercises.

Discussion:

The patient presented to us with a six-month history of right pectoral weakness, which had not improved after a course of physical therapy. He had no physical examination or imaging findings to suggest muculotendinous rupture as a cause of his weakness. His electrodiagnostic evaluation revealed involvement limited to the medial pectoral nerve. His otherwise normal nerv e conduction studies and EMG ruled out a more proximal process such as cervical radiculopathy or brachial plexopathy, or a more generalised process such as myopathy.

The medial pectoral nerve arises from the medial cord of the brachial plexus and, after travelling through the axilla, innervates and traverses the pectoralis minor muscle. The nerve then continues distally to innervate the sternal portion of the pectoralis major muscle (Fig2). Mononeuropathy of the medial pectoral nerve is rare; our own search of the literature yielded only two other reported cases[1, 2]. Proposed mechanisms include stretch injury related to strenuous chest exercises[1] and compressive injury where the nerve passes through the pectoralis minor[2]. The latter mechanism would also explain the lack of involvement of the lateral pectoral nerve, which does not have an intramuscular course.

While the pectoralis minor normally inserts at the coracoid process, anomalous insertions have been reported. Homsi *et al*[3]. reported an anomalous pectoralis minor insertion in 9.57% of subjects examined under ultrasound. Anatomic studies have documented pectoralis minor insertions at sites including the coracoacromial ligament, superior glenoid margin, supraspinatus tendon, glenohumeral joint capsule, and humeral tuberosities[3-5]. Anomalous insertion of the

pectoralis minor may lead to increased recruitment and hypertrophy of the muscle as a result of vigorous chest strength training and, thereby, predispose to entrapment of the medial pectoral nerve as it traverses the muscle[2].

Several cases of mononeuropathies in weightlifters and bodybuilders have been reported in the medical literature, including more commonly observed cases such as carpal tunnel syndrome[6] and suprascapular neuropathy, as well as unusual presentations such as thoracodorsal, dorsal scapular[1], and proximal radial mononeorupathies[7]. Use of anabolic steroids and growth hormone may also predispose to the development of such problems and the evaluating clinician should inquire regarding the use of any such agents. While unusual, the diagnosis of compressive mononeuropathy should be considered when evaluating avid weightlifters and bodybuilders who present with any loss of strength or decline in athletic performance, particularly as, without proper medical advice, this patient population is likely to continue with the offending activity and possibly exacerbate the condition further if recognition of the problem is delayed.

Conclusions:

While mononeuropathies in weightlifters have been reported, isolated lesions involving the medial pectoral nerve are rare. This diagnosis should be considered in weightlifters presenting with loss of strength isolated to unilateral pectoral muscles.

References:

1. Mondelli M, Cioni R, Federico A. Rare mononeuropathies of the upper limb in bodybuilders. *Muscle Nerve* 1998; **21:** 809-12.
2. Rossi F, Triggs WJ, Gonzalez R, Shafer SJ. Bilateral medial pectoral neuropathy in a weight lifter. *Muscle Nerve* 1999; **22:** 1597-9.
3. Homsi C, *et al*. Anomalous insertion of the pectoralis minor muscle: ultrasound findings. *J Radiol* 2003; **84:**1007-11.
4. Tubbs RS, Oakes WJ, Salter EG. Unusual attachment of the pectoralis minor muscle. *Clin Anat* 2005; **18:** 302-4.
5. Musso F, Azeredo RA, Tose D, Marchiori JGT. Pectoralis minor muscle. an unusual insertion. *Braz J Morphol Sci* 2004; **21:** 139-40.
6. Dickerman RD, Douglas JA, East JW. Bilateral median neuropathy and growth hormone use: a case report. *Arch of Phys Med Rehabil*; **81:** 1594-5.
7. Ng A ,*et al*. Radial nerve palsy in an elite bodybuilder. *Br J Sports Med* 2003; **37:** 185-6.