

INTERCOSTAL NERVE MONONEUROPATHY

Study of 14 cases

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ABSTRACT - This retrospective study describes 14 cases of intercostal nerve mononeuropathy (INM) found in 5,560 electromyography (EMG) exams performed between January 1991 and June 2004 in our University Hospital. Medical charts of all patients with history of thoracic pain and EMG diagnosis of intercostal mononeuropathy were reviewed. INM was detected in 14 patients; etiology was thoracic surgery in 6 (43%), post-herpetic neuropathy in 4 (28%), probable intercostal neuritis in 2 (14%), lung neoplasia in 1 (7%), and radiculopathy in 1 (7%). From this study, trauma and infection were the main etiologies in intercostal neuropathic pain development. Tricyclic antidepressants and anticonvulsants were the most common therapeutic drugs used.

KEY WORDS: intercostal mononeuropathy, EMG, etiology.

Mononeuropatia de nervo intercostal: estudo de 14 casos

RESUMO - Este trabalho apresenta estudo retrospectivo de 14 pacientes com mononeuropatia de nervo intercostal (MNI), obtidos dentre 5.560 exames eletromiográficos, realizados de janeiro de 1991 até junho de 2004, em nosso Hospital Universitário. MNI foi encontrada em 14 pacientes, tendo como causas prováveis intervenções cirúrgicas torácicas em 6 (43%), neuropatia por herpes-zoster em 4 (28%), provável neurite de nervo intercostal em 2 (14%), neoplasia pulmonar em 1 (7%) e radiculopatia em 1 (7%). As principais causas de MNI de nosso Serviço são similares às da literatura. Os antidepressivos tricíclicos e anticonvulsivantes foram os fármacos mais utilizados no controle da dor.

PALAVRAS-CHAVE: mononeuropatia intercostal, EMG, etiologia.

The first descriptions of intercostal nerve mononeuropathy (INM) were reported by USA army surgeons treating patients with chronic pain after thoracotomy as a result of thoracic trauma during the Second World War¹. There is an estimated 11 to 80% incidence of chronic pain after thoracotomy², but chronic pain tends to reduce over time³. High doses of analgesics consumed during the first week after surgery may be a risk factor for pain after thoracotomy³. However, low-dose treatment of post-surgical pain induces the liberation of stress related chemical mediators, which may cause pulmonary, cardiovascular, metabolic and neuroendocrine disturbances⁴. Despite these clinical problems, intercostal nerves have been transferred to the bra-

chial plexus to treat traumatic brachial plexopathy with minimal effects on pulmonary function⁵.

The first clinical descriptions related to Varicella zoster were in the XIX century⁶. Infection by Varicella zoster is also a common cause of INM⁷, usually presented as unilateral vesicular eruption in a belt-like distribution mainly on the thoracic sensory dermatomes, most cases preceded by pain and paresthesias. The prognosis is usually good, most cases presents complete recovery or significant improvement⁷. Atypical clinical presentations are described in immunosuppressed patients⁷.

The objective of our study is to describe INM found in our Service, diagnosed by electromyography (EMG).

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METHOD

A retrospective study was made of all patients diagnosed with INM by EMG between January 1991 and June 2004. Patients with insufficient clinical history and physical examination data were excluded.

EMG examinations were performed a) in the paravertebral muscles corresponding to the dermatome or myotome where clinical alterations had been reported or found by examination. Concentric needle electrodes were inserted 1cm lateral to the corresponding vertebra's posterior spinous process; or b) in the intercostal muscles, distal to the surgical scar or other visible skin lesion. Electrode insertion was slow, the examiner listening to respiratory muscle contraction sounds, and electrode progression was stopped when the first clear motor units were seen and heard on recruitment to avoid the pneumothorax. Analysis time was set to 10 ms/cm, filter band-pass to 10 - 10,000 Hz, sensitivity to 20 μ V/cm (at rest), 200 μ V/cm (slight effort) and 1 mV/cm (maximum effort). The exams were obtained using a 2-channel Nihon-Kohden Neuropack 2.

The EMG criteria for neurogenic process into the intercostal muscles were a) at rest: presence of fibrillations, positive sharp waves, and/or fasciculations; b) slight effort: elongated duration of motor unit potential; and c) maximum effort: increased amplitude of the motor unit potentials (above 5 mV) and different degrees of rarefaction of the interferential pattern.

RESULTS

There were 14 cases of INM diagnosed from 5,560 EMG exams (0.25%). Probable etiological diagnoses were a) thoracotomy (6 patients), post-herpetic infection (4), intercostals nerve neuritis (2), lung neoplasia (1), and radiculopathy (1). For the patient with lung neoplasia, impairment of bone, muscles, and intercostal nerve was by contiguity. In some patients with INM after thoracotomy, intercostal nerve impairment was at more than one level, resulting in multiple mononeuropathy (Fig 1). Two patients were diabetic, but no etiological relationship between their INM and diabetes could be found.

The most common drugs employed for pain treatment were tricyclic antidepressants (amitriptylin) and anti-epileptics (carbamazepine). Other drugs were used; they included non-steroid anti-inflammatories, dipirone, and tramadol. In one case, patient controlled analgesy was necessary; fentanyl was employed.

DISCUSSION

Impairment of the intercostal nerves may occur in common clinical conditions such as diabetes⁸, less frequent pathologies such as neoplasias originat-



Fig 1. Lateral aspect of left thorax surgical scar in a patient with mononeuropathy of the left Vth and VIth intercostal nerves after thoracotomy

ing in the intercostal nerves⁹, or in rare affections, such as sarcoidosis¹⁰. Diabetic thoracoabdominal neuropathy usually presents in the 5th and 6th decade, manifests primarily as pain along single or multiple intercostal nerves and may mimic different conditions as coronary artery disease or appendicitis¹¹. Recently it was published the second Brazilian case of INM by benign schwannoma, in a patient with expansive nodular lesion of the 7th coster arch projecting within the left hemitórax¹².

The more common INM etiologies found in our patients were thoracotomy (43%) and herpes zoster (28%); this is in agreement with literature^{2,3,7,13,14}. Direct injury of the intercostal nerve during thoracic surgery is not needed for symptoms to appear, the use of ratcheted rib spreaders may induce INM some distance from the surgical site¹³. The main clinical problem related to INM is chronic pain that may become debilitating requiring multidisciplinary attention¹⁵. Recent published papers highlight the efficacy of anaesthetic block of intercostal nerves in acute^{16,17} or chronic¹⁸ pain profilaxy. In our patients pain control was possible using common drugs (amitriptyne and carbamazepine). In only 1 case was patient controlled analgesy necessary.

As far as we know, this is the first description of INM in our country which has been confirmed by EMG. This serious clinical problem which frequently incapacitates has been overlooked in Brazil. More attention needs to be given to this problem. A multidisciplinary approach involving neurologists, pain specialists, and thoracic surgeons, could improve quality of life for our INM patients.

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