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Original article

Benign tumors affecting the median nerve. Case series report of diagnostic and surgical strategies☆

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ABSTRACT

Objective: The aim of this study was to describe the strategies adopted in this institution to diagnose and treat patients with benign tumors affecting the median nerve.
Methods: A retrospective chart review study of all patients operated on between 2010 and 2015. Histology, symptoms, complementary exams, surgical techniques performed, and demographic characteristics were analyzed.
Results: Fifty-four patients were included in the study. There were three neurofibromas, six schwannomas, 15 lipofibromatous hamartomas, three hemangiomas, 12 lipomas, one benign fibrohistiocytoma, and 14 synovial cysts. Complete tumoral resection was performed in 32 cases, partial resection in five, segmented nerve resection in one, nerve decompression in eight, and amputation for macrodactyly in eight.
Conclusions: The most important recommendations on treating benign tumors of the median nerve are related to the clinical symptoms, tumoral growth, and tumoral nature. The surgical approach resulted in good function for 60% of the patients. However, lipofibromatous hamartomas, hemangiomas, and neurofibromas were associated with preoperative functional deficit. It may be inferred that the diagnosis and treatment of these tumors should be performed earlier.

Tumores benignos afetando o nervo mediano. Relato das estratégias cirúrgicas e diagnósticas na série de casos

Palavras-chave:
Nervo mediano
Neoplasias do sistema nervoso periférico
Neoplasmas de partes moles

RESUMO

Objetivo: O objetivo deste estudo foi descrever as estratégias adotadas nesta instituição para o diagnóstico e tratamento de pacientes com tumores benignos que afetam o nervo mediano.
Métodos: Um estudo de revisão retrospectivo foi realizado com todos os pacientes operados entre 2010 e 2015. Foram analisados histologia, sintomas, exames complementares, técnicas cirúrgicas realizadas e características demográficas.

☆ Study conducted at Rede Sarah de Hospitais de Reabilitação, Brasília, DF, Brasil.

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Resultados: O estudo incluiu 54 pacientes. Observou-se três casos de neurofibromas, seis schwannomas, 15 hamartomas lipofibromatosos, três hemangiomas, 12 lipomas, um fibro-histiocitoma benigno e 14 cistos sinoviais. Em 33 casos, foi feita ressecção tumoral completa; em cinco, ressecção parcial; em um, ressecção segmentar de nervo; em oito, descompressão de nervo; e em oito, amputação de macrodactilia.

Conclusões: As recomendações mais importantes no que diz respeito ao tratamento de tumores benignos do nervo mediano estão relacionadas aos sintomas clínicos, crescimento tumoral e natureza tumoral. A abordagem cirúrgica levou a bons resultados funcionais em 60% dos pacientes. No entanto, hamartomas lipofibromatosos, hemangiomas e neurofibromas foram associados ao déficit funcional pré-operatório. Pode-se inferir que o diagnóstico e o tratamento destes tumores devem ser realizados de forma precoce.

Introduction

Most tumors affecting the median nerve are benign. They can originate in the peripheral neural sheath, or be intraneural or extrinsic. The latter can affect the nerve by compressing it, dislocating its structure, and disturbing its vascular flow. Deciding how to approach median nerve tumors is a complex process that involves knowledge about neurologic clinical exam, neurophysiological tests, nerve microanatomy, image diagnostic exams, and microsurgery.

Peripheral nerve tumors are uncommon lesions, generally benign, with slow growth, and few symptoms. The median nerve can be affected by tumors originating in: the neural sheath, schwannoma, and neurofibroma; intraneural lesions, lipoma, hemangioma, or hamartomas; and extrinsic compression by lipomas or cysts.[1]

The peripheral nerve is a complex structure regulated by the interaction between the neurons and Schwann cells. When the axon is injured, there is usually a myelin disorganization. Seddon[2] and Sunderland[3] published studies about the structural bases, histologic classification, and neural mechanisms of regeneration. For traumatic injuries, the neural regeneration process follows the Wallerian degeneration, which starts 24–36 h after the trauma. The pathophysiology of nerve injuries related to tumors differs from trauma in that it is characterized by slow growth and fewer symptoms, which is usually related to paresthesia, sensitive alterations, and median nerve entrapment syndrome.[1,4–8]

Sensitivity and motor tests, electrophysiological studies, computed tomography, magnetic resonance imaging, and ultrasound images are useful during preoperative evaluation to define the tumoral nature and location, nerve function, malignancy characteristics, size, necrosis, invasion, and surrounding tissues aspects. Tumors originating in the neural sheath can be confirmed by microscopy and immunohistochemistry (i.e., S-100 and Leu-7 stains).[1,6,7]

The most common benign tumors of the neural sheath are the schwannomas (also known as neurilemomas) and neurofibromas. Other tumors that can affect the median nerve are: giant cell tumors, lipomas, mixomas, hemangiomas, lipofibromatous hamartomas, hemangioblastomas, and meningiomas. Those tumors can jeopardize the nerve with their intraneural growth or extrinsic compression, causing symptoms that are similar to those of carpal tunnel syndrome. Schwannomas are rarely associated with any clinical syndromes, and they can be solitary or plexiform. Neurofibromas are less common, are not encapsulated, can have malignant degeneration, and be associated with neurofibromatosis.

Tumors of the median nerve can occur at any age, however, incidence rates are highest between the third and sixth decades of life, except for hemangiomas and lipofibromatous hamartomas (which usually occur in childhood).

This case series report adds knowledge about the strategies used to handle with benign tumors affecting the median nerve. This information is important for diagnosis, surgical approach, as well as to minimize recurrences and decreased functionality.

Materials and methods

This study is a case series description of patients treated for benign tumors affecting the median nerve. It includes data from the charts of all patients operated on between 2010 and 2015 at our institution. Inclusion criteria included diagnosis of benign tumors that affect the median nerve (i.e., those originating at the peripheral sheath, as well as intraneural and extrinsic tumors). Malignant and traumatic tumors were excluded.

The research project was approved by an independent ethical committee, respecting the institutions guidelines and the international agreements for scientific experiments with human tissues, including the Declaration of Helsinki (1964) and their following recommendations of Fortaleza/Brazil (2013). All patients signed a consent term allowing the institution to use their health records for scientific purposes.

Clinical evaluation and diagnostic procedures included the Louisiana State University Medical Center Grading System for Motor and Sensory Function,[6] the Semmes-Weinstein monofilament test, electroneuromyography (ENMG), Magnetic Resonance Imaging (MRI), ultrasonography imaging (USG), and histopathological studies.

Surgical treatment was indicated if the patient showed clinical symptoms such as pain, paresthesia, tumoral growth,

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