ACTA RADIOLÓGICA PORTUGUESA
May-August 2023 | Vol 35 nº 2 | 48-50
https://doi.org/10.25748/arp.31157

Images of Interest / Imagens de Interesse

An Atypical Cause of Pain and Motor Weakness of the Left Forearm

Causa Atípica de Dor e Fraqueza Motora no Antebraço Esquerdo

Maria Inês Rodrigues[1], João Dourado[1], Adriana Moreira[1]

[1]Serviço de Radiologia, Centro Hospitalar Universitário de São João, Porto, Portugal

Address

Maria Inês Rodrigues
Serviço de Radiologia
Centro Hospitalar Universitário de São João,
Alameda Prof. Hernâni Monteiro
4200-319 Porto, Portugal
e-mail: inesreisrodrigues@gmail.com

Received: 07/05/2023
Accepted: 02/06/2023
Published: 27/09/2023

Abstract

Traumatic neuromas are rare benign tumors, that occur mainly from acute or chronic injury to a nerve. We present a case of a posterior interosseous nerve neuroma after trauma to the left forearm.

Keywords

Traumatic; Neuroma.

Resumo

Os neuromas traumáticos são tumores benignos, com uma incidência rara, que ocorrem maioritariamente após trauma agudo ou crónico de um nervo. Apresentamos um caso de um neuroma traumático do nervo interósseo posterior após lesão traumática do antebraço esquerdo.

Palavras-chave

Neuroma; Trauma.

Case

A 34-year-old man, presented to our institution with pain and motor weakness in the left thumb and digital extensors, after being severely assaulted by a knife in the left forearm, three weeks previously.
An ultrasound (figure 1) and MRI (figure 2) studies were performed for better characterization, showing a nodular area with 4 mm in caliber with a bulbous end appearance (figure 1) in a plane proximal to the Frohse's arcade, consistent with an amputation neuroma of the posterior interosseous nerve (figure 2). A biopsy was not made.

At surgery, dissection of the two heads of the supinator muscle was made, and the sectioned posterior interosseous nerve was identified. Neurostimulation of the nerve was unsuccessful and suture end to end was not possible. Consequently, the ends were brought together with a 4 mm neurotube and biological glue.
Nevertheless, after 6 months of physical rehabilitation with electrostimulation, the patient was still unable to extend the left thumb and fingers.

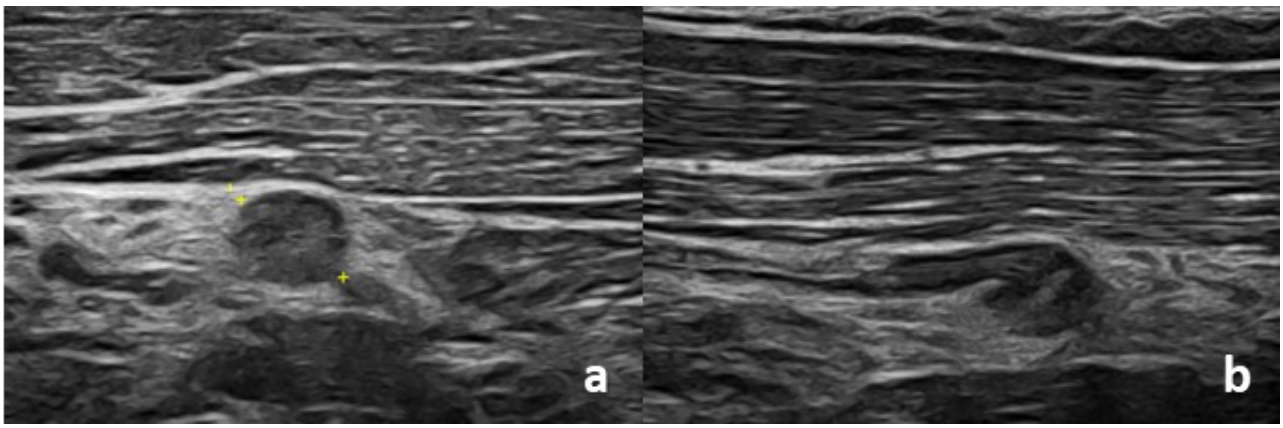


Figure 1 – Along the course of the posterior interosseous nerve, immediately proximal to its entry into the arcade of Frohse, a hypoechoic nodular area of approximately 4 mm in diameter is identified (image a), without unequivocal distal continuity and with a bulbous end appearance (image b), suggestive of terminal neuroma (amputation neuroma).

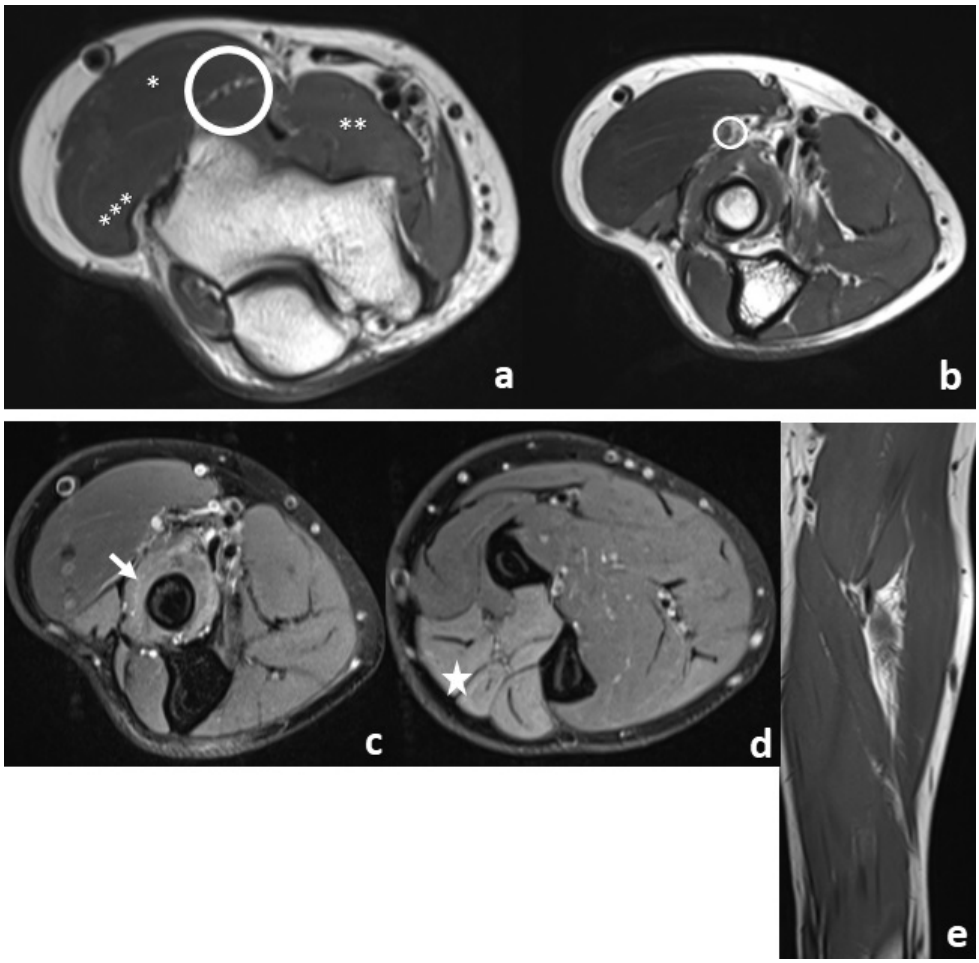


Figure 2 – Image a - Axial PD-weighted image just above the elbow joint demonstrates the bifurcation of the radial nerve into the superficial radial nerve and posterior interosseous nerve (circle). The brachioradialis (*), brachialis (**), the extensor carpi radialis longus (***) are indicated. Image b - Axial PD-weighted image shows the posterior interosseous nerve, in a plane immediately proximal to its entry into the Frohse's arcade exhibiting a focal area of nodular thickening with approximately 4 mm in caliber, consistent with an amputation neuroma (circle). Image c, d and e - Axial PD-weighted fat suppressed and coronal T1 images show the supinator muscle (arrow) and extensor compartment muscles (star) with diffuse interstitial hyperintensity, indicating denervation edema in the territory of the posterior interosseous nerve, yet without associated atrophy or lipomatous infiltration (image e).

Discussion

Peripheral nerves are parallel unidirectional nerve axons encircled by perineurium, a connective tissue sheath. After focal traumatic injury, neural axonal tissue displays disordered proliferation at the site of trauma, resulting in a focal non-neoplastic area of enlargement called a traumatic neuroma.[1]

Two types of traumatic neuromas have been described, spindle neuromas and terminal neuromas. Spindle neuromas occur when the nerve trunk is injured but still intact, such as in traction injury or chronic repetitive stress. Terminal neuromas occur after transection of the nerve (such as limb amputation), presenting with a bulbous appearance at the end of the proximal fragment.[1,2]

Clinically, the most common symptom is pain. Physical examination may reveal a palpable mass at the site of previous trauma.

Ultrasound (US) and magnetic resonance imaging (MRI) are commonly used alone or in combination to study peripheral nerves and are the gold standard for radiologic diagnosis. By following the guidelines regarding soft tissue tumors in adults approved by the European Society of Musculoskeletal Radiology (ESSR) for peripheral nerve tumors, biopsy could be avoided in cases of purely benign lesions.[2] US features such as a well marginated hypoechoic oval mass with echogenic strands in direct continuity with a nerve, allows to establish the possible neural origin of these soft tissue masses (figure 1).[2]

On MR imaging, traumatic neuromas present normally with intermediate signal on T1-weighted images, and they tend to be isointense to hyperintense compared to muscle on proton density- and T2-weighted images, often approaching the hyperintense signal intensity of the associated nerve.[2]

Because intraneural fascicles may remain intact proximal to the injury site, traumatic neuromas often demonstrate clustered hypointense ring-like areas called the "fascicular sign" on T2-weighted images acquired perpendicular to the nerve, corresponding to nerve fascicles.

Variable contrast enhancement is seen.[1,2]

The treatment can be conservative including physical therapy, neuromodulation, alcohol ablation and medication, or surgical, by excision of the neuroma and repair of the nerve with direct anastomosis, graft, or conduit.[1,3]

Conclusion

Traumatic neuromas are a well-known complication of injury to peripheral nerves. A painful mass developing at a site of previous trauma or amputation should prompt further workup. Definitive diagnosis of traumatic neuroma can often be made by ultrasound or MRI.

Ethical Disclosures / Divulgações Éticas

Conflicts of interest: The authors have no conflicts of interest to declare.

Conflitos de interesse: Os autores declaram não possuir conflitos de interesse.

Financing Support: This work has not received any contribution, grant or scholarship.

Suporte financeiro: O presente trabalho não foi suportado por nenhum subsídio ou bolsa.

Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.

Confidencialidade dos dados: Os autores declaram ter seguido os protocolos do seu centro de trabalho acerca da publicação dos dados de doentes.

Protection of human and animal subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Protecção de pessoas e animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

References

1. Murphey MD, Smith WS, Smith SE, Kransdorf MJ, Temple HT. From the archives of the AFIP. Imaging of musculoskeletal neurogenic tumors: radiologic-pathologic correlation. Radiographics. 1999;19:1253-80.

2. Tagliafico A, Altafini L, Garello I et-al. Traumatic neuropathies: spectrum of imaging findings and postoperative assessment. Semin Musculoskelet Radiol. 2010;14: 512-22.

3. Watson J, Gonzalez M, Romero A, Kerns J. Neuromas of the hand and upper extremity. J Hand Surg Am. 2010;35:499-510.