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Images of Interest / Imagens de Interesse

Ulnar Neuropathy Secondary to Intramuscular Oil Injection: A Case Report

Neuropatia Ulnar Secundária a Injeção Intramuscular de Óleo: Um Caso Clínico

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Abstract

Intramuscular injection of site-enhancing oils (SEOs) for cosmetic muscle augmentation is an increasingly recognized practice in bodybuilding communities, associated with severe local and systemic complications. We report a case of a 38-year-old male bodybuilder presenting with chronic elbow pain and ulnar neuropathy secondary to intramuscular oil deposits in the biceps and triceps brachii muscles. MRI neurography and neurosonography findings are discussed.

Keywords

Site-enhancing oil; Synthol; Ulnar neuropathy; Epineural fibrosis; MR neurography; Bodybuilding complications.

Resumo

A injeção intramuscular de synthol para aumento muscular cosmético é uma prática cada vez mais reconhecida nas comunidades de culturismo, associada a complicações locais e sistémicas graves. Descrevemos o caso de um fisiculturista do sexo masculino de 38 anos com dor crónica no cotovelo e neuropatia ulnar secundária a depósitos de óleo intramuscular nos músculos bicípite e tricípite braquial. Os achados de neurografia por RM e neurossonografia são discutidos.

Palavras-chave

Synthol; Neuropatia ulnar; Fibrose epineural; Neurografia por RM; Complicações do culturismo.

Case

A 38-year-old male bodybuilder presented with a six-year history of right medial elbow pain and paresthesias in the ring and little fingers. Physical examination revealed mild weakness of little finger adduction and hypesthesia in the ulnar nerve distribution. Electrodiagnostic studies confirmed mild axonal partial lesion of the right ulnar nerve.

Imaging Findings

The right ulnar nerve demonstrated marked thickening along the entire upper arm with a cross-sectional area of 25 mm² compared to 7 mm² on the contralateral side (Figure 1). Fascicles were diffusely thickened, with predominantly isoechogenic and volume-increased external epineurium indicating epineural fibrosis. Notably, small echogenic deposits were present along the epineurium, comparable to the intramuscular changes. These changes extended to a short segment of the ulnar nerve at the mid-forearm. No static or dynamic compression suggestive of typical ulnar neuropathy at the elbow was identified. No muscle atrophy of intrinsic hand muscles was observed.

Subsequent additional MR neurography of the right upper extremity revealed intramuscular textural disturbances within the biceps and triceps brachii muscles as well as the deltoid and latissimus dorsi muscles. On MRI, these abnormalities demonstrated markedly high T1 signal intensity (Figure 2) that was low intense on T2-weighted fat-saturated sequences (Figure 3), confirming fat or oil-equivalent nature. Surrounding edema was visible, suggesting inflammatory muscle reaction. The patchy fat like lesions with surrounding

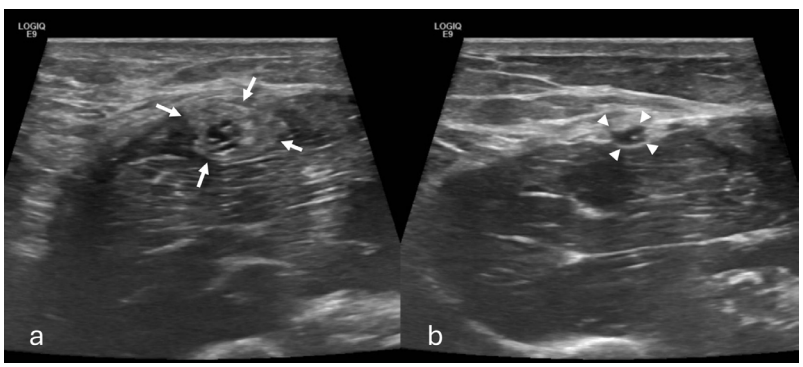


Figure 1 – Transverse ultrasound images of the ulnar nerve. (a) Affected right ulnar nerve (arrows) demonstrating marked enlargement with diffusely thickened fascicles, echogenic external epineurium, and small echogenic deposits along the epineurium. (b) Normal contralateral left ulnar nerve (arrowheads) with preserved fascicular architecture.



Figure 2 – T1-weighted coronal (a) and axial (b) images showing high signal intensity intramuscular deposits within the biceps (arrow) and triceps (arrowhead) brachii muscles.

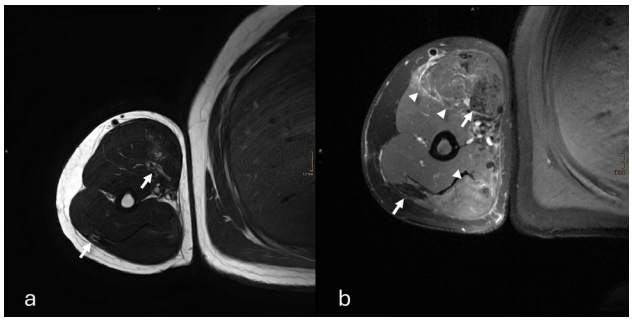


Figure 3 – Transverse T2-weighted image (a) showing high signal intensity intramuscular deposits within the biceps (arrow) and triceps brachii (arrowhead) muscles. Transverse proton density fat-saturated image (b) demonstrates low signal of the oil deposits (white arrow and arrowhead) with persistent high signal intensity in the surrounding muscle tissue (red arrowheads), indicating inflammatory reaction.

inflammatory reaction in an oligomuscular distribution was suggestive for residuals from previous percutaneous muscle augmentation – synthol injections - consistent with oil deposits termed oleomas.

Discussion

Site-enhancing oils (SEOs), including synthol and paraffin-based preparations, are increasingly used for cosmetic muscle augmentation in bodybuilding communities. These substances cause chronic foreign body reactions with granuloma formation, characterized by macrophage infiltration and fibrosis.[1]

On MRI, oil deposits demonstrate high T1 signal intensity that suppresses on fat-saturated sequences, confirming their oil-equivalent nature.[2] Beyond the deposits themselves, the chronic foreign body reaction leads to surrounding fibrosis and granuloma formation, which appear as areas of low signal on both T1- and T2-weighted sequences. Calcifications, a well-recognized feature of oil deposits, manifest as signal voids on MRI and are readily depicted on CT and radiography as streaky or nodular soft tissue calcifications. Sonographically, mineral oil deposits appear as echogenic foci with posterior acoustic shadowing.

Regarding complications, local sequelae include chronic painful indurations, abscess formation, skin necrosis, irreversible muscle damage, and oil migration along fascial planes and nerve sheaths causing peripheral neuropathy, as illustrated in this case. Systemic complications include non-parathyroid hypercalcemia, autoimmune/inflammatory syndrome induced by adjuvants, and, rarely, pulmonary oil embolism.

In this case, the ulnar neuropathy likely resulted from epineural fibrosis because of leaking or migrating oil deposition along the nerve rather than typical mechanical entrapment at the cubital tunnel. MR neurography is the reference standard for imaging ulnar nerve pathology, demonstrating nerve enlargement and loss of normal fascicular architecture.[3]

The markedly increased cross-sectional area with echogenic epineural deposits visible on both MRI and ultrasound confirmed the diagnosis as the location is not a typical mechanical compression site and no apparent trauma was reported by the patient. The absence of muscle denervation changes in intrinsic hand muscles suggested low grade neuropathy and absence of severe axonal nerve damage.

Conclusion

Chronic elbow pain and ulnar neuropathy in bodybuilders should prompt consideration of intramuscular oil injection complications. MR neurography and neurosonography are valuable tools for identifying oil deposits, epineural fibrosis, and nerve pathology. A helpful clue for differentiating these muscle changes from myopathies and other muscle lesions is the distribution pattern analysis of involved muscles and their patchy oil-like changes. This case highlights the serious consequences of cosmetic muscle augmentation with site-enhancing oils.

Ethical Disclosures / Divulgações Éticas

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

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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.

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