NODULAR FASCIITIS: A CASE SIMULATING SUSPICIOUS PATHOLOGY AT ULTRASONOGRAPHY

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ABSTRACT

Nodular fasciitis is a benign tumor of the subcutaneous tissue, and its etiology has not yet been truly elucidated. It predominantly affects the upper extremities of patients between the second and fourth decades of life. The clinical and imaging features of this entity can resemble those of malignant tumors, especially due to the rapid growth, thus, becoming a diagnostic challenge. Treatment usually consists of surgical removal of the lesion. The objective of this study is to report a case of a patient with nodular fasciitis of unusual location and simulated suspect tumor at ultrasonography and to briefly review current literature about this pathology and its sonographic characteristics.

KEYWORDS: NODULAR FASCIITIS, ULTRASONOGRAPHY, ELASTOGRAPHY, MAGNETIC RESONANCE IMAGING, NODULE.

INTRODUCTION

Nodular fasciitis (NF) is a benign condition in which there is a self-limited proliferation of fibroblasts and myofibroblasts, that was first described in 1955 by Konwaler et. al[1]. Characteristically, it presents rapid growth, high cellularity and high mitotic activity [1-3], which can then be confused with malignant tumors such as sarcomas[1-5].

It preferably affects young adults, between 20 and 45 years old, without gender predilection [2,6]. The anatomical regions that are most affected, according to the literature on the subject, are the upper limbs, especially the forearms [1,2,7]. It is often located in the subcutaneous region, but there are reports of being identified in deeper planes such as intramuscular and intra-articular [4,6].

CASE REPORT

30-year-old female patient, black, was referred to the ultrasound service due to the appearance of a palpable nodule, located below the sternal furcula, with a report of rapid and progressive growth. On physical examination, a hardened nodular lesion was found, measuring approximately 5mm. The Doppler ultrasound examination of soft tissues revealed a nodule with precise limits, irregular contours, spiculated, markedly hypoechoic, with a slight increase in the echogenicity of the surrounding tissues, located in the subcutaneous plane, shown in figure 1. The nodule measured approximately 6 x 3 x 5mm (figure 2), with its center 4 mm from the skin plane and 26 mm inferior to the sternal furcula (figure 3). During the study with color Doppler, the nodule showed internal vascularization of easy capture and the study with spectral Doppler revealed pulsatile flow, with low resistance arterial pattern (IR: 0.61), shown in figure 4. In a complementary study with dynamic elastography by compression (strain elastography), the nodule appeared hard, with a stiffness about 5.3 times greater than that of the surrounding tissues (figure 5).

After carrying out the ultrasonographic exam, the patient was referred to the plastic surgery service, which proceeded to excise the lesion. Such procedure was performed without any complications and the surgical specimen was sent to the pathological anatomy laboratory. The anatomopathological analysis revealed a relatively monomorphic fusocellular proliferation, without significant atypia and with red cell extravasation, shown on the slides in figure 6 .

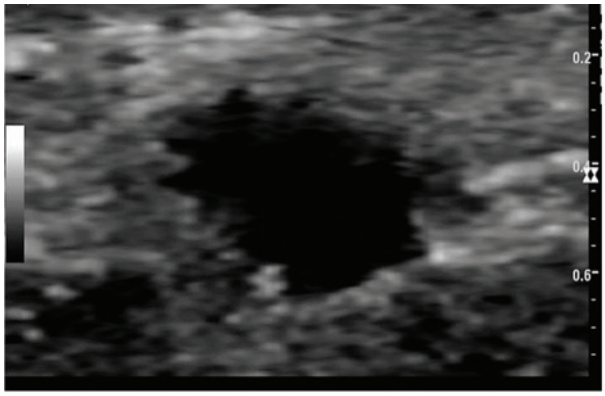

Figure 1: Solid nodule, markedly hypoechoic, with irregular contours and unclear limits.

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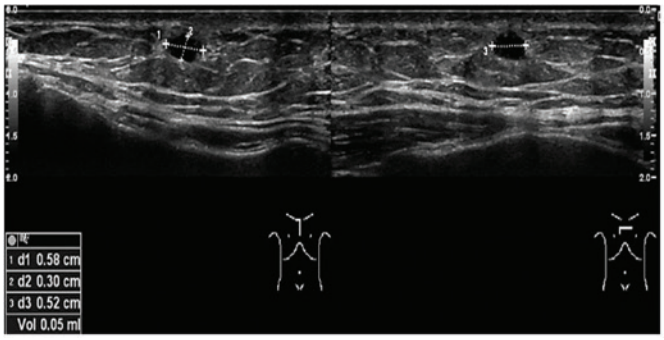

Figure 2: Measurements of the nodule in the longitudinal (left) and transverse (right) planes, with estimated volume of 0.05cm³.

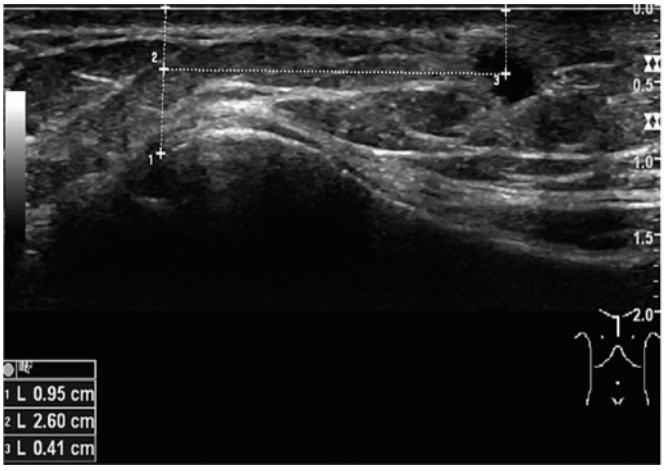

Figure 3 - The center of the lesion is approximately 4mm from the skin and 26mm caudal to the sternal furcula.

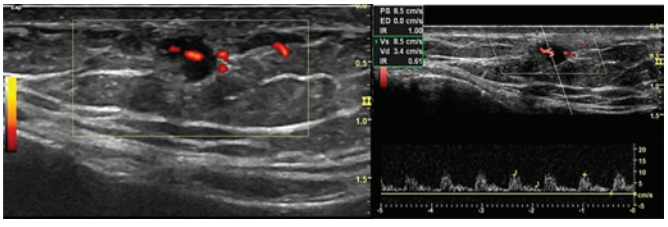

Figure 4 - The nodule shows easy central flow uptake on the Power Doppler study (left), with a low resistance arterial flow pattern to the Spectral Doppler study (right).

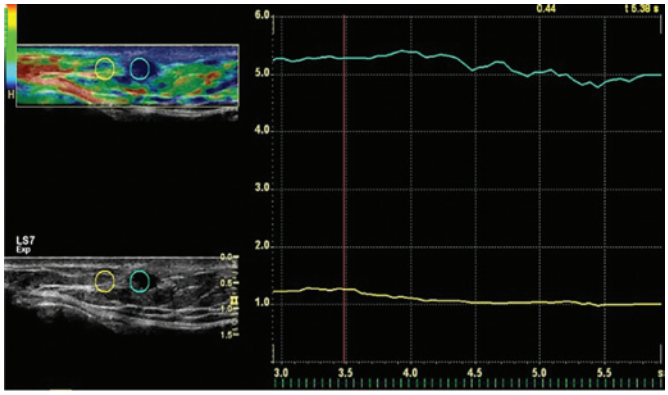

Figure 5 - Compression elastography showed nodule stiffness (blue circle)

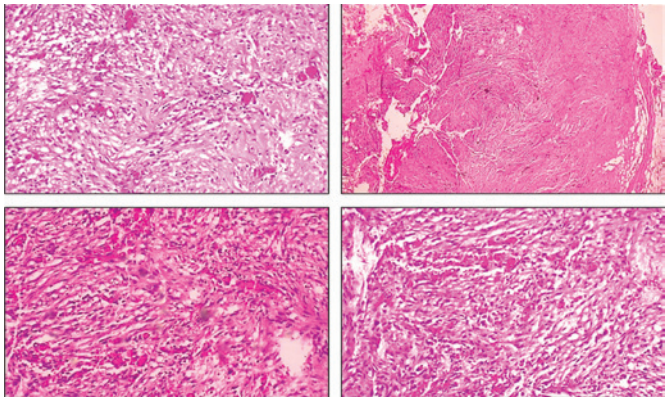

Figure 6 - Relatively monomorphic fusocellular proliferation, with no significant atypia and with red blood cell extravasation.

DISCUSSION

Nodular fasciitis is a benign lesion, characterized by the proliferation of fibroblasts that is constantly confused histologically with sarcomas [1-5].

Its etiology has not been completely clarified, but Velagaleti et al., reviewed publications pointing out the involvement of clonal abnormalities in the tissue repair mechanisms related to the FGR7 (fibroblast growth factor) gene located on chromosome 15 [8]. Oliveira, AM and Chou, MM., on the other hand, observed a high expression of mRNA of the USP6 gene (ubiquitin-specific protease) in these lesions and raised the hypothesis of an oncogenic mechanism involving genomic rearrangements in the locus of this gene [6] .

NF commonly presents as a single, rapidly growing nodule (2 to 4 weeks), with a diameter that rarely exceeds 5cm[6,7,9] and may or may not be accompanied by pain [4,7]. There are reports of association with local trauma in 10 to 15% of cases[1,2,6]. The anatomical regions most affected are the upper extremities and the trunk, followed by the head and neck and lower

extremities[1,2,4,7,9] but they can affect any part of the body[1,9]. In the pediatric population, the head and neck are the most affected regions[1,2]. Symptoms such as numbness, paresthesia and pain irradiation are uncommon and denote compression of peripheral nerves[4] .

It can take three main forms, that are based on their anatomical location: the subcutaneous form (which is the most common); the intramuscular form (which mimics malignant lesions) and the fascial form[2,4].

Microscopically, NF basically consists of fibroblasts arranged in short bundles and fascicles scattered within a myxoid or fibrous stroma[6]. Based on the predominant histological composition, the lesion can be: fibrous, myxoid or cellular[6]. Giant osteoclastlike cells may be present, as well as an infiltration of lymphocytes and extravasation of erythrocytes, without deposit of hemosiderin[2]. It presents a wide variation of morphological pattern and can often be mixed, consisting of spindle cells, thin, similar to fibroblasts[7]. In the case described, the macroscopy of the lesion proved to be predominantly fibrous.

Ultrasonography usually shows quite nonspecific findings, such as a solid, well-defined, ovoid or lobular, isoechogenic or hypoechogenic mass[1]. In some cases, it may also present a posterior acoustic shade[2]. As in the ultrasonographic findings, NF usually presents itself on magnetic resonance imaging (MRI) as a well-defined, rounded or oval lesion, still without a specific pattern of signal intensity in the different sequences[4,9]. In the T1-weighted sequence, the NF usually presents with an increased signal in relation to the adjacent and slightly heterogeneous muscle tissue. In the T2 weighted image, the lesions are relatively homogeneous and hyperintense in relation to the subcutaneous adipose tissue[4] . However, depending on the histological components of the lesions, they may be slightly hypointense in all sequences[9]. Due to this fact, some authors[9] advocate that the myxoid and cellular subtypes show a more intense signal than the muscle in T1 and are also hyperintense in relation to fat in the T2-weighted sequences, whereas in the fibrous subtype, the lesion is hypointense in relation to the muscle tissue in all weights. Such properties of the different histological subtypes and the location of the lesion will influence the gadolinium contrast pattern enhancement[9] .

High celularity and dense vascularization are related to an early enhancement after intravenous gadolinium injection, which was mainly homogeneous when the lesion was located in the subcutaneous topography[9]. In view of image aspects only, differential diagnoses are diverse and include aggressive fibromatosis, adenomegaly, dermatofibroma, fibrosarcoma and malignant fibrous histiocytoma[2,4]. Thus, the diagnosis of NF cannot be made using only the results of imaging tests[2] .

Compression elastography (strain elastography) is an ultrasound technique based on the static deformation of a linear, isotropic and elastic material[10,11]. In a simpler way, it can describe the displacement (compression) or stiffness of a given tissue in response to the application of a local force that makes rigid tissues deform less and have less tension than compliant tissues when the same force is applied[12].

Recent studies show that elastography has high sensitivity and specificity for differentiating benign from malignant lesions when the technique is properly applied[13].

The treatment of choice is surgical excision of the lesion [2,4,7], but some authors suggest alternatives such as observation and injection of corticoids into the lesion[4]. Recurrence is quite rare, being reported in 1-2% to 10%[2,4,7], probably due to incomplete resection[2]. In this patient, the treatment offered was complete surgical excision of the lesion, without the need for additional treatment.

Nodular fasciitis is a relatively infrequent benign tumor, with unusual clinical and imaging features, with several differential diagnoses, including pathologies of malignant nature.

Ultrasonography can be considered as an initial method for evaluating these lesions due to its wide accessibility, availability and the non-use of ionizing radiation, and can offer valuable information for the elaboration of a diagnostic hypothesis. Tools such as color Doppler, pulsed Doppler and elastography are useful to increase the sensitivity of B-mode ultrasound.

The final diagnosis is made after biopsy or surgical excision of the injury. The removed specimen is sent for anatomopathological analysis and in some situations the immunohistochemical study must be performed for diagnostic confirmation.

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