Clinical Rheumatology (2023) 42:967–969
https://doi.org/10.1007/s10067-022-06461-z

CLINICAL IMAGE

Clinical image: ultrasound findings and magnetic resonance imaging comparison in the muscular involvement in polyarteritis nodosa

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Received: 16 August 2022 / Revised: 30 October 2022 / Accepted: 25 November 2022 / Published online: 6 December 2022

Presentation

A 72-year-old female with a 3-year history of cutaneous polyarteritis nodosa (PAN) involving the lower limbs, previously treated in another clinic with systemic glucocorticoids, colchicine, methotrexate and dapsone, came to our attention after developing a disease flare. At the first evaluation at our clinic, the patient presented diffuse erythematous plaques at the lower legs and thighs with skin thickening especially at the lower third. The patient reported moderate pain (visual analogic scale (VAS) 6/10) at her skin lesions, diffuse mild pain (VAS 5/10) and increased muscular exhaustion during movement with moderate muscular weakness. Upon examination the ankle range of movement was severely reduced (dorsiflexion 8°, plantar flexion 15°) due to skin thickening. Muscular strength was assessed using the manual muscle testing (MMT)-8 testing procedure [1], with the following results (all results were symmetric): ankle dorsiflexors 6/10, quadriceps 7/10, gluteus maximus and medius 9/10. Notably, C-reactive protein was elevated (85 mg/L, normal: < 5 mg/L), while serum creatine kinase was in range (33 U/L, normal: < 200 U/L). Complete laboratory testing is provided in the supplementary material. Due to the lack of response to previous therapy, a positron-emitting tomography-computed tomography (PET-CT) was performed to rule out alternative diagnosis, such as infective disease, other systemic vasculitis or malignancy. The PET-CT revealed a slight increase of the 18-fluorodeoxyglucose uptake at the lower limbs muscles. A magnetic resonance imaging (MRI) was performed to address these findings and revealed that most of the proximal lower limb muscles, notably the left vastus intermedius, presented with a patchy hyperintense appearance on the short tau inversion recovery (STIR) sequence (Fig. 1), compatible with inflammatory oedema. A biopsy of the vastus lateralis was performed, showing severe atrophy of the muscle fibres and fat infiltration, without inflammatory cellularity. No medium-size vessels were included in the bioptic fragments. We performed ultrasonography with a Logiq S7 PRO using a 9–15 MHz linear probe. Power Doppler (PD) setting was 9 MHz and pulse repetition frequency (PRF) 0.8 kHz. We performed sagittal and transverse scans at the distal third of the rectus femoris and vastus intermedius. On grey scale (GS) the muscle structure was unevenly hypoechoic with focal hyperechoic areas, and no PD signal was detected (Fig. 1). Applying the recently described Siena Myositis Score [2], we attributed the following score: GS oedema 3, GS atrophy 1, and PD 0.

Discussion

Muscle involvement in PAN is a rare but well-described condition, and most cases are diagnosed using MRI [3]. To our knowledge, this paper represents the first ultrasonographic description of this manifestation. Our findings show a GS pattern similar to inflammatory myopathies and a high degree of concordance with MRI findings, as recently

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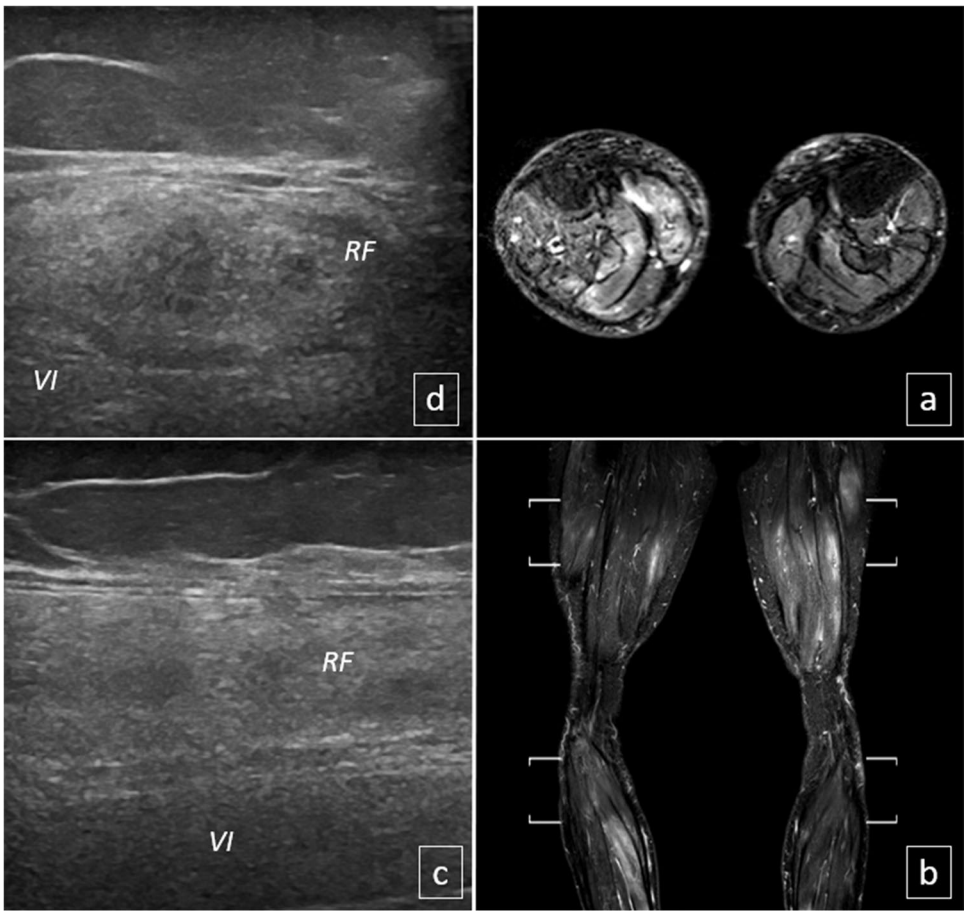

Fig. 1 Short tau inversion recovery (STIR) sequence MRI (**a**, **b**) and ultrasound (**c**, **d**) findings in a patient with polyarteritis nodosa showing high concordance of lesions at the rectus femoris (*RF*), compared to the vastus intermedius (*VI*), as described in the main text

showed in juvenile dermatomyositis [4]. We look toward further clinical studies to assess the utility of point of care ultrasound as a screening tool in patients with PAN presenting myalgias or muscle weakness of new insurgence, given the widespread availability in the rheumatology clinics and the lack of reliable markers such as CK elevation.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10067-022-06461-z.

Author contribution RB provided substantial contribution to the conception of the work, the acquisition, analysis, interpretation of data for the work, drafted the work, gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. GO and AF provided substantial contribution to the analysis and interpretation of data for the work, revised it critically for important intellectual content, gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. OV and MR provided substantial contributions to the conception of the work and interpretation of data for the work, revised it critically for important intellectual content, gave final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Data availability Supplementary material available.

Declarations

Ethics approval Written informed consent has been obtained from the patient to access and collect data from the medical record to be used in scientific publications.

Consent to participate Written informed consent has been obtained from the patient to access and collect data from the medical record to be used in scientific publications.

Consent for publication Written informed consent has been obtained from the patient to access and collect data from the medical record to be used in scientific publications.

Conflict of interest All authors declare no conflict of interest and have signed the Conflict of Interest Disclosure Form.

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