Case report

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The diagnostic value of ultrasound in the assessment of soft tissue masses in rheumatology practice – a case series of 4 patients

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Abstract

A great number of studies have proved the added value of musculoskeletal ultrasound (MSUS) in the diagnosis, assessment of disease activity and treatment response in both inflammatory and degenerative rheumatic diseases. However, it is a frequent scenario that rheumatologists should also assess patients with various soft tissue masses, referred to their practices. In such cases, MSUS could be a valuable and precise tool that helps in the evaluation and triage of these lesions. Hereafter, we describe a case series, where MSUS played a decisive role in the diagnostic process and allowed for prompt patients' management.

Keywords: ultrasound; soft tissue mass; diagnosis; case-report

Introduction

Musculoskeletal ultrasound (MSUS) has become a valuable tool for rheumatologists, aiding in reaching the correct diagnosis and predicting disease course. In addition, MSUS helps in determining the disease activity and damage, monitoring treatment efficacy and guiding the correct needle placement in diagnostic and therapeutic procedures [1,2]. A high number of studies have been published supporting the greater sensitivity of MSUS in the assessment of extraarticular pathologies as compared to the physical examination [3]. Regarding the soft tissue lesions in particular, MSUS allows for a detailed assessment of the object's borders, internal structure and most importantly its vascularisation. These features are important in the decision making regarding soft tissue tumours.

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In the following series of four clinical cases, the MSUS assessment of the presented soft tissue masses helped in this regard and allowed for correct and in-time patients' management. In addition, we provide a detailed US description of these lesions and discuss features suggestive of a potentially malignant nature and which necessitated further surgical assessment.

Cases report

Case 1. Clavicular metastasis from pancreatic cancer, mimicking sternoclavicular joint arthritis in a patient with psoriatic arthritis.

History. A 78-year-old (YO) man, diagnosed with psoriatic arthritis (PsA) thirty years ago, on methotrexate treatment ever since, was admitted in our Rheumatology Department, due to a complaint of pain in the left shoulder joint, which had started one month ago. The pain persisted during rest, at night, and was slightly relieved by the intake of analgesics and non-steroidal anti-inflammatory drugs. The patient reported having lost 10 kilograms of his body weight during the past three months, loss of appetite and easy fatigue.

MSUS – a lesion was detected, with a heterogeneous, predominantly hypoechoic echostructure, with a trans-

verse diameter of 3.0 cm, originating from the distal third of the left clavicle, with marked interruption of the bone profile, exhibiting an intense Power Doppler (PD) signal, suspicious of a malignant lesion (Fig 1A,B)

The patient was referred for a consultation with a gastroenterologist, where the abdominal US detected a mass, originating from the head of the pancreas. The patient underwent US-guided biopsy of the lesion, and the final diagnosis was adenocarcinoma of the pancreas.

Case 2. Histiocytoma, presenting with cervical radiculopathy.

History. A 48-YO woman, was admitted to our Rheumatology Department with symptoms of pain, stiffness, and restricted range of motion in the cervical region with paraesthesia along the arm, forearm, reaching to the first three fingers. In addition, she had noticed a painless swelling in the back of her neck.

MSUS – a soft tissue mass, 2 cm. in diameter, located above and laterally from the spinous process of C7 and deep fascia with a heterogeneous, predominantly hyperechoic structure, with slight posterior acoustic shadowing, exhibiting an intense PD signal was detected (fig 1C,D).

Extraction from the operative protocol – in the subcutaneous tissue an oval-shaped mass was found to have infiltrated the spinal column and the space between the arches of C6-C7 space on the right, which leads to compression of the nerve roots exiting at this level. The tumour was excised, which led to root decompression. The biopsy specimen revealed fragments of cellular proliferation from myoblasts with a fibrillar pattern, blood vessels, with a storiform pattern, suggestive of fibrous histiocytoma.

Case 3. MALT-lymphoma of the parotid gland, presenting as difficult to treat and recurrent leukocytoclastic vasculitis in a patient with a primary Sjogren syndrome (pSS).

History. A 55-YO woman, with a pSS, was admitted to our Rheumatology Department, with palpable purpura on the lower extremities, muscle weakness, numbness and tingling sensation of the shins and feet, pain, swelling, erythema and decreased range of motion of the left ankle joint, while on treatment with Hydroxychloroquine 200 mg/daily, Methylprednisolon 4 mg/daily. The patient had been initially treated with cyclophosphamide and corticosteroid (CS) pulses. Later on, the persistence of clinical symptoms and worsening of cytopenia, persistently low C3 and C4 complement fraction, high immunologic activity, warranted initiation of rituximab, but worsening of the clinical symptoms was noted despite therapy.

MSUS – in October, 2023, US assessment of both parotid glands was performed, revealing a heterogenous mass lesion in the right parotid gland with a lobulated cystic structure, irregular borders, 2 cm in diameter, exhibiting an intense PD signal (fig 1E,F).

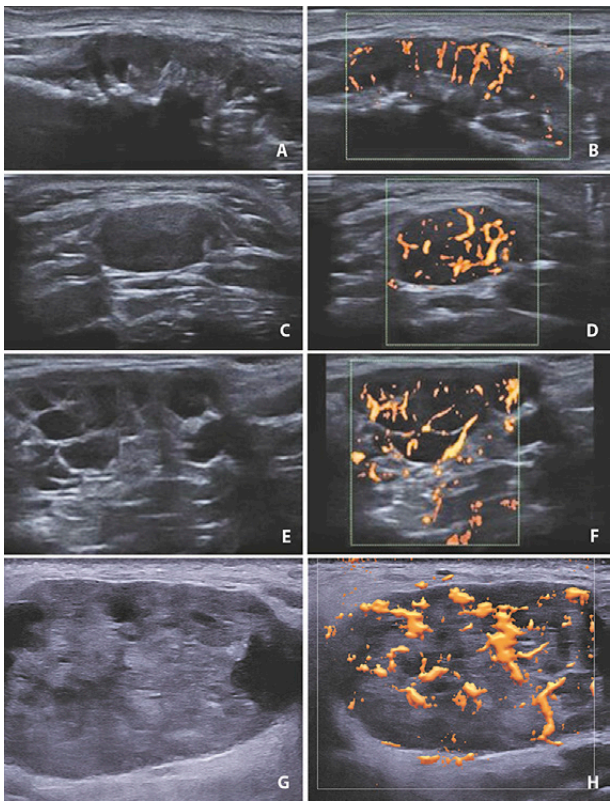

Fig 1. Representative MSUS images in the grey scale and Doppler mode of the four soft tissue lesions described in the case series. Details regarding each of them are provided in the main text.

A biopsy specimen was obtained. The diagnosis was MALT-lymphoma, confirmed by histochemistry.

Case 4. Adenolymphoma of the parotid gland in a rheumatoid arthritis patient.

History: A 55-YO male patient with RA on treatment with Tofacitinib 11 mg daily, noticed a painless nodule in front of his left ear which grew fast (over several weeks) to a size of an olive. On palpation – firm but elastic, smooth and painless nodule, accreted to the surrounding right parotid gland, without overlying erythema.

MSUS - an oval, well-demarcated structure within the right parotid gland, with mixed hypo-hyperechoic appearance, with greater cystic zones at the poles and some posterior enhancement. Microvascular flow imaging revealed intensive signals scattered around the whole nodule (Fig 1G,H). Due to these diffuse flow signals, the patient was referred for surgery and excision of the lesion, pathohistological result: adenolymphoma (tumor of Warthin).

Discussion

Currently, MSUS is the leading imaging method used in rheumatology. In addition to the standardized scans used to assess the activity of inflammatory or the structural damage in degenerative joint diseases, MSUS has a much wider potential that could be used in musculoskeletal practice. Many structures of interest have an appropriate acoustic window and can be visualized in detail by high-frequency MSUS [2,3]. Moreover, being bedside, this modality could be used as a natural continuation of the physical examination. This is especially important in any masses of unknown origin detected by the patient or the physician and well-illustrated in the presented clinical cases.

The point-of-care US turned out to be the key to diagnosing the bone-soft tissue metastasis in the first patient with a history of PsA, in whom otherwise the joint pain would have been attributed to the arthritis itself, thus further delaying the diagnosis.

In case report 2, the US description of the lesion's size, structure, borders, pattern of vascularization, was the reason for the physicians' decision that it should be biopsied. The biopsy revealed a histiocytoma, compressing the nerve roots, with complete resolution of the patient's symptoms after the surgery.

The presented case-report of the third patient suggests that each patient with pSS with systemic organ involvement, resistant to treatment, must have an US assessment of the major salivary glands to exclude evolution of pSS into lymphoma.

In the fourth case, the finding of an extensive vascular flow in the otherwise nonpainful parotid lesion in a RA patient on biological therapy, hinted a timely referral for surgery.

Despite being an extremely useful imaging modality, several limitations of MSUS need to be acknowledged, namely low sensitivity for deeply located structures, where it loses its main advantages, i.e. the higher resolution and the dynamic component of the assessment. [4]

Though different in localization and origin, all the described soft tissue masses shared common sonographic features (mainly diffuse, not ordered and intense internal flow signals) which were found suggestive of a potential malignant nature of the lesion, later confirmed by the histological analysis.

Conclusion

MSUS assessment of soft tissue masses provides the physician with valuable real-time information, regarding the size, borders, inner structure and the presence and nature of vascularisation within the lesion, thus playing a decisive role in the clinical decision making.

Conflict of interest: none

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