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Ultrasonography of the glenohumeral joints – a helpful instrument in differentiation in elderly onset rheumatoid arthritis and polymyalgia rheumatica

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Abstract In a prospective study, the glenohumeral joints of 51 patients (aged 60 or above) were examined, using ultrasonography. Twenty-two patients were suffering from characteristic polymyalgia rheumatica (PMR) symptoms. In contrast, 29 other patients initially had similar complaints, but were diagnosed as having elderly onset rheumatoid arthritis (EORA, rheumatoid factor negative) upon development of typical symptoms. Ultrasound examination revealed glenohumeral joint inflammation in 40.9% (9/22) of the patients with PMR and 65.5% (19/29) of the patients with EORA. A discrete symmetrical biceps tendon sheath effusion was found in only three patients and unilateral in six patients with PMR. In contrast, 12 patients with EORA presented a massive effusion of the biceps tendon sheath, in some cases combined with a bilateral subdeltoid bursitis, and an intraarticular (i.a.) effusion/synovitis. To summarize our results: an i.a. effusion/synovitis, subdeltoid bursitis and biceps tendon sheath effusion were more frequent in patients with EORA, with a predominate symmetry and signs for massive inflammation. The typical ultrasonographic result in patients with PMR was a unilateral inflammation of the glenohumeral joint with predominate discrete biceps tendon sheath effusion and, in comparison with the EORA group, with signs of a low grade inflammation. We conclude that the results of our prospective study might be helpful in the differentiation of PMR and a rheumatoid factor negative subgroup of EORA at the first time of manifestation where clinical overlaps can be observed. However, ultrasonography of the glenohumeral joints might be a good and helpful instrument of differentiation in both diseases.

Key words Polymyalgia rheumatica · Seronegative elderly onset rheumatoid arthritis · Ultrasonography

Introduction

Elderly onset rheumatoid arthritis (EORA) and polymyalgia rheumatica (PMR) affects older patients (60 years of age and over). Both diseases are often dominated by stiffness and pain of the shoulder and/or hip area, accompanied by increased parameters of humeral inflammation, weight loss and distress [1–3].

It is not known whether histological abnormalities precede the subjective shoulder pain in PMR [4]. A close relationship exists between giant cell arteritis and PMR and some investigations have suggested that PMR is a manifestation of arteritis, but good evidence for this is lacking [1]. As noted earlier, the presence of synovitis in PMR has been described by many, but not all, authors and is undoubtedly the cause of many of the findings in this condition [5, 6].

Inflammation of the glenohumeral joints in both diseases has been demonstrated in recent studies by ultrasonography [4, 7, 20]. Because of overlapping clinical symptoms/manifestations in both diseases, a differentiation between PMR and EORA with polymyalgic symptoms is often either clinically very difficult or impossible.

Ultrasonographic assessment of joints and periarticular tissues occupies an established place in the diagnostic imaging of articular disease, due principally to good visualization of the soft-tissue mantle altered by inflammation, and it has gradually gained acceptance in rheumatology [23].

The aim of the study was to examine whether ultrasonography of the glenohumeral joint might be a helpful instrument in screening and differential diagnosis of
PMR and a rheumatoid factor negative subgroup of EORA at the first time of manifestation.

**Patients and methods**

The glenohumeral joints of 51 patients were examined at the first rheumatological contact by ultrasonography (HP Image Point with a 5–10 MHz linear probe). Twenty-two patients (16 women, eight men) were suffering from typical PMR symptoms, with involvement of the shoulder region. A temporal biopsy was performed on all patients: 6/22 had temporal headaches and two patients had a histological cranial giant cell arteritis. No serum rheumatoid factors or antinuclear antibodies were identified in the PMR-group.

In contrast, 29 patients (22 women, seven men) initially had similar complaints and were progressively diagnosed as EORA by involvement of arthritis in additional joints and typical bony erosions. Serum rheumatoid factor was negative in all cases; antinuclear antibodies were found in four cases.

All study patients fulfilled the following criteria: (1) aged 60 or over; (2) erythrocyte sedimentation rate was higher than 45 mm/h; (3) symptoms (pain and marked morning stiffness of the shoulders, neck and/or pelvic girdle) lasted longer than 4 weeks; (4) radiographs of glenohumeral joints were normal; and (5) all patients responded well to prednisone (initial dose ≤30 mg/day).

Both glenohumeral joints were examined by dynamic and passive ultrasonography. A longitudinal and transversal section of the dorsal, lateral and ventral part of the glenohumeral joint was performed for pathologic alterations: (1) of the bone structure, (2) of the bursae and intraarticular effusion/synovitis, (3) of the soft part (muscles, tendon sheaths), and (4) of articular stability [18, 19]. Pathological changes of the glenohumeral joint were analyzed to established criteria [21].

**Results**

Common symptoms of the study patients were pain, morning stiffness (several hours), and a limitation of motion in neck and shoulder. Seven patients with PMR had additional symptoms of the pelvic girdle.

After oral prednisone medication (initial dose ≤30 mg/day), there was a remarkable recovery in the movements of the glenohumeral joints.

By ultrasonography, glenohumeral joint inflammation was found in 40.9% (9/22) of PMR patients and in 65.5% (19/29) of the EORA patients. A discrete symmetrical biceps tendon sheath effusion (incomplete hypoechoic coat surrounding the tendon and sometimes only an isolated sac-like distention of the tendon sheath on one side) was found in only three patients with PMR.

Furthermore, 12 patients with EORA presented with a massive effusion of the biceps tendon sheath (complete hypoechoic to anechoic coat surrounding the long head of the biceps and complete tubular hypoechoic structure in front of and/or behind the tendon in the longitudinal scan), in some cases combined with a bilateral subdeltoid bursitis (echogenic reflection around a fluid margin, more than 4 mm thick) and an intraarticular effusion/synovitis (about ≥5 mm capsule thickness).

Intraarticular effusion/synovitis, subdeltoid bursitis and biceps tendon sheath effusion were more frequent in EORA-patients; with a predominant symmetry and signs of massive inflammation.

The typical ultrasonography result in patients with PMR was a unilateral inflammation of the glenohumeral joint with predominate discrete biceps tendon sheath effusion and, in comparison to the EORA group, with signs of a low grade shoulder inflammation. In cases with subdeltoid bursitis, the bursa was ≤3.5 mm thick. For detailed results see Table 1 and Figs. 1–4.

**Discussion**

Elderly onset rheumatoid arthritis (EORA) and polymyalgia rheumatica (PUR) affect patients aged 60 or over. Common symptoms of the two diseases are pain and marked morning stiffness of the shoulder, neck, and/or hip area, inflammation and distress [1–3, 8–10]. A differentiation between seronegative EORA with polymyalgic symptoms in the early stage of disease and PMR is often either very difficult or impossible. The most typical symptom in both rheumatic diseases is an inflammatory process that mainly affects the shoulder region. In addition, PMR is a clinical syndrome that often presents a diagnostic challenge because of the large differential diagnosis, lack of definitive diagnostic criteria, and relatively frequent atypical clinical findings [8].

While the term PMR suggests an underlying myopathy, the etiology of PMR remains unknown. However, there is no convincing evidence for abnormalities of the serum creatinine phosphokinase, other muscles enzymes, electromyographic findings, or muscle biopsies [1]. The relationship between PMR and giant cell arteritis was recognized because of the frequency with which the two conditions appeared in the same patients: in 15% of cases [1]. However, many patients appear to have PMR alone.

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