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Involvement of the hip in rheumatoid arthritis patients: Sonographic assessment

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ABSTRACT

To determine the prevalence of different ultrasound lesions(synovial hypertrophy, effusion synovial, bone erosion, enthesopathy, tendinopathy, osteophytes) of the hip among patients with rheumatoid arthritis ; to compare these ultrasound lesions of the hip with clinical and biological parameters .Patients with rheumatoid arthritis were included according to the 2010 ACR/EULAR criteria. The evaluation scores as (Disease Activity Score 28, Heath Assessment Questionnaire) were collected. Ultrasound explorations were performed bilaterally on the hip, according to recommended and appropriate techniques. Examination sought synovial hypertrophy, effusion synovial, bone erosion, enthesopathy, tendinopathy, bursitis, osteophytes. The study included 37 patients, with the average age of 50.30 ± 11 years. A total of 73 hips were explored using ultrasound. During the inclusion of patients, we obtained the frequency of current spontaneous coxo-femoral joint pain, peri coxo-femoral joint pain, limitation of hip , respectively 7(10%), 4(5%) and 5(7%). For ultrasound data, the frequency of synovial hypertrophy , effusion joints, and bone erosions were respectively represented in 17(23%), 12(16%) and 2(3%).Our study revealed 14% of ultrasound abnormalities despite how normal the clinical examinations were. This study suggests that ultrasound is a complement to the clinical examination and it would be desirable to conduct more researches for the evaluation of the Doppler activity in the hips.

Introduction

The frequency of the occurrence involvement of hip in rheumatoid arthritis is 15 to 36% [1-3]. It is a poor prognostic factor and its evolution would be severe, because it could engender a major functional handicap , if there is a diagnosis delay or an unadapted care [4-6]. The clinical assessment of the hip in rheumatoid arthritis is difficult. The fact that it is a deep and an inaccessible joint outlines the need to use the ultrasound method in order to explore it. Its evaluation is important to enable early positive and adequate diagnosis to avoid the aftereffect [7, 8]. The aims of our study were to determine the prevalence of different ultrasound damage of the hip and to compare these ultrasound damages of the hip to clinical and biologicals data.

Materials and methods

It was a transversal study which included patients with rheumatoid arthritis meeting the criteria, according to 2010 American College of Rheumatology /European League Against Rheumatism criteria [9].The verbal consent from all patients was obtained before the start of the inclusion. The hip prostheses were not included. Clinical examination was performed by an experienced rheumatologist who collected the following data: hips pain in the past, current spontaneous hip pain, hip pain of mobility, limitation of hip (internal and external rotations, flexion extension). The Disease activity score in 28 joints and Heath Assessment Questionnaires were also evaluated.

Lequesne Index, biomarkers (VS, CRP) and immunologic parameters (rheumatoid factor, Antibodies anti-citrullinated peptides) were collected. Treatment received by patients (antalgic, NSAIDS, steroids, csDMARDS, boDMARDS) were recorded during the data collection. The ultrasound examination was performed by an experienced rheumatologist sonographer who used a machine equipped with an 8 MHz frequency linear probe modes B and power Doppler. The hips have been explored in anterior time (neutral position, external rotation) , lateral time (according to Guidelines for musculoskeletal ultrasound in rheumatology) [10]. The OMERACT criteria were used to guide the interpretation of results. The ultrasound explorations sought as anomalies: synovial hypertrophy and effusion, bone erosion, tendinopathy (gluteus medius and gluteus minimus tendon), osteophytes .The capsular height (distance between the ilio-femoral ligament and the femoral neck) was also measured in millimeters. The hip joint cavity widening was considered if its distance was ≥8mm or the right –left comparison showed a value of > 2mm.

The statistical test used on the software SPSS21 (Statistical Package Social Sciences) with significant p value is less than 0.05. Quantitative variables were presented as mean ± standard deviation or median. Qualitative variables were presented in workforce (percent). For comparison, we used the simple linear correlation of Pearson (r, when it is symmetrical quantitative variables), Spearman (for asymmetric quantitative variables) and crosstabs with Fisher exact test (qualitative variables)

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Results

The study included 37 patients with rheumatoid arthritis, average age was 50.30 ± 11years , with a total of 73 hips were explored using ultrasound. One hip prosthesis was not included. All patients had their positive immunological status (FR, Anticcp).The duration of disease was 7,4±0,72 months. The demographic, clinical and biological characteristics of the patients are presented in table I. The spontaneous frequency of hip pain was 7/73 (10%), the frequency of the synovial hypertrophy represented to 17/73 (23%). We found 7 (25%) of patients have a clinical damage at the hips (p, 040). Correlation between ultrasonography results and demographic, clinical and biologic parameters are presented in (table 3,4).

Table1 . Demographic, Biologic parameters.

Parameters	**frequency**
Number of patients	37
female	32(86%)
csDMARDS	27(74%)
boDMARDS	8(22%)
Corticosteroids(per os)	34(93%)
NSDAIs	7 (19%)
	Mean
Age in years (median±SD)	50,30±11(30;78)
Disease duration, months median±SD)	3,24±0,42(2,8;4)
Hip damage duration	7,4±0,72 (6;9)
ERS, mm/h (median±SD)	39[22;67,50]
CRP, mg/dl (median±SD)	10[4,25;29,62]
Rheumatoid factor rate(UI)	64[20,128]
Antibodies anti-citrullinated peptides rate(UI)	200[59;342]
BMI, kg/m2(median±SD)	25,50±5,33(14;36)
Lequesne index (median±SD)	5,40±3,85 (0;15)
HAQ score (median±SD)	1,16±0,68 (0;2,62)

Table 2 .Frequency of clinical and ultrasonography parameters.

Parameters	**Frequency**
Number of hips	73
Current spontaneous coxo-femoral joint pain Coxo-femoral joint pain of mobility (Rotation external and internal)	7(10%) 13(18%)
Limitation of the coxo-femoral joint Type of limitation Evocated limitation by Rotation external or internal Evocated limitation by Flexion	5(7%) 4(5 %) 1(2%)
Peri-joint pain	4(5%)
US synovial effusion	12(16%)
US synovial hypertrophy	17(23%)
US bone erosions	2(3%)
US osteophytes Medius gluteus Tendinopathy Iliopsoasbursitis	2 (3%) 3(4%) 2(3%)

The rheumatoid arthritis is the most frequent chronic inflammatory rheumatism. It is a polymorphic disease likely to cause joints deformation and destruction of the patients. During the rheumatoid arthritis, suffering from the hip is an evolutionary stage of the disease and engages the patient's functional prognosis [12-13].The early diagnosis of these damages, is required by ultrasound exploration to prevent their expansion. Our study was the first in the Maghreb region, aimed to correlate the clinical biologics with hip ultrasound parameters in patients suffering from rheumatoid arthritis. Our study found synovial hypertrophy in 17(23%) cases; we significantly found that 14% of patients had ultrasound damage, although the clinical examination of the hip was normal; otherwise, ultrasound explorations have more found abnormalities than clinical examination. So for this group of patients, sonography of the hip would be useful for the early diagnosis of damage. While the work of Kerstin. E et al. revealed, among 76 patients with rheumatoid arthritis, 7(9%) patients with positive ultrasound findings were asymptomatic [14]. The joint effusion, bone erosion and osteophytes were found respectively in 12 (16%), 2 (3%) and 2(3%) cases in our study. During hips explorations in our patients, no Doppler activity was registered. L. Di. Geso and al, Having included 52 patients over 62±15 years old including 39 women in their study; L. Di. Geso and al have also reported that the ultrasound exploration of the hip didn't reveal any Doppler signal [15] .We know that during the ultrasound explorations of the joints, the Doppler activity of synovitis detection is predictive of structural progression [16-18]. Several questions arise about the detection of Doppler activity in the hips: would there be a doppler activity that recently used probe could not detect? If there is, then there is need to do some research studies in order to invent some appropriate probe. Comparing the different clinical and ultrasound impairs, we significantly found a moderate correlation between the overall number of the femoral joints clinical damage, and the number of hips that have presented a synovial hypertrophy. However there was no correlation between the number of periarticular pain and the number of hips that have been submitted to tendinopathy. Hip damage can remain asymptomatic for a long time and show up at a stage when complications occur. We found that 25 % of patients under treatment have a clinical damage at the hips. Some hip diseases do not respond to treatments even when well administered. That group of patients may be candidates to local ultrasound guided gestures. No correlation was significant between ultrasound and biological parameters, nor with the Lequesne index, DAS28 and HAQ; however, there was a significant correlation between the number of hip limited and synovial hypertrophy. As for the limits of our study, although the sample may be statistically valid, it remains insufficient and further studies may include a large sample for desirable results.

Table 3 . Comparison between ultrasonography and clinical damage of coxo-femoral articular .

Ultrasonography damage of coxo-femoral articular				
Height	Effusion	Presence		Absence
Capsular r p	Synovial Presence	Hypertroph y synovial 6(75%)	Bone erosions	Osteophytes 2(25%)
Clinical involvement of coxo-femoral Articular absence		4 (14%)		25(86%)

p 0,002, kappa of cohen : 0,56 , sensibility 60% , specificity 93%.

Table 4. Correlation between ultrasound , demographic , clinical and biologic parameters.

Age	0,35 0,33	-0,12 0,45	0,17 0,30	0,27 0,10	-0,20 0,22
Disease duration	-0,26 0,12	-0,13 0,42	0,28 0,09	0,13 0,14	-0,09 0,56
Duration of hip damage	0,15 0,3	0,13 0,41	0,33 0,06	0,01 0,92	-0,09 0,57
ESR	0,04 0,8	0,05 0,74	-0,10 0,57	0,17 0,34	-0,23 0,19
CRP	0,28 0,12	0,08 0,63	0,11 0,54	0,09 0,60	-0,12 0,48
Rate of Rheumatoid Factor	-0,01 0,95	-0,05 0,75	-0,11 0,53	-0,02 0,89	-0,04 0,82
Rate of A CCP	-0,08 0,63	-0,07 0,68	-0,10 0,57	-0,02 0,89	-0,06 0,72
Lequesne index	0,17 0,31	0,10 0,55	0,16 0,34	-0,10 0,53	-0,01 0,91
DAS 28	0,11 0,53	0,16 0,34	0,004 0,98	0,04 0,82	-0,25 0,15
HAQ	0,04 0,79	0,12 0,47	0,09 0,56	-0,04 0,81	-0,01 0,95
Spontaneous pain of femoral joint Peri joint pain Pain mobility	0,16 0,34 0,53 0,1 0,16 0,34	-008 0,60 -008 0,62 -0,08 0,60	0,18 0,27 0,45 0,4 0,18 0,27	0,26 0,11 -0,05 0,73 0,26 0,11	-0,06 0,71 0,47 0,3 0,06 0,71

Conclusion

Our study revealed 14% of ultrasound abnormalities despite how normal the clinical examination was. This study suggests that ultrasound is a complement to the clinical examination and it would be desirable to conduct more researches for the evaluation of the Doppler activity in the hips.

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