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Correlation between Radiological Score and Prognostic Markers in Rheumatoid Arthritis in Libya

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Abstract

The objective of our study was to estimate Radiological change in patients with rheumatoid arthritis and to determine the possible correlation with established prognostic markers in those patients.

Patient and method: Follow up study patients were diagnosed as Rheumatoid Arthritis (RA), those patients were studied clinically, history of fatigue, morning stiffness, number of joint pain or swollen functional disability assessed by the Health Assessment Questionnaire (HAQ), and the Disease Activity Score in 28 joints (DAS 28), Radiographic assessment; Plain radiograph of the shoulders, elbows, hips, knees, ankles, subtalar, hands and feet analysis by The Larsen score. The correlation coefficients between Radiographic changes and different prognostic markers were calculated using Pearson's correlation coefficient (r). Statistical significance was defined as $P<0.05$.

Result: Mean DAS 28 activity at baseline was (4.4 ± 1.2), Most patient had moderate or severe disease activity, the mean health assessment questionnaire score (HAQ) of patients (1.2) was indicated moderate disability. The mean Radiological change assessment by Larsen score (34-200) M=[106 ± 44.3) was reflect progression radiological score most of patient s had grade in between 2 to 3 (narrow joint space and erosion), The distribution erosive changes is The hands, Elbows, feet and knees were most frequently affected .the significant correlation between progression joint damage and age, duration disease, antibodies against citrullinated antigens (anti-CCP), rheumatoid factor (IgM-RF), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP).
Conclusion: Improvement in health assessment questionnaire score (HAQ) after treatment from baseline indication less destructive joints.

Keywords: Radiological score; The health assessment questionnaire (HAQ); The disease activity score in 28 joints (DAS 28); Rheumatoid factor (IgM-RF); Antibodies against citrullinated antigens (anti-CCP); Disease modified anti rheumatoid drugs (DMARDs)

Introduction

Rheumatoid Arthritis (RA) is a systemic autoimmune disease characterized by inflammatory polyarthritis, which affects peripheral joints and the small joints of hands and feet, most patients report involvement of small joints first, classically the PIP, MCP, and MTP joints followed by the wrists, knees, elbows, ankles, hips, and shoulders [1].

Patients with RA develop joint space narrowing and bony erosions, which are observed in radiographs of the hands and feet. Plain radiographs are often normal early in disease and the early changes evident on plain films may include only soft tissue swelling and periarticular osteopenia. Radiographs should be repeated every two years [1]. Widely available tests that may predict functional and radiographic outcomes in patients with rheumatoid arthritis are serum IgM rheumatoid factor, serum anti-citrullinated peptide antibodies (ACPA), erythrocyte sedimentation rate (ESR), and C reactive protein (CRP) [2,3].

The objective of our study was to estimate Radiological change in patients with rheumatoid arthritis and to determine the possible correlation with established prognostic markers in those patients.

Patients and Method

Follow up study patients were diagnosed as rheumatoid arthritis according to 2010 ACR/European League against Rheumatism (EULAR) Classification Criteria for Rheumatoid Arthritis, assessment clinically and laboratory test every 6 months and 12 months.

Those patients were studied clinically, history of fatigue, morning stiffness, number of joint pain or swollen and functional disability assessed by the Health Assessment Questionnaire (HAQ) which evaluates patients' ability to perform activities of daily living, Ranges of HAQ scores <0.3 are normal - (0,3-1) are mild disability - (1-2) are moderate disability >2 are sever disability and the Disease Activity Score in 28 joints (DAS 28), Ranges of DAS28 scores that correspond to high DAS28 >5.1, moderate >3.2 To 5.1, low DAS28 2.6 To 3.2, and remission DAS28 <2.6. the blood samples were obtained to evaluate the Erythrocyte sedimentation rate (ESR) (normal values ≤15 mm/1st hour in men and ≤20 mm/1st hour in female) and C-reactive protein (CRP) normal values ≤0.40 mg/dl level and positive values >6 mg/dl, the presence of Rheumatoid Factor (IgM-RF) whereas a titre of IgM-RF >40 UI/ml was considered as positive and anti-cyclic citrullinated peptide (anti-CCP) antibodies positivity was >20 IU/ml.

Radiographic Assessment

Plain radiograph of the shoulders, elbows, hips, knees, ankles, subtalar, hands and feet analysis by The Larsen score was graded for each joint and calculated for each patient, The Larsen score, on a scale of 0 to 5 according to reference radiographs, total score has a range from (0 to 260).

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0=Intact bony outlines and normal joint space,

1=Erosion less than 1 mm in diameter or joint space narrowing,

2=One or several small erosions, diameter more than 1 mm,

3=Marked erosions,

4=Severe erosions, where there is usually no joint space left, and the original bony outlines are partly preserved,

5=Mutilating changes, where the original bony outlines have been destroyed.

Statistical Analysis

Data and statistical analysis was done using the Statistical Package for Social Science (SPSS) version 20, Descriptive Statistics included the mean and Standard Deviation (SD) for quantitative variables, and effective and percentage for categorical variables Differences between the categorical variables were tested using Paired t-test and The correlation coefficients between Radiographic changes and different prognostic markers were calculated using Pearson's correlation (r). Statistical significance was defined as $p<0.05$.

Ethical

My study done on human body by interviewed with a structured questionnaire in rheumatology clinic and hospitalization to Benghazi medical centre, no invasion investigation done and all patients had agreed precipitated in my work

Result

Ninety three patients with diagnosed rheumatoid arthritis were included in the study. Patient's clinical characteristics are shown below (Table 1). The age of the study patients ranged from (24-68 years), M=(48 ± 13 year), 80 (86%) were female, 13 (13.9%) were male. the duration disease range from (2-28 year) M=(12 ± 7 year), 84 (90.3%) of the patients had positive rheumatoid factors, 80 (86%) had positive anti-cyclic citrullinated peptide (anti-CCP), 88 (94.6%) had positive C-reactive protein (CRP+), 13 (13.9%) had positive Sub Cutaneous Nodule, 8 (8.6%) had lung fibrosis and erythrocyte sedimentation rate (ESR) ranged from(50-148) M=98.1 ± 23.7. Mean DAS 28 activity at baseline was (4.4 ± 1.2), Most patient had moderate or severe disease activity, the mean health assessment questionnaire score (HAQ) of patients (1.2) was indicated moderate disability choice of therapy of rheumatoid arthritis according guideline methotrexate (MTX) was the most commonly prescribed 86 (92.5%), and leflunomide therapy prescribed 7 (8%) who intolerance to methotrexate (MTX), As stated by recent updated 2016 European League Against Rheumatism (EULAR) recommendations for the management of rheumatoid arthritis be combined with biological therapy because of a superior efficacy .choice of biological drug was 40 (43%) of patient on Infliximab, 24 (25.8%) of patient on Adalimumab, 19 (20.4%) of patient on Etarnercept and 10 (10.7%) of patient on Rituximab .at follow-up shown below Figure 1. decline DAS 28 activity at 6 month after treatment from baseline was 1.2-3.6 M=(2.3 ± 0.5), and Mean DAS 28 activity at 12 months after treatment from baseline was 0.6-2.6 M=(1.2 ± 0.4), Differences between Mean DAS 28 activity at baseline and 6 months or 12 months analyzed by Paired T test with significant P value=0.000, in addition greater improvement in health assessment questionnaire score (HAQ) after treatment from baseline with significant P value=0.000 in Figure 2.The mean Radiological change assessment by Larsen score (34-200) M=[106 ± 44.3) was reflect progression radiological score most of patient s had grade in between 2 to 3 (narrow joint space and erosion), The distribution of narrow joint space in the large joints, hands and feet is shown in Table 2 is the hip, knee, ankle, subtalar, feet, shoulder, elbows, hands were (32.2%, 28%, 27%, 30.1%, 32.2%, 39%, 34%, 26%, respectively) while erosive changes in hands, Elbows, feet and knees were most frequently affected (34.4%, 9%, 11% and 26% respectively) and were affected significantly more often bilaterally than unilaterally. The shoulder, hips, ankles, and the subtalar joints were less often

Age	24-68 years M=(48 ± 13 y)
Sex	80 female (86%) 13 male (13.9%)
Duration disease	2-28 year M=[12 ± 7 y]
RF+	84 (90.3%)
CCP+	80 (86%)
Erythrocyte sedimentation rate (ESR)	(50-148)M=98 ± 24
C-reactive protein (CRP+	88 (94.6%)
Sub Cutaneous Nodule	13 (13.9%)
Extra Articular Lung Fibrosis	8 (8.6%)
High DAS28 >5.1	28 (30.1%)
Moderate DAS28 >3.2 <5.1	48 (51.6%)
LOW DAS28 >2.6 <3.2	17 (18.3 %)
Methotraxte therapy	86 (93%)
leflunomide therapy	7 (8%)
Infliximab	40 (43%)
Adalimumab	24 (25.8%)
Etarnercept	19 (20.4%)
Rituximab	10 (10.7%)

Table 1: Clinical characteristics of patients in rheumatoid arthritis.

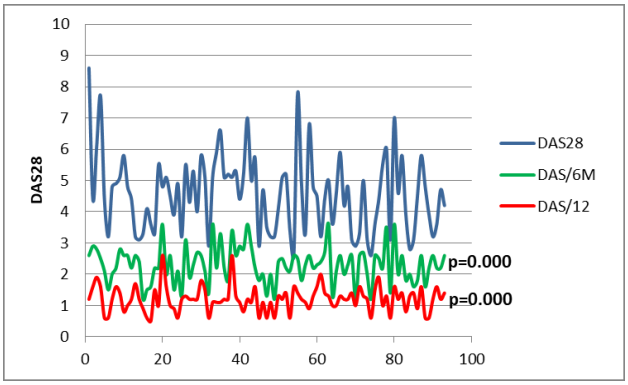

Figure 1: Improvement in disease activity score 28 after treatment of patient with rheumatoid arthritis.

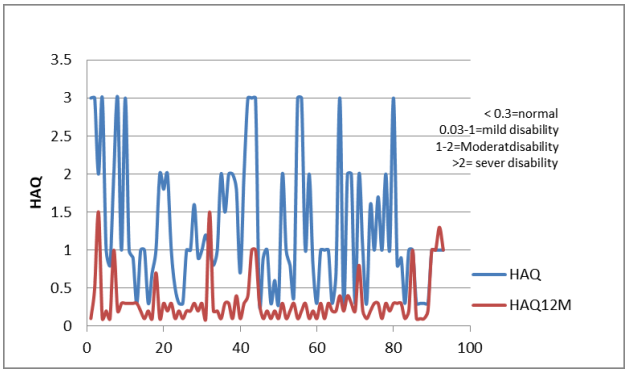

Figure 2: Improvement in HAQ after treatment of patient with rheumatoid arthritis.

Radiological Score	Joint space narrowing	Erosion	Ankyloses Joint	Replacement Joint (Prostheses joint)
Hip joint	30 (32.2%)	4 (4.3%)	5 (5.4%)	2 (2.2%)
Knee joint	26 (28%)	24 (26%)	11 (12%)	4 (4.3%)
Ankle joint	25 (27%)	5 (5.4%)	-	-
Subtalar joint	28 (30.1%)	1 (1.1%)	-	-
Feet (MTP) Joint	30 (32.2%)	10 (11%)	-	-
Shoulder joint	36 (39%)	-	6 (6.5%)	-
Elbow joint	32 (34.4%)	8 (9%)	13 (14%)	-
hands	24 (26%)	32 (34.4%)	14 (15.1%)	-

Table 2: Baseline radiological score in patient with rheumatoid arthritis.

	Correlation coefficient	P value
Age	0.282	0.006
Sex	0.005	0.96
Duration Of Disease	0.501	0
CCP+	0.209	0.044
RF+	0.215	0.038
Erythrocyte sedimentation rate (ESR)	0.381	0
C-reactive protein (CRP+)	0.232	0.025
HAQ (0-3)	0.113	0.281

Table 3: Correlation coefficient between progression joint damage and different variables.

affected. We demonstrated (Table 3) a significant correlation between progression joint damage and age, duration disease, antibodies against citrullinated antigens (anti-CCP) rheumatoid factor (IgM-RF), erythrocyte sedimentation rate (ESR) and (C-reactive protein (CRP). (r=0.282**P=0.006), (r=0.501**P=0.000), (r=0.209*p=0.038), (r=0.381**p=0.000) and (r=0.232* p=0.025, respectively), no significant correlation between progression joint damage and sex or health assessment questionnaire score (HAQ).

Discussion

In this study of Libyan patients with Rheumatoid arthritis The demographic characteristics of Our patients had mean age (48 ± 13 years), (86%) were female affected were agreement with other studies [2,4], Our patients had long standing disease with a mean 12 years, patients had disease long duration was reflecting Daley referral patient or missed early diagnosis, almost of patients had (90.3%) positive Rheumatoid Factor (RF), (86%) positive anti-cyclic citrullinated peptide (anti-CCP) antibodies and (13.9%) positive Sub Cutaneous Nodule which help in diagnosis of rheumatoid arthritis and prognostic value. Measures of function score by Health Assessment Questionnaire (HAQ) which most widely used questionnaire to assess disability. Mean of Health Assessment Questionnaire (HAQ) was (1.2 ± 0.4) that reflecting moderate disability indicated active disease. The Disease Activity Score (DAS 28) it combines changes in joint counts, global responses and the ESR (or CRP), can be used to measure the absolute level of disease activity and response to treatment in both clinical trials and routine practice, The higher the DAS 28 score >5.1 the more active the arthritis. Our patients had mean (4.4 ± 1.2) that reflecting high active disease.

Erythrocyte Sedimentation Rate (ESR) and Serum C-Reactive Protein (CRP) will both be increased tend to correlate with disease activity in rheumatoid arthritis as well as disease severity and may be useful for monitoring therapeutic response [5,6]. Our patients had (94.6%) positive C-reactive protein (CRP), mean erythrocyte sedimentation rate (ESR) 98 ± 24 reflecting disease activity in rheumatoid arthritis as well as radiologic progression in rheumatoid arthritis.

Radiographic changes in rheumatoid arthritis (RA) can be assessed by the method of Larsen score (LS) based on the analysis of large joints, hands and feet. The mean Radiological change assessment by Larsen score (34-200) M=(106 ± 44.3) was reflect progression radiological score most of patient s had grade in between 2 to 3 (narrow joint space and erosion), few destruction joint with Prostheses joint are reflecting delay treatment and progression of disease [7], however most joint are affect hands, feet and knees, with erosive changes are most frequently in hands and feet and knees.

Several studies have shown CRP score, and IgM RF positivity proved to have a higher association with radiological progression than the duration of disease [4,8]. Elevations of both ESR and CRP are stronger indications of radiologic progression than CRP alone [8] in the present study found significant correlation between progression joint damage and age, duration disease, antibodies against citrullinated antigens (anti-CCP) rheumatoid factor (IgM-RF), Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP) agreement with other studies [4,7,10-14]. The treatment of rheumatoid arthritis (RA) is start with methotrexate (MTX) is first drug started as soon as a diagnosis of rheumatoid arthritis (RA) has been made and, biologics therapies are highly effective in reducing rheumatoid arthritis symptoms, slowing disease progression, and improving DAS 28 activity at baseline and 6 months or 12 months are agreement with other studies [9-11], the greater improvement in health assessment questionnaire score (HAQ) after treatment from baseline and no disability indication less destructive large joints which important determinant of functional capacity and disability in several studies [12-14].

Conclusion

Powerful predictor of erosion change in Radiological score of rheumatoid arthritis has been made a diagnosis is age, duration disease, antibodies against citrullinated antigens (anti-CCP), rheumatoid factor (IgM-RF), Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP). Improvement in health assessment questionnaire score (HAQ) after treatment from baseline indication less destructive large joints.

References

1. Kellgren JH, Bier F (1956) Radiological signs of rheumatoid arthritis: A study of observer differences in the reading of hand films. Ann Rheum Dis 15: 55.
2. Egeland T, Munthe E (1983) The role of the laboratory in rheumatology. Rheumatoid factors. Clin Rheum Dis 9: 135.
3. Donald F, Ward MM (1998) Evaluative laboratory testing practices of United States rheumatologists. Arthritis Rheum 41: 725.
4. Syversen SW, Goll GL, Van der Heijde D, Landewe R, Lie BA, et al. (2010) Prediction of radiographic progression in rheumatoid arthritis and the role of antibodies against mutated citrullinated vimentin: results from a 10-year prospective study. Ann Rheum Dis 69: 345-351.

5. Nam J, Villeneuve E, Emery P (2009) The role of biomarkers in the management of patients with rheumatoid arthritis. Curr Rheumatol Rep 11: 371.

6. Amos RS, Constable TJ, Crockson RA, Crockson AP, McConkey B (1977) Rheumatoid arthritis: relation of serum C-reactive protein and erythrocyte sedimentation rates to radiographic changes. Br Med J 1: 195-197.

7. Mattingly PC, Matheson JA, Dickson RA (1979) The distribution of radiological joint damage in the rheumatoid hand. Rheumatol Rehabil 18: 142-147.

8. Drossaers-Bakker KW, de Buck M, van Zeben D, Zwinderman AH, Breedveld FC, et al. (1999) Long-term course and outcome of functional capacity in rheumatoid arthritis: the effect of disease activity and radiologic damage over time. Arthritis Rheum 42: 1854-1860.

9. Smolen JS, Landewe R, Breedveld FC, Dougados M, Emery P, et al. (2010) EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying anti rheumatic drugs. Ann Rheum Dis 69: 964-975.

10. Weinblatt ME, Kremer JM, Bankhurst AD, Bulpitt KJ, Fleischmann RM, et al. (1999) A trial of etanercept, a recombinant tumor necrosis factor receptor: Fc fusion protein, in patients with rheumatoid arthritis receiving methotrexate. N Engl J Med 340: 253-259.

11. Aletaha D, Funovits J, Keystone EC, Smolen JS (2007) Disease Activity Early in the Course of Treatment Predicts Response to Therapy after One Year in Rheumatoid Arthritis Patients. Arth and Rheum 56: 3226-3235.

12. Kievit W, Fransen J, Oerlemans AJ, Kuper, HH, van der Laar MA, et al. (2007) The Efficacy ofAnti-TNF in Rheumatoid Arthritis, a Comparison between Randomised Controlled Trials and Clinical Practice. Ann of the Rheum Dis 66: 1473-1478.

13. Landewe R, Van Der Heijde D, Burmester G, Perez JI, Spencer-Green G (2005) Radiograph improvement in clinical responders in the early treatment of recent-onset rheumatoid arthritis: Sub analysis of the PREMIER study. Ann Rheum Dis 64 (Suppl. III).

14. Lindqvist E, Saxne T, Geborek P, Eberhardt K (2002) Ten year outcome in a cohort of patients with early rheumatoid arthritis: health status, disease process, and damage. Ann Rheum Dis 61: 1055-1059.