DOES CLINICAL AND LABORATORY MARKERS ARE PREDICTIVE OF RADIOLOGICAL JOINT DAMAGE IN RHEUMATOID ARTHRITIS?

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Abstract

Aims and objectives. *To identify the association of following variables with radiographic findings in rheumatoid arthritis cases in Bangladesh: Age at onset, Duration of suffering, Sex, Clinical indexes of disease activity & Rheumatoid factor*

Methods. *In this observational study, 100 consecutive rheumatoid arthritis patients who met ACR criteria 1987 were enrolled from rheumatology OPD of BSMMU from the period of August 2009-April 2010. Clinical evaluations and laboratory investigations were done in all cases. Final evaluation was done on 96 patients, because 4 patients were dropped out, due to inconclusive radiological report. Radiographs of hands and wrists were scored by Van der Heijde modification of Sharp scoring method.*

Results. *Out of 96 patients 73 were female and 23 male with female male ratio of 3.1:1. Age of onset was 41.0±11.0 (mean ± SD) in male and 37.7±12.9 in female. 90 patients had severe RA among them 21 (23.3%) were male and 69 (76.6%) were female. Rose Waaler (RW) test was positive in 68 cases. Bony erosions were observed in 58 cases, out of them 15 (65.2%) were male and 43 (58.9%) female. Bony erosions were observed in 60.3% cases of positive Rose Waaler and 69.8% in patients whose age at onset was < 45 yrs. Hemoglobin level (gm/dl) was 12.2±1.6 in male and 10.9±1.5 in female. Platelet count was 312142±111233 in male and was 379114±115574 in females.*

Conclusion: *Hemoglobin levels were significantly lower among the anemic women than anemic men. Thrombocytosis was also more in women than men. Higher percentage of bony erosions was observed among the cases of positive RW and whose age at onset was < 45 but it was not statistically significant.*

Key words: *Rheumatoid arthritis, Rheumatoid factor, joint damage.*

Introduction:

Rheumatoid arthritis (RA) is a systemic inflammatory disorder that mainly affects the diarthrodial joints[1]. It is the most common form of inflammatory arthritis. In its typical form RA is a symmetrical, destructive and deforming polyarthritis affecting small and large synovial joints with associated systemic disturbance, a variety of extraarticular features and the presence of circulating antiglobulin antibodies (Rheumatoid factor, RF)[2]. The clinical course of RA is variable, ranging from mild to severe with profound morbidity and mortality. The best predictors of disability are-early age of onset, radiological grade, sex, initial functional class, rheumatoid factor positivity and rheumatoid nodule[1]. Age is the most powerful single predictive variable. As age increases incidence of RA also increases, co-morbid condition also increases. The course of major disability of RA is set in the first few years of disease[3]. Rheumatoid factor is a hallmark of adult onset RA but in many published studies are of series containing few patients to whom RF is not detected[4]. Severe disease, extraarticular manifestations and radiographic progression of joint damage are more frequently observed in seropositive RA[5,6]. The degree and extent of joint damage as assessed by radiographic techniques constitutes an important measure of outcome in the treatment of RA. Radiological damage progresses at a constant rate[7] which is the result of chronic joint inflammations and is often considered an important factor in judging the course of RA and

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the efficacy of treatment with DMARDs. In advanced disease monitoring the progression of previously existing damage is as important as assessing new abnormalities in previously undamaged joints[8].

Materials and methods

In this observational study 100 RA patients who met American College of Rheumatology (1987) criteria were selected. Four patients were dropped out from the study due to inconclusive radiological report. Subsequently all analysis were done with 96 patients. This study was carried out in the Rheumatology wing, department of Medicine, BSMMU. All the X-rays of hands and wrists were interpreted by a Radiologist. The patients were collected during the period of August 2008- April 2009. Inclusion criteria were, all patients must meet American College of Rheumatology (1987) criteria for RA and have onset age > 16 yrs, Radiographs and/or report of radiographs of hands and wrists must be available,

Outcome measures.

The following parameters were assessed in all patients at study entry: age, sex, duration of symptoms, time between diagnosis and study enrollment, total number of joint involvement (out of 58-joint count, PIP- 10, MCP- 10, wrist- 2, elbow- 2, shoulder- 2, hip- 2, knee- 2, ankle- 2, MTP- 8, IP- 18).

Total number of tender joints, joint tenderness index by Ritchie articular index (0 = non-tender, 1 = tender, 2 = wincing and 3 = withdrawal)[9], total number of swollen joint, Ten point visual analogue scale (VAS) for patient's assessment of pain, patient's global assessment of disease activity score: 1 = asymptomatic, 2 = mild, 3 = moderate, 4 = severe, 5 = very severe, physician's global assessment of disease activity score: 1 = asymptomatic, 2 = mild, 3 =

moderate, 4 = severe, 5 = very severe, Health Assessment Questionnaire (HAQ), Rose Waaler test, X-ray of the hands and wrists - by scoring system (the van der Heijde modification of the Sharp scoring method), ESR, Hb%, TC, DC, Urine R/E, Serum Creatinine, SGPT, fasting blood sugar. Early onset-disease was considered in patients who developed RA before age of 45 years[10]. Assessment of severity: Severe RA if one of the following characteristics was present: HAQ score > 1.25, total number of erosions > 30, and number of persistently swollen joints > 4, number of prescribed second line drugs > 2, or occurrence of nodules and other extraarticular manifestations[11]. If none of these characteristics was present, patients were classified as having mild RA. HAQ scoring was done by standard Scoring system[12,13]. Radiographs of the hands and wrists (postero-anterior views) were scored according to the van der Heijde modification of Sharp scoring method.

Data analysis. Descriptive measures (Mean and Standard Deviation) were used in analysis. Crossed tabulations were used to find the associations. Finally t-test and chi-square test with Yates correction were done to find out significant association.

Results

Table1. Out of 96 patients 73 were female and 23 were male with female male ratio of 3.1:1. Age of onset was 41.0±11.0 (mean± SD) in male and 37.7±12.9 in female and duration of disease was 4.2±4.0 and 6.0±7.5 in males and females respectively. Family history was positive in 11 cases. Rose Waaler test was positive in 68 cases. Joint erosions were observed in 58 patients, out of them 15 (65.2%) were male and 43 (58.9%) female. Hemoglobin % was 12.2±1.6 in males and 10.9+1.5 in females, Platelet Count were 312142± 111233 in males and 379114± 115574 in females.

Table-I

	Total	Male	Female
Sex	96	23 (23.96)	73 (76.04)
Male: Female ratio	1:3.1		
Age at onset	38.5 ± 12.5		
Duration or Disease		4.2±4.0	6.0±7.5
Positive family history	11(11.5)		
Total joint involved	21.5±7	22.4±16.1	21.23±14.3
Number of Swollen joint	7.8+6.5	7.7±6.9	7.9±6.5
Number of Tender joint	20.7±14.9	21.7±16.1	20.3±14.7
Tenderness index	41.8±37.7	43.4±42.9	41.3±36.2
Patient assessment of pain (VAS)	4.8±2.4	4.5±2.4	4.9±2.5
Patient global assessment	2.8±0.93	2.8±1.0	2.8±.9
Physician global assessment	2.8±0.9	2.7±.9	2.8±.9
HAQ score	1 .26±0.7	1.29±.7	1.26±.7
Rose Waaler positive	68 (70.8)		
Erosive joint damage	58 (60.42)	15(65.2)	43(58.9)
Non erosive joint	38 (39.58)	8(34.8)	30(41.1)
ESR	71.9±39.4	65.0±42.0	74.2±38.6
Hb (gm/dl)	11.3±1.6	12.2±1.6	10.9±1.5
Platelet Count	363659±117452	312142±111233	379114±1 15574

(Data in the parenthesis indicates percentages and values are described as mean ± SD)

Table II

Variables were assessed at first visit in male and female patients in tabulated form and significance were tested by t-test. There was significant difference between hemoglobin (gm/dl) and platelet count between male and female.

	Male (23)	Female (73)	t- value
Age of onset	41.0+11.0	37.7±12.9	1.19
Duration of Disease	4.2±4.0	6.0±7.5	-1.47
Total joint	22.4±16.1	21.23±14.3	.281
Swollen joint	7.7±6.9	7.9±6.5	-.109
Tender joint	21.7±16.1	20.3±14.7	.347
Tenderness index	43.4±42.9	41.3±36.2	.217
Patient assessment of pain (VAS)	4.5±2.4	4.9 ± 2.5	-.649
Patient global assessment	2.8±1.0	2.8±.9	.086
Physician global assessment	2.7±.9	2.8±.9	-.119
HAQ score	1.29±.7	1.26±.7	.223
ESR	65.0±42.0	74.2±38.6	-.927
Hb	12.2±1.6	10.9±1.5	3.52**
PC	312142±111233	379114±115574	-2.398*

**p< 0.01, *p< 0.05

Table-III

Radiographic evidence of joint erosion was present in 62.7% of early age and 55.2% of late age of onset

	Total	Erosion present	Erosion absent
Age of onset			
<45	67 (69.8)	42 (62.7)	25 (37.3)
> = 45	29 (30.2)	16(55.2)	13(44.8)
Total	96	58(100.0)	38 (100.0)

(Data in the parenthesis indicates percentages)
$X^* = 0.48$, $p = 0.49$

Table-IV

Higher percentage of erosion (60.3%) was observed among the cases of positive RW but it was not statistically significant.

	Total	Erosion present	Erosion absent
Positive	68 (70.8)	41 (60.3)	27(39.7)
Negative	28 (29.2)	17(60.7)	11(39.3)
Total	96	58	38

(Data in the parenthesis indicates percentages)
$X^2 = 0.969$, $p = 0.578$

Table-V

The clinical and laboratory variables were analyzed and significance was tested by t-test. There was no significant difference between the variables in erosion present and absent patients.

	Erosion present (58)	Erosion absent (38)	t-value
Age of onset	38.1±12.5	39.1±12.5	-.383
Duration of disease	6.1 ±6.3	4.7±7.6	.893
Total joint	23.3±15.0	18.7±14.0	1.512
Swollen joint	8.9±9.6	6.3±5.8	1.974
Tender joint	22.3±15.4	18.2±14.1	1.332
Tenderness index	43.8±38.4	38.8±36.9	.629
Patient assessment of pain (VAS)	5.1 ±2.6	4.4±2.2	1.386
Patient global assessment	2.9±.9	2.6+.S	1.759
Physician global assessment	2.9±1.0	2.6±.7	1.861
HAQ score	1.3+.7	1.2+.6	.969
ESR	76.3±41.5	65.0±35.3	1.419
Hb	11.1±1.6	11.5±1.4	-1.559
PC	375905.6±120 813.3	346579±1119 30	1.192

**p < 0.01, *p < 0.05

Table-VI

Joint erosions were present in 65.2% male and 58.9% female patients. Comparison by chi square (X^2) test did not show any significant difference.

	Total	Erosion present	Erosion absent
Male	23 (24.0)	15(65.2)	8 (34.8)
Female	73 (76.0)	43 (58.9)	30(41.1)
Total	96	58(100)	38(100)

(Data in the parenthesis indicates percentages)
X^2=0.29, p = 0.589

Table-VII

6 patients had mild RA and 90 patients had severe RA. Among the patients of severe diseases 21 (23.3%) were male and 69 (76.6%) were female. The result is not statistically significant.

	Total	Male	Female
Severity			
Mild	6(6.3)	2(33.3)	4(66.7)
Severe	90(93.8)	21(23.3)	69(76.6)
Total	96(100)	23 (100)	73 (100)

(Data in the parenthesis indicates percentages)
X^2= 0.004 (Yates correction), p = 0.95

Table-VIII

Among the patients of severe diseases 55 (61.1%) had erosive damage. Among the patients of mild diseases 3 (50%) had erosive damage. The result is not statistically significant.

	Total	Erosion present	Erosion absent
Severity			
Mild	6 (6.3)	3 (50.0)	3 (50.0)
Severe	90 (93.7)	55(61.1)	35 (38.9)
Total	96(100)	58(100)	38(100)

(Data in the parenthesis indicates percentages)
X^2=0.01 (Yates correction), p=0.91

Discussion

Out of 96 cases 73 were female and 23 male with female to male ratio 3.1:1 which is similar to most of the studies[14,15]. We observed mean age of onset of RA in the study population is 38.5 years, in whom mean age of onset in male cases were 41 years and in female cases were 37 years, which is consistent with most of the studies[16,17]. Analysis of clinical and laboratory variables between male and female cases showed no significant difference except hemoglobin

% and platelet count. Hemoglobin % was significantly lower and platelet count was significantly higher in females than males. Hochberg et al 1988 showed that hemoglobin levels were significantly lower among the anemic women than anemic men which are consistent with our observation[18]. Higher percentage of bony erosions were observed among rheumatoid factor positive patients but comparison between erosion present and absent cases did not show any statistically significant difference. Van Zeben et al, observed that patients with a persistently positive RF test, irrespective of the type of test used, had more radiological abnormalities[11]. Fuchs et al 1989, observed that radiographic scores were strongly correlated with duration of disease but we did not find any significant difference[19].

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