

Patterns of radiographic changes in hands and feet of rheumatoid arthritis in Saudi Arabia

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ABSTRACT

Objectives: The aim of the study was to characterize the pattern of radiographic changes in the hands and feet of rheumatoid arthritis in Saudi patients.

Methods: The radiographs of hands and feet of rheumatoid arthritis patients attending rheumatology outpatient clinics of King Khalid University Hospital in Riyadh, Kingdom of Saudi Arabia, over the period extending from March to June 2001, were examined and reported for the presence of osteopenia, joint space narrowing, and erosions.

Results: Fifty-six rheumatoid arthritis patients were studied. Their mean age was 50 ± 1.9 years, and mean disease duration was 9.07 ± 0.84 years. Generalized

osteopenia was seen in 16/56 (29%) and periarticular osteopenia in 38/56 (68%). Joint space narrowing was present in 9/56 (16%) of feet and 35/56 (63%) of hand x-rays. Erosions were seen in 3/56 (6%) of feet and in 22/56 (39%) of hand x-rays. Significant correlation was seen between joints space narrowing, joint erosions, and disease duration.

Conclusion: Radiographic changes in hands and feet of Saudi rheumatoid arthritis patients are less severe than those reported from the West, and the pattern is also different with less affection of the feet.

Saudi Med J 2005; Vol. 26 (7): 1065-1067

Rheumatoid arthritis (RA) is an inflammatory polyarticular symmetrical erosive disease. Hands and feet are usually affected at the onset of the disease. Reports from western countries documented that erosions occur in up to 90% of patients after 2 years and feet erosions are more common and occurred earlier than in hands. Radiographic progression was reported by some to be linear with time while others noted a faster radiographic progression during the initial of 2-5 years.¹⁻⁵ In our clinics, we noticed over the past 14 years that erosions are seen less frequently and particularly in feet. This study aimed on finding the frequency of radiographic changes in the hands and feet of RA patients in Kingdom of Saudi Arabia and to differentiate it from the pattern reported from the west.

Methods. Fifty-six patients diagnosed as having RA according to the American College of Rheumatology (ACR) criteria,⁶ who were attending the outpatient rheumatology clinic at King Khalid University Hospital in Riyadh, KSA over a 4 month period extending from March to June 2001, were included in our study. The patients were examined and medical records were reviewed and the following data were obtained: age, gender, age of onset of rheumatoid arthritis, duration of disease, rheumatoid factor status (using latex method) and erythrocyte sedimentation rate at initial presentation for each patient. Evaluation of radiographic changes of the hands were carried out by studying 3 views [anteroposterior, lateral and semisupine (ball-catcher)]. The feet were examined utilizing 2

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Received 29th December 2004. Accepted for publication in final form 30th April 2005.

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views (anteroposterior and lateral). The authors read the radiographs separately and consensus reporting was documented. We assessed the following radiographic features: bone density, alteration in joint space and joint erosion. Erosions were defined as focal cortical defects within and around the articular surfaces and marginal sites at the capsular attachment; periarticular osteopenia was defined as localized areas of reduced bony density with loss of trabecular pattern within the periarticular region. Simple descriptive statistics were used to analyze the data.

Results. Fifty-six [43 women (77%) and 13 men (23%)] of RA cases were reviewed. Their mean age at the time of study was 50 ± 1.9 years with a range of 22-76 years. The mean age at onset was 39.7 ± 1.86 years with a range of 18-65 years, mean disease duration 9.07 ± 0.84 years with a range of 2-34 years, mean erythrocyte sedimentation rate 52.50 ± 4.75 years with a range of 5-150 years and mean hemoglobin 12.4 ± 1.86 years. Rheumatoid factors were positive in 43 (77%) patients and rheumatoid nodules were seen in 10 (18%). Radiological evaluation revealed generalized osteopenia in 16 (29%). Periarticular osteopenia in 38 (68%). In the feet, joint space narrowing was seen in 9 (16%), joint erosion metatarsophalangeal (MTP) joints in 3 (5%), while in the hands, joint space narrowing was observed in 35 (63%) and joint erosions in 22 (39%) (**Table 1** shows the specific joint sites).

There was significant correlation between joint space reduction and disease duration ($R=0.266$) ($p<0.05$) and also between joint erosions and disease duration ($R=0.275$) ($p<0.05$). There was no correlation with rheumatoid factor positivity, the presence of rheumatoid nodules, ESR, hemoglobin level, age or gender.

Discussion. Our results show a different pattern of radiographic changes to that witnessed in the West. Our rheumatoid patient had less radiographic lesions in general and the distribution is also different. There were less radiographic changes in the feet than in the hands, which is the opposite of what is frequently reported for western patients.^{4,7} Bukhari et al⁷ reported erosions in 185/395 (44%) of rheumatoid patients and erosion started in the 1st year but continued over the 4 years of the study. Hulsmans et al⁴ reported stable rates of erosion scores and narrowing scores over the course of 6 years follow up study of 502 rheumatoid arthritis patients and that the joints of feet, and especially the 5th MTP became eroded earlier and more of them became eroded compared with the joints of the hands. Priolo et al,⁸ looking at 284 rheumatoid arthritis patients, found 11% having

Table 1 - Radiographic changes in hands and feet of rheumatoid arthritis patients.

Target	Reduced joint space		Joint erosion	
	n=56	(%)	n=56	(%)
Hands	35	(63)	22	(39)
Feet	9	(16)	3	(5)
MCP	24	(43)	10	(18)
Wrist	21	(38)	20	(36)
PIP	3	(5)	1	(2)
MTP	9	(16)	3	(5)

MCP - metacarpophalangeal, PIP - proximal interphalangeal, MTP - metatarsophalangeal.

only feet erosion and those progressed faster than others. Van der Heijde et al⁵ reported that more feet were affected at the start of their study of rheumatoid arthritis patients and hands followed. However at the end of 3 years, feet affection was still higher and the 70% radiographic change reported at the end of 3 years, was mostly present at the end of the 1st year. Lindqvist et al¹ in a 10 year follow up study of 181 rheumatoid arthritis patients showed that 90% of them had erosion after 2 years and 96% after 10 years.¹ And again, the small joints of feet were mostly affected early in the study, then hand erosions caught on. Unlike our study, it was the 2nd MTP which showed the greatest erosion.¹

Mottonen et al⁹ concluded that erosiveness in feet joints were twice that in finger joints and appeared earlier. The above studies showed rheumatoid arthritis to be a more aggressive disease in the West, with more erosions occurring early in the course of the disease and feet joints being affected and eroded at a higher rate than other joints.

While most of the above studies showed correlation with rheumatoid factor positivity, we found no such correlation. In our study, erosions correlated with duration of the disease only. Halla et al,¹⁰ in a cross-sectional study of 200 RA patients, showed that erosions correlated with disease duration but not seropositivity, however, his patients exhibited a preponderance of erosions especially in the feet joints [MTP erosions in 70%, metacarpophalangeal (MCP) 68%, proximal interphalangeal (PIP) 42% and distal interphalangeal (DIP) 16%. In comparison to the above plain radiography reports of radiographic changes in rheumatoid arthritis patients, Boutry et al,¹¹ in an MRI study of 30 rheumatoid arthritis patients, showed bone erosions in wrist joints to predominate [wrists 24/30 (80%)] over erosions of both metacarpophalangeal and metatarsophalangeal

(23/30 each). In other parts of the world, investigators also found difference in the occurrence of erosions between different ethnically derived populations. Anaya et al¹² reported that erosions in African descent, Columbian were less than the native score 7.7 ± 2 versus 2.2 ± 3.5 ($p < 0.05$). Others also found Caucasian rheumatoid arthritis patient to have higher rate of erosion than black Africans and the distribution of these erosion to be different.¹³ Chikanza et al¹³ studied the radiologic changes in black patients (84 Zimbabwe) and found them to be less than British Caucasian (84) and the distribution of erosions (hands and feet) were also different (Africans MCP 42/84, MTP 31/84 while United Kingdom MCP 46/84, MTP 54/84).

The reasons for these differences in rate, severity and distribution of erosions could be due to genetic factors as exemplified by the different human leukocyte antigen (HLA) association of rheumatoid arthritis between Caucasians and other population. Rheumatoid arthritis in our population is associated with HLA DR10 (DRB1* 1001) while that in Caucasian were with DR4 and DR1.¹⁴ It is interesting to note that Zimbabwean rheumatoid arthritis patients have a higher incidence of HLA DR10 than the control.¹⁵ Other reasons for the differences were difference in habits, an example of this is the lesser wearing of shoes in hotter climates and the act of 5 times daily ablution and washing of feet in preparation for Muslim prayer which has a massaging action in feet. Other factor which is seen to play part in the causation of less hip osteoarthritis versus non-Caucasian may have a role here, which can be related to the position of sitting on the floor as oppose to sitting on chairs, which in the case of rheumatoid feet may entail less hydrostatic venous back pressure and so less stagnation and better circulation.

In conclusion, our finding suggest a different pattern of radiographic changes of rheumatoid arthritis in our population with less rate and severity of erosions and less affection of joints of feet with these erosions as compared to hands.

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