

RADIOGRAPHIC APPEARANCE IN HANDS AND FEET OF RHEUMATOID ARTHRITIS PATIENTS AT A TERTIARY CARE HOSPITAL IN PAKISTAN

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ABSTRACT

Objective: The aim of the study was to see the radiographic appearance (erosions and joint space narrowing [JSN]) in hand and foot joints of patients of rheumatoid arthritis (RA) coming to a tertiary care hospital in Islamabad, Pakistan.

Study Design: Cross-sectional descriptive study.

Place and Duration of Study: The study was conducted in Department of Rheumatology at Pakistan Institute of Medical Sciences from June, 2013 till December, 2013.

Subjects and Methods: Both male and female patients of RA coming to Rheumatology outpatient department were recruited in the study after taking their consent. X-rays of both hands and feet were performed in each of these patients. These X-rays were scored using simple erosion narrowing score.

Results: There were total 153 patients in the study, 121 (79.10%) females and 32 (20.90%) males. The mean duration of RA was 6.36 ± 5.47 years. Joint erosions were found in 142 (92.81%) patients. All of these 142 (100%) patients had hand joint erosions. Only 63 (44.36%) patients had foot joint erosions as well. Radiographic changes (combined erosions and JSN) were found in 3712 (39.13%) hand joints and 335 (9.12%) foot joints.

Conclusion: Both erosions and JSN were seen predominantly in hand joints of our RA patients, with the foot joints showing much less radiographic changes. Therefore, doing X-Rays of only hands may be sufficient in RA patients for diagnostic and prognostic purposes.

Keywords: Rheumatoid arthritis (RA), Rheumatoid factor (RF), X-Rays.

INTRODUCTION

Many previous studies have assessed radiographic damage in hands and feet of RA patients. Most of these studies have been done in Europe and North America. They have shown that radiographic changes are found more frequently in the feet compared to hands especially in the initial few years of the disease^{6,7}. More recently two studies in Saudi Arabia revealed that the overall radiographic changes were less in both hands and feet compared to studies done in west^{8,9}. One of these studies showed that changes in feet were significantly less compared to those in the hands⁸. The other study showed equal changes in hands and feet⁹.

Rheumatoid arthritis (RA) is an autoimmune disease which primarily targets the synovium. This results in chronic synovial

inflammation with loss of the articular cartilage and erosion of juxta-articular bone. The destruction of synovial joints in RA ultimately leads to severe disability and premature mortality¹. It is therefore very important to diagnose this disease early and to institute appropriate treatment, as this can significantly improve the outcome in this chronic disease².

SENS is a simple method that has been validated in various studies for assessing the radiographic damage in RA. Because of its simplicity, it is a more practical method that can be used in clinical practice⁵.

Diagnosing RA early in its course can be challenging. However a combination of information obtained from physical examination, radiographs and laboratory tests is very helpful in this regard. Apart from helping in the diagnosis, radiographs can tell us about aggressiveness of the disease and can help in evaluating disease progression and effectiveness of interventional therapy³.

Hands and feet are most frequently imaged in RA patients for the assessment of

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joint damage. The two abnormalities that are scored most commonly on these radiographs are erosions and joint space narrowing (JSN). Scoring for both of these abnormalities is important as these abnormalities give independent information regarding joint damage⁴.

A variety of methods are used for scoring radiographic damage in RA. One of the widely used methods is Sharp/Van der heijde method. In 1999, Van der Heijde proposed a modification of this method which is called the simple erosion narrowing score (SENS). This scoring system is based on the same parameters (erosions and JSN) and the same joints as in Sharp/Van der heijde method are assessed.

The current study was therefore carried out with the intent to assess radiographic damage in hand and foot joints of our patients of RA using the simple erosion narrowing (SEN) score.

MATERIAL AND METHODS

This cross-sectional descriptive study was conducted in the department of rheumatology at Pakistan institute of medical sciences (PIMS), Islamabad. It was carried out from June, 2013 till December, 2013. Consecutive patients of RA ≥ 16 years of age and of either gender coming to rheumatology outpatient department were recruited in the study after taking their consent. A total of 153 RA patients were enrolled in the study. All of these patients were classified as having RA according to the 1987 American College of Rheumatology classification criteria for RA. Patients who were pregnant were excluded from the study.

Demographic details, duration of RA and serology for Rheumatoid factor (RF) were checked for each patient. X-rays of both hands and feet were performed in each patient at the time of enrolment in the study. These radiographs were taken in the standard posteroanterior view for hands and anteroposterior view for feet

All radiographs were scored independently by one experienced rheumatologist and one radiologist. The scoring method used was the SENS. It consists of a

score of 0 or 1 for the absence or presence respectively of erosion or JSN. Erosions are assessed at 16 joints of each hand and wrist and at 6 joints of each foot. JSN are assessed at 15 joints of each hand and wrist and at 6 joints of each foot. The maximum score is 62 for combined erosions and JSN at hand joints and is 24 for foot joints. The maximum SEN score for any patient can thus be 86. For each radiograph, the independent score by the two readers was averaged. This average score was used for the analysis.

Data was analyzed using SPSS version 18. Means and standard deviation were calculated for the quantitative variables, while percentages were calculated for the categorical variables.

RESULTS

A total of 153 patients were enrolled in the study. The mean age of the patients was 44.12 ± 13.27 years with a range of 17-77 years. Out of the total 153 patients, 121 (79.10%) were females while 32 (20.90%) were males. The mean duration of RA was 6.36 ± 5.47 years with a range of 3 months to 25 years. Among the 153 patients, 102 (66.70%) were positive for RF, while the remaining 51 (33.30%) patients were negative for RF. Out of the total 153 pairs of radiographs, 126 (82.35%) pairs were taken at the radiology department of PIMS. Rests of 27 (17.64%) pairs were done by patients from other facilities. Most of the radiographs were digital pairs, except 11 (7.18%), which were conventional.

Out of the total 153 patients, erosions were found in 142 (92.81%) patients. The frequencies of erosions in hands and feet are shown in table-1. The mean total SEN score was 26.76 ± 17.46 . For hand radiographs the mean SEN score was 24.47 ± 5.03 while for foot radiographs it was 2.29 ± 3.86 .

A total of 4896 joints in hands were assessed for erosions. Out of these 1613 (32.94%) were positive for erosions. A total of 4590 joints in hands were assessed for JSN. Out of these 2099 (45.72%) were positive for JSN. So, out of the total 9486 hand joints assessed, 3712 (39.13%) were having radiographic changes either in the form of erosion or JSN.

A total of 1836 joints in feet were assessed for erosions and a similar number for JSN. Out of these, 198 (10.78%) were positive for erosions and 137 (7.46%) were positive for JSN. So out of the total 3672 foot joints assessed, 335 (9.12%) joints were having radiographic changes (erosion or JSN)

DISCUSSION

This study examined erosions and JSN in hand and foot joints of 153 patients with RA. Overall 142 (92.81%) patients had one or more erosions. All of these 142 patients had erosions

finding was also in contrast to findings in western population. Several previous studies done in western population have shown that in many patients of RA, feet are involved earlier and that they show more radiographic damage compared to hands¹³.

In the study by van der Heijde et al, 90 patients of RA were followed for a period of 3 years. In this study the radiographic damage at baseline in the foot joints was twice compared to the hand joints. Over the course of 3 years the radiographic damage increased in both hands

Table: Frequencies of joint erosions in hands and feet.

	Number of patients (n = 142)	Percentage
Erosion(s) at both hand and foot joints	63	44.36%
Erosion(s) only at hand joints	79	55.63%
Erosion(s) only at foot joints	0	0 %

in hand joints. Out of these 142 patients, only 63 (44.36%) had foot joint erosions as well. Interestingly, none of our patients had erosive changes in the feet.

These findings were in contrast to previous studies done in the west. In one study, a total 61 patients of RA were evaluated. Out of these 61 patients, 41 (67%) patients had erosions in hands and or feet. Interestingly, in this study 17% patients with erosions had erosions only in the feet¹⁰. In another study by Priolo et al, baseline radiographs of hands and feet of 284 patients with RA were studied. It was found that 31 (11%) patients had joint erosions only in feet¹¹. Indeed, various studies have shown that up to 36% of patients with RA develop radiographic foot joints involvement prior to involvement of the hands¹². This is the reason that radiographs of feet are considered important, as many patients with erosive disease may be missed if we carry out radiographs of hands only.

This study found that a larger percentage of hand joints were having radiographic damage compared to foot joints. We assessed a total of 9486 hand joints and a total of 3672 foot joints for radiographic damage. It was shown that a total of 3712 (39.13%) hand joints were affected. On the other hand only 335 (9.12%) foot joints revealed radiographic damage. This

and feet at a similar rate¹⁴. In another study from Spain, disease characteristics of a total of 161 patients with early RA were examined. X-rays of hands and feet in these patients showed comparable radiological changes (erosions and JSN) between hands and feet¹⁵.

However a study carried out in Saudi Arabia showed findings similar to our study. In this study, radiographic changes in hands and feet were examined in 56 patients with RA. It was found that radiographic changes in feet were less compared to hands. In this study only 6% of patients had foot joints involvement compared to 39% patients with hand joints involvement⁸.

The main limitation of this study was the quality of radiographs. Although 82% patients had digital X-Rays done from our radiology department, 18% did it from other sources. Some of these radiographs had problems, mainly with the exposure. Because of cost issue, anti-CCP antibody test could not be performed in many patients and we had to rely on rheumatoid factor test.

CONCLUSION

Our patients of RA show predominant radiographic changes in hands only, with the feet showing much less changes. We suggest that requesting radiographs of only hands may

be sufficient for diagnostic as well as prognostic purposes in patients suffering from RA.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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