RADIOLOGICAL TREATMENT OF HANDS IN RHEUMATOID ARTHRITIS

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Received on 13.6.2025. Reviewed on 17.9.2025. Accepted on 3.10.2025.

ABSTRACT

Introduction: Rheumatoid arthritis often leads to characteristic radiological changes in the small joints of the hands, the prevalence and frequency of which require further research. The main aim of this study was to analyze these radiological patterns and assess the influence of factors such as gender.

Materials and methods: The study was conducted as a cross-sectional study using historical sources, at the University Clinical Hospital Mostar with a dialysis center in the outpatient clinic for rheumatology and immunology. It included data from January 1, 2024, to December 31, 2024. The target population consisted of patients over 18 years of age diagnosed with rheumatoid arthritis who were treated during that period. A total of 111 participants were included, while patients with other autoimmune diseases affecting the joints, severe infections, malignancies, or incomplete documentation were excluded.

Results: Rheumatoid arthritis affects women more often than men and most often occurs between the ages of 45 and 55. The disease usually affects both hands symmetrically, and the seropositive form is significantly more common than the seronegative form. Of the 111 participants, a significantly higher number were women.

Conclusions: Women tend to develop rheumatoid arthritis earlier than men, and older patients have more affected joints. The radiocarpal joint is most often affected. Family medical history does not significantly influence the occurrence of rheumatoid arthritis.

Keywords: Rheumatoid arthritis, Radiocarpal joint, Joint disease, Seropositive, Seronegative.

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INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disease that primarily affects synovial joints, particularly in the hands and wrists (1,2). It leads to progressive destruction of articular cartilage and bone, resulting in reduced functionality, disability, and decreased quality of life (3). Epidemiological studies have consistently shown that women are affected two to three times more often than men, especially in middle age, although rheumatoid arthritis also occurs in men and disease patterns can vary (4-6). Evidence from multiple studies demonstrates that early involvement of the hands, particularly the metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints, often in a bilateral and symmetrical pattern, is predictive of disease progression and functional impairment (1,2,7–9). Radiographic changes such as joint space narrowing, erosions, and osteopenia have been repeatedly observed and are associated with worse functional outcomes (1,10,11). Genetic factors play a significant role in susceptibility to rheumatoid arthritis. HLA-DR alleles, especially HLA-DR4 and HLA-DR1, have been linked to more severe disease and erosive changes in the hands (8–10). In addition to sex and genetic predisposition, modifiable environmental and lifestyle factors such as smoking, obesity, and occupational exposures have been consistently shown to increase the risk of disease development and progression of joint damage (4,8,9). Several studies indicate that early identification of these risk factors can help guide preventive strategies and individualized treatment plans (6,12,13). Radiographic evaluation of the hands remains a key diagnostic and monitoring tool in rheumatoid arthritis, allowing early detection of joint involvement, assessment of disease activity, and planning of therapeutic interventions aimed at preserving function and preventing disability (14–16). Evidence from recent studies highlights that systematic monitoring of hand joints provides predictive information on disease course and facilitates optimization of pharmacological and rehabilitative approaches (12,13,16). Overall, findings from multiple investigations underscore the importance of understanding the distribution, frequency, and risk factors for hand involvement in rheumatoid arthritis to improve patient outcomes and guide clinical management (1–16).

OBJECTIVE

The main objective of this research study was to examine the frequency and distribution of radiological changes in the hands of patients with rheumatoid arthritis and to assess the influence of factors such as gender. The research aims to contribute to the understanding of the diagnostic value of conventional radiography in detecting early and advanced stages of the disease.

SUBJECTS AND METHODS

The research was conducted at the Clinic for Internal Medicine with a Dialysis Center in the Rheumatology and Immunology Outpatient Clinic. The research included data from the time period from 01.01.2024 to 31.12.2024. The target population included people over 18 years of age, both sexes, diagnosed with rheumatoid arthritis who were treated during the specified period. A total of 111 subjects who met the research criteria and whose documentation was complete were

included in the research, regardless of the therapy they received. Patients with other autoimmune diseases that can affect the joints, patients with serious infections and malignant diseases, and patients with incomplete medical documentation or unclear diagnosis were excluded. Patients did not actively participate in this research and the confidentiality of their personal data remained fully protected. The research was thoroughly reviewed and approved by the Ethics Committee of the University Clinical Hospital Mostar. The data were collected retrospectively from the hospital archive of the Clinic for Internal Medicine with a Dialysis Center in Mostar. I personally conducted the data collection process in the period from 05.02.2025. to 25.03.2025. by accessing the hospital information system (BIS). After forming a representative sample of patients, the following data were analyzed based on the available documentation: age, gender, affected hand, serological status, affected joints and family history. The SPSS for Windows and Microsoft Office Excel 2010 software systems were used for statistical data processing. The SPSS for Windows and Microsoft Excel software systems were also used for statistical analysis of the data obtained.

RESULTS

Sociodemographic characteristics of the sample

Of the total number of respondents in the study, 81% were female and 19% male, or 21 men and 89 women. Of the 110 subjects, the largest number was in the age groups older than 39 years, i.e. in the group 40-59 years there were 53% of subjects (58 people), and in the group 60-79 years there were 34% of subjects (38 people). The youngest subjects, in the group 18-39 years, were 13% (14 people). The study did not include patients younger than 18 years, and patients older than 80 years were not admitted for treatment during the specified period.

Hand involvement of the disease

Of the 110 subjects, 79% had bilateral hand involvement. Only the right hand was affected in 12% of subjects, while 9% of subjects had symptoms only in the left hand in the early phase of the disease. The distribution of hand participation among the subjects is shown in the first table.

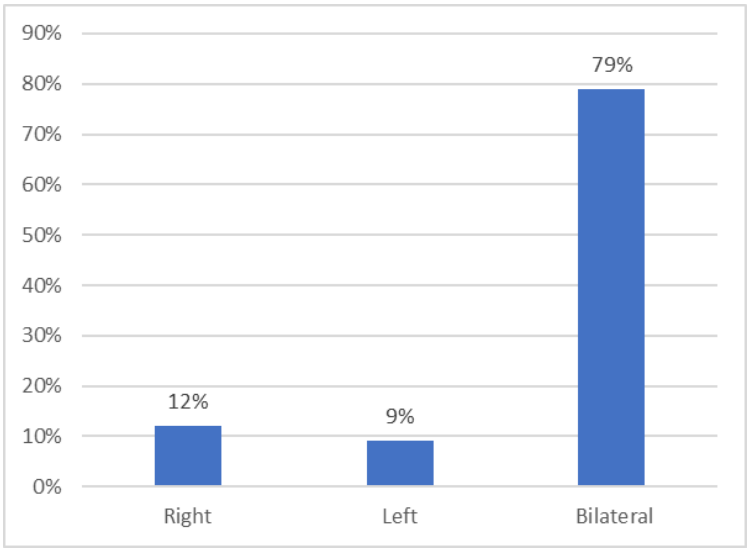

Figure 1. *Distribution of hand involvement in subjects*

Seropositive rheumatoid arthritis is significantly more common in the subjects, i.e. 77% of them were diagnosed with seropositive and 23% with seronegative rheumatoid arthritis. Of the 4 most commonly affected joints, the radiocarpal joint was involved in 85 subjects, or 38%. The metacarpal joint was involved in 70 subjects, or 31%. The proximal interphalangeal joint was involved in 46 subjects, or 21%. The distal interphalangeal joint was involved in 22 patients, or 10%. The distribution of affected joints is shown in the second table.

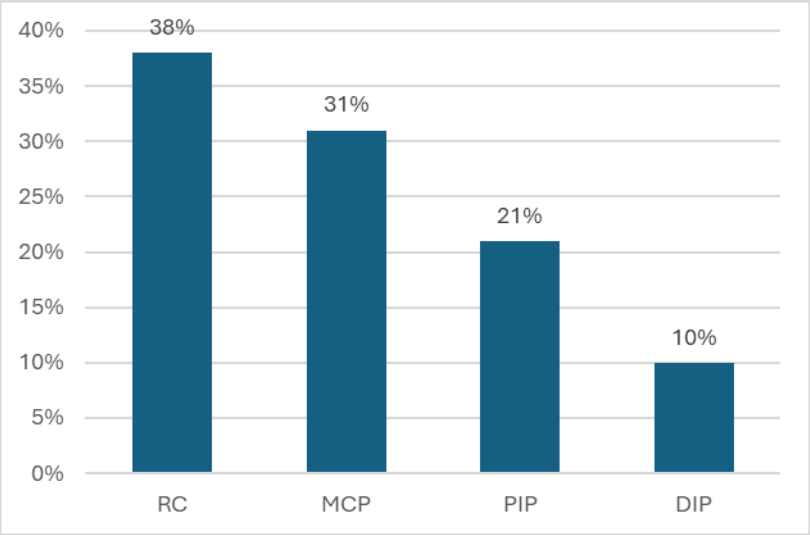

Figure 2. *Distribution of affected joints*

Of the 110 subjects, 78 subjects (71%) had a negative family history of any form of arthritis. 32 subjects (29%) had a positive family history. The average age of men diagnosed with rheumatoid arthritis is 55 years, while the average age of women diagnosed with rheumatoid arthritis is 53 years. In both sexes, a negative family history was significantly expressed. Of the 21 male subjects, 62% had a negative and 38% a positive family history. Of the 81 female subjects, 73% had a negative and 27% a positive family history of some form of arthritis. The distribution of family history by gender is shown in the third table.

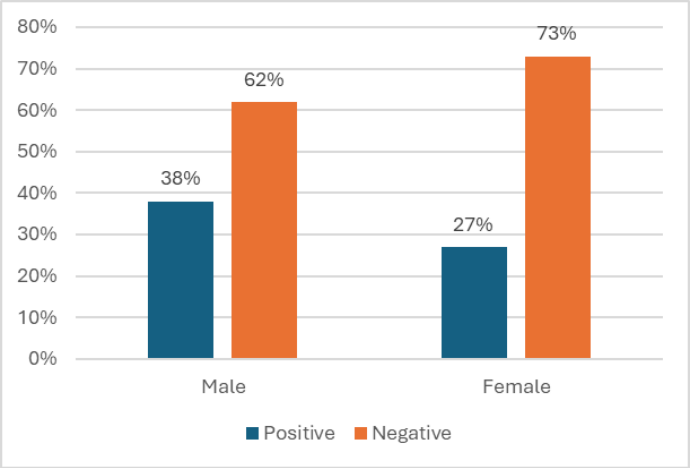

Figure 3. *Distribution of family history by gender*

A slight trend line is visible, suggesting a weak positive correlation between age and the number of affected joints. However, individual patients show considerable variability, with different numbers of affected joints regardless of age.

DISCUSSION

Radiological analysis in our study demonstrated that in most participants, rheumatoid arthritis exhibited a typical symmetrical involvement of the small joints of the hands, a key diagnostic feature of the disease (4,6,18,24). Among our 110 subjects, 79% presented with bilateral hand involvement, while only 21% exhibited unilateral symptoms in the early disease phase. These results are consistent with classical radiographic patterns described in the literature, where symmetrical joint involvement is a hallmark of established rheumatoid arthritis (24–26). Similar patterns were reported by McQueen (2008) and Narváez et al. (2010), emphasizing that bilateral joint inflammation strongly correlates with disease chronicity and severity (30,31). Seropositive rheumatoid arthritis was significantly more common in our cohort (77%), compared to 23% with seronegative disease. This finding aligns with previous studies indicating that seropositive rheumatoid arthritis is typically associated with a more aggressive clinical course and higher risk of erosive changes (7,8,25). Differences in seropositivity rates across studies may be influenced by population characteristics, inclusion criteria, and diagnostic methods applied (18,20). Analysis of individual joint involvement revealed that the radiocarpal joint was most frequently affected (38%), followed by metacarpophalangeal (31%) and proximal interphalangeal joints (21%). This distribution closely corresponds to patterns reported in earlier imaging studies, where wrist and MCP joints were identified as the earliest and most commonly affected regions (25–27,29). McGonagle et al. (1999) demonstrated using MRI that early synovitis and bone marrow edema predominantly affect the carpal region (4). These results further support the role of conventional radiography in identifying characteristic disease sites, even though MRI and ultrasound provide higher sensitivity for early inflammatory and erosive changes (26,27,30). Regarding family history, 71% of participants reported no hereditary background, whereas 29% had a positive family history of arthritis. This observation contrasts with the assumption that genetic predisposition is the dominant etiological factor in rheumatoid arthritis (10,11,44). However, other studies have shown that a significant proportion of patients develop rheumatoid arthritis without clear hereditary links, suggesting the contribution of environmental triggers and individual immune responses (10,11,44). The slightly higher proportion of negative family history in our cohort may reflect local population characteristics or recruitment factors. Comparing our results with international cohorts, the overall pattern of symmetrical joint involvement, predominance of seropositive rheumatoid arthritis, and carpal joint predilection aligns with global data (25,31,40,41,45). Minor deviations, including the lower rate of positive family history and a small percentage of early unilateral cases, may be explained by variations in sample size, demographic characteristics, and methodological differences compared to larger multicenter studies (32,33,37). In conclusion, our findings reinforce the

diagnostic value of conventional radiography as a cornerstone in evaluating rheumatoid arthritis, particularly in settings where MRI or ultrasound are not routinely accessible (6,24,27,29). Conventional imaging reliably identifies joint space narrowing, erosions, and symmetrical involvement, features essential for diagnosis, classification, and monitoring of disease progression (18,24,25,30,31).

CONCLUSIONS

Rheumatoid arthritis affects women more often than men, and most often occurs between the ages of 45 and 55. The disease most often affects both hands symmetrically, and the seropositive form is significantly more common than the seronegative. The radiocarpal joint is most often affected. Women develop the disease earlier than men, and older patients have more affected joints, although there are individual differences. Family history does not significantly influence the incidence of rheumatoid arthritis.

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RADIOLOŠKO LIJEČENJE RUKU KOD REUMATOIDNOG ARTRITISA

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SAŽETAK

Uvod: Glavni cilj ovog istraživanja bio je ispitati učestalost i distribuciju radioloških promjena na rukama pacijenata s reumatoidnim artritisom te procijeniti utjecaj čimbenika poput spola. Svrha istraživanja je razjasniti značaj konvencionalne radiografije u dijagnosticiranju ranih i uznapredovalih stadija bolesti.

Materijali i metode: Istraživanje je provedeno kao presječna studija korištenjem povijesnih izvora, u Sveučilišnoj kliničkoj bolnici Mostar s centrom za dijalizu u ambulanti za reumatologiju i imunologiju. Obuhvatilo je podatke od 1. siječnja 2024. do 31. prosinca 2024. Ciljanu populaciju činili su pacijenti stariji od 18 godina s dijagnozom reumatoidnog artritisa koji su liječeni tijekom tog razdoblja. Ukupno je uključeno 111 sudionika, dok su pacijenti s drugim autoimunim bolestima koje zahvaćaju zglobove, teškim infekcijama, malignim bolestima ili nepotpunom dokumentacijom isključeni.

Rezultati: Reumatoidni artritis češće pogađa žene nego muškarce i najčešće se javlja između 45. i 55. godine života. Bolest obično simetrično zahvaća obje ruke, a seropozitivni oblik je značajno češći od seronegativnog oblika. Od 111 sudionika, značajno veći broj bile su žene.

Zaključci: Žene imaju tendenciju ranijeg razvoja reumatoidnog artritisa od muškaraca, a stariji pacijenti imaju više zahvaćenih zglobova. Radiokarpalni zglob je najčešće zahvaćen. Obiteljska medicinska anamneza ne utječe značajno na pojavu reumatoidnog artritisa.

Ključne riječi: reumatoidni artritis, radiokarpalni zglob, bolest zglobova, seropozitivno, seronegativno.

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