Fear of falling, foot disability and disease activity in patients with rheumatoid arthritis

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Abstract

Objective: To evaluate fear of falling (FOF) in patients with established rheumatoid arthritis (RA) and its relationship with disease activity and foot disability.

Materials and methods: A cross-sectional study that included patients with RA. We collected the following data: age, sex, duration of disease, foot pain assessed by the Visual Analogue Scale (VAS), HAQ disability index (HAQ-DI). Disease activity was measured with swollen and tender joint count (SJC28, TJC28), patient and evaluator global assessment of disease activity (PGA, EGA), 28-joint DAS (DAS-28) and the clinical and simple disease activity indexes (CDAI, SDAI). Fear of falling was assessed by Falls Efficacy Scale-International (FES-I). Foot disability was measured using the Leeds Foot Impact Scale (LFIS). Correlations were used to assess the relationship between fear of falling and disease activity, foot pain, impairment and disability. Multiple linear regression analysis was used to explore risk factors associated with FOF.

Results: Thirty-three patients were included. The mean age was 49.3 ± 10.5 years with female predominance (n = 29 (87.9%)). The mean disease duration was 9.0 ± 7.4 years. The mean VAS foot pain was 5.5 ± 2.4. The mean FES-I score was 37.4 ± 15.1 and 69.7% (n = 23) of patients had significant fear of falling. FES-I was significantly correlated with foot impairment (r=0.66; p<0.0001) and disability (r=0.80; p<0.0001).

Evaluating the relationship between fear of falling and disease activity, FES-I was significantly correlated with TJC28 (r = 0.52, p = 0.02), PGA (r=0.56, p=0.01), EGA (r=0.39, p=0.025), HAQ-DI (r = 0.70, p = 0001), DAS28 (r = 0, 38, p = 0.029), CDAI (r = 0.48, p = 0.005) and SDAI (r = 0.52, p = 0.002). Foot disability (β = 0.64, 95% CI [0.36 ; 1.06], p ≤0.0001) and HAQ-DI (β= 0.36, 95% CI [1.23 ; 11.80], p=0.017) were the factors associated with FOF.

Conclusion: This study has demonstrated the importance of the relationship between FOF and disease activity, foot impairment and disability in patients with RA. Others studies are needed to increase the awareness around FOF and foot disability among practitioners.

Introduction

Falls are one of the major health care concerns for both older and people with rheumatoid arthritis (RA). Fear of falling (FOF) has been associated with an increased risk of falls in RA patients [1]. The risk of falls may be higher because of gait disorder [2], postural instability [3,4], muscle weakness and lower limb disease [5]. In fact, several studies have demonstrated that the foot is common site of pathology in RA which often results in poor physical functioning due to both structural and functional impairment [6].

However, only few studies have assessed the relationship between FOF and problems related to RA foot such as foot pain disability and impairment.

The aim of the present study is to investigate FOF among patients with RA and to evaluate the relationship between FOF and foot pain, disease activity and foot impairment and disability in patients with established RA.

Materials and methods

Patients characteristics

Thirty-three participants aged over 18 years old with a history of RA, according to the 2010 ACR/EULAR classification criteria [7], were recruited from the Department of Rheumatology of El Ayachi Hospital, University Hospital of Rabat- Sale, in Morocco. Participants were excluded from the study if they had a history of neuromuscular, cognitive disorders or impaired vision. Participants provided informed written consent.

We collected the following data: age, gender, body mass index (BMI). Clinical characteristics included disease duration, current medications and comorbid conditions. We also obtained the HAQ disability index (HAQ-DI).

Foot pain

A 100 mm visual analogue scale (VAS) was used to measure foot pain in the past week.

Disease activity

The following parameters were evaluated: ESR (mm/h), CRP (mg/l), swollen joint counts (SJC28), tender joint counts (TJC28), patient global assessment of disease activity [PGA ; visual analogue scale (VAS) 0-10], evaluator global assessment of disease activity [EGA; (VAS) 0-10], patient’s pain assessment (VAS pain 0-10 cm). Composite...
measures of disease activity: 28-joint DAS (DAS-28) and the clinical and simplified disease activity indexes (CDAI, SDAI) were calculated.

**Foot impairment and disability**

Patient reported foot disability and impairment were measured using the Leeds Foot Impact Scale (LFIS), a validated measure of the impact of foot disease in RA [8]. Foot disability was represented by the total score (LFIS; range 0 to 51) of the LFIS, foot impairment by the first subscale (LFISIF; range 0 to 21) and activity limitation by the second subscale (LFISIF; range 0–30) [8]. Scores of ≤6 were considered mild, from 7–13 were considered moderate and ≥14 were considered severe for the FISIF [9].

**Fear of falling**

Fear of falling was assessed using the Falls Efficacy Scale-International (FES-I) [10]. The FES-I measures participants’ level of concern pertaining to falling during physical and social activities, both inside and outside the home, regardless of whether the participant can perform the activity [10]. The FES-I consists of 16 different activities, scored using a four-point scale (1=not at all concerned, 2=somewhat concerned, 3=fairly concerned and 4=very concerned). The summed scores for the 16 activities for each participant were calculated. Scores of ≥23 indicated a high concern of falling [10].

**Statistical analysis**

Descriptive statistics for clinical and demographic characteristics were obtained. All variables were tested for normality by the Kolmogorov-Smirnov statistic. To evaluate the relationship between fear of falling and foot pain, impairment, disability and disease activity, Pearson’s r-correlation tests were conducted. Multiple linear regression analysis was used to explore risk factors associated with FOF. P<0.05 was acknowledged to be statistically significant level.

All data was analyzed using Statistical Package for the Social Sciences (SPSS) version 21 (IBM, New York, US).

**Results**

**Patients characteristics**

Thirty-three patients with RA participated in this study. The demographic features and the disease activity parameters of the patients are shown in table 1.

Among the comorbidities, osteoporosis was the most common (n=11, 33%).

The mean FES-1 score was 37.4 ± 15.1 and 69.7% (n = 23) of patients had significant fear of falling.

**Correlation analysis**

Investigating the relationship between fear of falling and foot pain, impairment and disability, the results demonstrated positive correlations between fear of falling and foot impairment (r=0.66; p<0.0001) and disability (r=0.80; p<0.0001). No correlation was found between fear of falling and foot pain (r = 0.29, p = 0.07).

Evaluating the relationship between fear of falling and disease activity, FES-I was significantly correlated with TJC28 (r = 0.52, p = 0.02), PGA (r=0.56, p=0.01), EGA (r=0.39, p=0.025), HAQ-DI (r = 0.70, p = 0001), DAS28 (r = 0, 38, p = 0.029), CDAI (r = 0.48, p = 0.005) and SDAI (r = 0.52, p = 0.002). No correlation was found between FOF and SJC (r = 0, 18, p = 0.30) Table 2.

**Factors associated with fear of falling**

Table 3 present the results of the multivariate regression analysis using fear of falling as the dependent variable. Foot disability (p ≤0.0001) and HAQ-DI (p = 0.017) were detected to be the apparent independent risk factors affecting variations in FES scores (p ≤0.05).

**Discussion**

This study suggest a link between fear of falling, disease activity and foot related disability and impairment. Fear of falling is a problem that affects not only elderly but also patients with RA. The examination of risk factors associated with falls and fear of falling focuses on the elderly. Little is known about factors associated with falls and fear of falling among middle aged and older adults with RA.

Previous studies have reported FOF incidence between 10 and 60% in this population [11-14] and falls incidence between 10 and 50% [4,12,14-18].

In our study, 69.7 % of patients were fearful of falling. These results are comparable to the findings of Jamison and al and Duyur çakit and al who reported respectively the rate of fear of falling in people with RA as 60% [16] and 66.7 % [19], and higher than Nevitt (50%) [12].

FOF is associated with an increased risk of falls [1,12,16] that may result in avoidance of activities and reduction of physical ability which could increase the risk of future falls.
In conclusion, this study has demonstrated the importance of the relationship between FOF and disease activity and foot impairment and disability. Others studies are needed to increase the awareness around FOF and foot impairment and disability among practitioners. Because of the risk of the osteoporotic fractures in people with RA is high, the prevention of falls should be the one of the most important objectives of the management of patients with RA.

Authors’ contributions
JB was involved in the study design, performed the statistical analyses and drafted the manuscript. BA was involved in the study coordination and helped to draft the manuscript. IB advised on the statistical analyses and the interpretation of the analyses. ME, YB, SF contributed to the preparation of the data. SR and RB participated in the design and coordination of the study. All authors read and approved the final manuscript.

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Competing interests
The authors declare that they have no competing interests.

Availability of data and materials
Data are available upon request from the corresponding author

Ethics approval and consent to participate
The study protocol was performed in accordance with ethics principles. A subjects’ written consent was obtained. Analysis was conducted on anonymized data.

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