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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 (ß = 0.64 , 95% CI [0.36 ; 1.06] , p ≤0.0001) and HAQ-DI (ß= 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.

Materiels 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

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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 ($LFIS_T$; range 0 to 51) of the LFIS, foot impairment by the first subscale ($LFIS_{IF}$; range 0 to 21) and activity limitation by the second subscale ($LFIS_{AP}$; 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.

Patients were middle aged, with female's predominance. They had a mean (SD) disease duration of 9 (7.4) years. The majority were having anti-CCP-antibodies positive (63,6%) and taking methotrexate (n=32, 97%) and corticosteroids (n=31, 93.9 %).

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

The mean FES-I 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.

Table 1. Clinical characteristics of patients

Parameter	value
Age (years)	49 (24-68)
Female, % (n)	87,9 (29)
Body Mass Index (kg/m2)	26 (16-38)
Disease duration (years), mean (SD)	9 (7.49) (1-36)
Anti-CCP antibodies positive, n (%)	63,6 (21)
Rheumatoid factor positive, n (%)	63,6 (21)
HAQ-DI	1,37 (0.8) (0-2,60)
CDAI	29,9 (13,6) (4-61)
SDAI	31,6 (13,7) (4.4-61.5)
DAS-28	5,5 (1,3) (2,2-7,3)
SJC28	5 (4) (0-17)
TJC28	12 (8) (0-27)
CRP, mg/l	16.7 (18) (0.2-94)
ESR, mm/h	35 (23) (3-90)
PGA, cm	6.2 (2.1) (0-9)
EGA, cm	5.7 (1.7) (0-9)
VAS foot pain	5.5 (2.4) (0-8)
Co-morbid conditions, n (%)	
Diabete	9.1 (3)
Heart disease	3 (1)
Hypertension	12.1 (4)
Osteoporosis	33.3 (11)
Renal disease	0
Medications, n (%):	
Methotrexate	97 (32)
Biologics	39.4 (13)
Prednisone	93.9 (31)
NSAIDs	39.4 (13)
Analgesics	36.4 (12)

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.

Table 2. relationship of foot pain, impairment and disability and disease activity with fear of falling in patients with RA

	r	p
VAS foot pain	0.29	0.07
$LFIS_T$	0.80	<0.0001
$LFIS_{IF}$	0.66	<0.0001
$LFIS_{AP}$	0.83	<0.0001
TJC28	0.52	0.02
SJC28	0.18	0.30
PGA	0,56	0,01
EGA	0,39	0,025
HAQ-DI	0.70	0001
DAS28	0, 38	0.029
CDAI	0.48	0.005
SDAI	0.52	0.002

Table 3. Factors associated with fear of falling in patients with RA (Multivariate analysis)

	ß	p	IC 95%
DAS28	-0.16	0.186	[-4.64 ; 0.94]
HAQ-DI	0.36	0.017	[1.23 ; 11.80]
$LFIS_T$	0.64	0.0001	[0.36 ; 1.06]

Fessel and Nevitt examined fear of falling among 570 older adults (aged 50 years and older) with RA [12]. Factors associated with fear of falling included female sex, depressive symptoms, poor physical functioning, minor fall-related injuries, and a greater number of painful joints. Fessel and Nevitt also found that fear of falling motivated many older adults with RA to avoid or modify specific activities [12].

Factors intrinsic to individuals with RA appear to play an important role in fear of falling. Compared with subjects who were not fearful, fearful subjects in our sample were shown to suffer from greater pain intensity due to arthritis, higher levels of disease activity and higher score of foot impairment and disability. In the study of Jamison, fearful patients had more painful joints, longer walk times (which provides evidence of reduced physical fitness), and more comorbid conditions [16].

In another study, the walking time was longer in patients with FOF, and the CASI score, which measures disability and number of tender joints, was higher in subjects with FOF and in those who were classified as fallers [19]. The current results also concur with other study that found that FOF is correlated with disease activity [19].

Several studies have demonstrated that foot problems in patients with rheumatoid arthritis (RA) are highly prevalent, even when classic measures of disease activity suggest clinical remission [20-23]. Despite great advances in disease management, a large majority of patients remain significantly impaired by foot complications [24].

Our findings suggest that fear of falling is significantly correlated to the foot related disability and impairment in patients with RA. These findings are similar to previous studies [12,19,25]; Morpeth et al found that increasing foot disability was associated of fear of falling [26], Furuya and al found the same findings using the Japanese version of the HAQ to assess disability [25].

FOF were not significantly related to older age, which suggest that FOF in patients with RA override the FOF usually associated with age.

No correlation was found between FOF and disease duration, steroid use, foot pain and swollen joints.

The major limitation of this study was a limited sample size, other studies are needed for the evaluation of the reasons of falls, fall risks and FOF associated with foot problems in patients with RA.

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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Consent for publication

Not applicable.

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