

Falls in rheumatoid arthritis: Prevalence and associated factors

Chutes dans la polyarthrite rhumatoïde: Prévalence et facteurs associés

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ABSTRACT

Objective: to assess the frequency of falls and identify its associated factors in rheumatoid arthritis (RA) patients.

Methods: we conducted a cross-sectional study including RA patients according to the ACR EULAR criteria 2010. Sociodemographic and disease-related data were collected. Fall risk and balance disorders were evaluated respectively according to the Timed Up and Go Test (TUG) and the Berge Balance Scale (BBS). Foot disability was assessed using the Foot Function Index (FFI).

Results: Fifty patients were included. The mean age was 58 years [30-88] with a gender ratio of 0.25. The average disease duration was 11 years [1-47]. Previous falls were found in 25% of the patients, resulting in fractures in 6.3% of them. Only three patients reported a history of fall in the last year with recurrent falls reaching 12.5%. There was a statistically significant association between the occurrence of falls and a prolonged TUG score ($p=0.041$) as well as a history of vertigo ($p<0.05$). Similarly, the risk of falls was more frequent in female RA patients with a prolonged disease duration but without reaching a significant threshold ($p=0.05$).

Conclusion: the study highlighted the frequent risk of falls in patients with RA. Factors associated with fall occurrence involved the number of falls, and a history of vertigo.

Keywords: Rheumatoid Arthritis, Fall, Risk, Fracture

RÉSUMÉ

Objectif : évaluer la fréquence des chutes et identifier les facteurs associés chez les patients atteints de polyarthrite rhumatoïde.

Méthodes : nous avons mené une étude transversale incluant des patients atteints de PR selon les critères EULAR de l'ACR 2010. Des données sociodémographiques et liées aux maladies ont été collectées. Le risque de chute et les troubles de l'équilibre ont été évalués respectivement selon le Timed Up and Go Test (TUG) et la balance de Berge (BBS). Le handicap du pied a été évalué à l'aide de l'Indice de Fonction Pédestre (FFI).

Résultats : Cinquante patients ont été inclus. L'âge moyen était de 58 ans [30-88] avec un ratio de genre de 0,25. La durée moyenne de la maladie était de 11 ans [1-47]. Des antécédents de chutes ont été observés chez 25 % des patients, entraînant des fractures dans 6,3 % d'entre eux. Seuls trois patients ont rapporté des antécédents de chutes au cours de l'année écoulée, avec des chutes récurrentes atteignant 12,5 %. Il y avait une association statistiquement significative entre la survenue des chutes et un score TUG prolongé ($p=0,041$) ainsi qu'un historique de vertiges ($p<0,05$). De même, le risque de chutes était plus fréquent chez les patientes polyarthritides ayant une durée prolongée de la maladie sans atteindre un seuil significatif ($p=0,05$).

Conclusion : l'étude a mis en lumière le risque fréquent de chutes chez les patients atteints de PR. Les facteurs associés à la fréquence des chutes concernaient le nombre de chutes et un historique de vertiges.

Mots clés: Arthrite rhumatoïde, Risque de chute, Fracture

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INTRODUCTION

Falls represent a significant issue within the elderly population, and a serious public health concern. They can lead to severe outcomes, including mortality and disability [1-2]. In the general healthy population, falls are typically associated with aging and age-related comorbidities, which increase the likelihood of instability and accidents as individuals grow older [3-4]. However, it has been recognized that rheumatoid arthritis (RA) presents an additional critical risk factor for falls [5]. RA is a chronic autoimmune disease characterized by joint inflammation that leads to pain, stiffness, swelling, and potential joint damage. This debilitating condition not only compromises mobility but also significantly impacts balance and strength.

The risk of falls is further compounded in older adults with RA, as age-related physiological changes, such as decreased muscle strength and impaired proprioception, interact negatively with the physical disabilities caused by the disease. In fact, studies indicate that RA is the second most powerful independent risk factor for major falls, emphasizing the urgent need for greater awareness and intervention strategies in this vulnerable population [6]. Despite the relatively high incidence of falls and their significant consequences, the issue remains under-recognized and insufficiently explored within the context of RA patients. The interplay between the disease's physical limitations and the natural aging process creates a unique set of challenges that can lead to an increased frequency of falls.

This study aimed to assess the prevalence of falls among RA patients and to identify the specific risk factors that contribute to these incidents, thereby highlighting the necessity for targeted prevention strategies and increased support for this population.

METHODS

Study design

We conducted a cross-sectional study in the department of Rheumatology of Mongi Slim Hospital of Tunis between March and June 2024.

We included patients diagnosed with RA according to the ACR EULAR 2010 criteria. Individuals with dementia or cognitive decline that hinders data collection and score calculation, as well as those who have recently undergone a surgical intervention affecting their mobility, were excluded from the study. Additionally, participants who did not provide informed consent were also excluded.

Each patient who participated in the study provided informed oral consent after being fully briefed on the study's purpose, procedures, and any potential risks or benefits associated with their involvement.

We declare that our work adheres to the principles of medical ethics and has no conflicts of interest.

Collected data

-Sociodemographic variables

Such as gender, age, and medical history, including hypertension, diabetes mellitus, visual impairment, epilepsy, Parkinson's disease, stroke, osteoporosis and previous musculoskeletal interventions were recorded.

Disease characteristics were also gathered, including disease duration, immunological profile defined by levels of Anti-Citrullinated Protein Antibodies (ACPA) and Rheumatoid Factor (RF), as well as scores reflecting disease activity: Patient Global Assessment of Disease Activity (PtGA) and Disease Activity Score 28 (DAS28). Additionally, current treatment and its posology were documented.

-Fall assessment

We investigated falls history: medical history of vertigo, frequency of falls, the number of falls experienced within the past year, along with any instances of falls leading to fractures.

Falls assessment was conducted with the Timed Up and Go Test (TUG): the test involves observing and timing the patient as they rise from a chair, walk a distance of 3 meters, turn, walk back, and sit down again. A TUG time exceeding 10 seconds suggests an elevated risk of falls and mobility limitations [7] and the Berge Balance Scale (BBS), which consists of 14 tasks graded on a 5-point scale based on the individual's ability to maintain balance while performing each task. Total BBS scores range from 0 to 56, with higher scores reflecting superior balance and mobility [8].

Foot disability was evaluated using the Foot Function Index (FFI), a validated patient-reported outcome measure designed to assess foot function and disability across three domains: pain, disability, and activity limitation ranging from a minimum of 0 to a maximum of 100 for each domain [9].

Statistical analysis

The sample size of 50 participants was determined based on similar studies in the literature exploring falls in RA, and was considered sufficient to allow for statistically significant analyses within the scope of this exploratory cross-sectional study.

Statistical analyses were performed using the IBM® SPSS® 23 Statistics for Windows. A descriptive statistical analysis was conducted to identify significant associations between patient characteristics, disease-related factors, and the outcomes of interest in the fall assessment. Chi-square test or Fisher exact test was used to compare qualitative variables. Student t-test was used to compare quantitative variables with normal distribution and homogeneous variances. Spearman's correlation analysis was used, with a significance threshold set at $p \leq 0.05$.

RESULTS

Population characteristics

The study involved 50 patients, with a mean age of 58 years

[30-88] and a gender ratio of 0.25. Patient history was distributed as follows: hypertension: 13 (26%), 12 (24%) of them receiving antihypertensive treatment, diabetes: 8 (16%), all of them were on hypoglycemic treatment and visual impairment: 8 (16%). No stroke or Parkinson's disease history were recorded.

Rheumatoid arthritis characteristics

The average duration of the disease was 11 years [1-47]. All patients except three of them presented with seropositive RA. On average, PtGA was 5 [0-10], with a mean DAS28 C-reactive protein (CRP) of 3.85 [1.18-6.34]. In total, 14 (28%) patients had high disease activity, 16 (32%) had moderate activity, 12 (24%) had low activity, and 8 (16%) were in remission. The distribution of the actual treatments was as follows: csDMARDs: methotrexate: 18 at an average dose of 15 mg [10-20] per week, one patient receiving sulfasalazine at an average dose of 2g per day, and one patient receiving hydroxychloroquine at a dose of 400 mg per day as monotherapy, while two patients were receiving methotrexate in combination with sulfasalazine. bDMARDs and tsDMARDs were used in 25 and 3 patients respectively. Regarding symptomatic treatments: 33 patients were on corticosteroids, with an average dose of 2.5 [0-10] mg per day, and 10 patients were receiving NSAIDs.

Risk of falls' assessment

A history of a previous fall was found in 25% of the patients, resulting in fractures in 6.3% of them. Three patients reported a history of fall in the last year with recurrent falls reaching 12.5%.

According to the TUG score, 50% of the subjects were independent, 37% were dependent and 13% required walking aids. The distribution of the BBS score was as follows: 68.8% were independent, 21.7% required walking assistance and only 6.5% needed a wheelchair.

On average, the FFI index was equal to 48, 31, and 43 respectively for the pain, disability, and activity limitation domains.

A higher risk of falls was associated with a history of multiple falls, the presence of vertigo, and an elevated TUG score. Whereas, the risk of falls was more frequent in female RA patients with a prolonged disease duration but without reaching a significant threshold (Table 1).

DISCUSSION

The present study aimed to assess the frequency of falls among RA patients and its associated factors. Overall, 25% of the patients reported the occurrence of at least one fall and only 6% during the preceding year. In a recent systematic review, the prevalence of falls was 34% (CI: 29% to 38%, $p < 0.001$), and of recurrent falls was 16% [24].

Several retrospective studies investigating falls risk in RA patients have examined the incidence of falls, revealing a range from 33% to 51% [6,11,12,13]. While other cross-sectional and prospective studies showed prevalence

rates ranging from 37.1% to 64.5% [18,21] and from 20.2% to 45.6% [14,15], respectively. These variances in findings have been previously documented [16]. These discrepancies may be explained by the tendency to underestimate the frequency of falls in the elderly, due to the propensity to forget [17].

Although falls are recognized as very common among RA patients, the cause-effect relationships remain a topic of ongoing debate.

Table 1. Risk factors of fall in rheumatoid arthritis patients

Risk factors	p-value
Sociodemographic characteristics	
Gender	0.05
Age	0.3
Vertigo	0
Visual impairment	0.9
Antihypertensive treatment	1
Hypoglycemic treatment	1
RA disease activity	
Disease duration	0.05
PtGA	0.37
DAS28 CRP score	0.364
RF level	0.358
ACPA level	0.355
Risk of falls assessment	
The number of falls	0.03
TUG score	0.041
BBS	0.355
FFI-pain	0.45
FFI-disability	0.576
FFI-activity limitation	0.636

PtGA: Patient Global Assessment of Disease Activity, DAS28: Disease Activity Score 28, RF: Rheumatoid Factor, ACPA: Anti-Citrullinated Protein Antibodies, TUG score: Timed Up and Go score, BBS: Berge Balance Score, FFI: Foot Function Index.

Our results showed a significant association between the fall risk and TUG score as well as a history of vertigo, which was consistent with the literature [11,15,18]. Aside from vertigo, none of the other patient-related factors assessed (age, hypertension and diabetes treatment, visual impairment) nor RA-related factors (RA duration, PtGA, DAS28 score, RF and ACPA blood levels) or measures like FFI and BBS were found to be associated with the incidence of falls, according to our findings.

However, other studies showed that age and comorbidities chronic disease treatment such antihypertensive treatment, FFI and BBS are linked to fall occurrence in the elderly population [11,18,19,20]. A recent systematic review including more than 24,123 subjects with RA revealed that the strongest associations were found were antihypertensive medicine/diuretic (OR=1.83, $p = 0.055$), dizziness (OR=1.95, $p = 0.003$), history of fracture (OR=4.03, $p < 0.001$), psychotropic medication use (OR=1.79, 95%CI: 1.39 to 2.30, I²=22.0%, $P = 0.254$), taking four or more medicine (OR=1.51, 95%CI: 1.26 to 1.81, I²=26.0%, $P = 0.256$) [24]. Similar to our results, risk of falls appeared to be independent of age, gender, or RA disease duration [17]. In contrast, some authors have demonstrated correlations between falls risk and factors such as ACPA blood levels [12], visual impairment [7], and PtGA [7].

This is one of the rare studies addressing the risk of falls in RA. We focused on determining risk factors, which were

not always assessed in the literature. One of the main limitations of the present study is the lack of a control group and its cross-sectional design based on a unique timepoint examination. A longitudinal study may be interesting to capture fluctuations in disease activity and to yield more comprehensive insights into the correlation between disease activity and falls risk; potentially shedding light on the underlying mechanisms of the fall risks in the RA population. Further large-scale, comprehensive studies are needed to confirm these findings. It could represent a significant advancement in the development of effective fall prevention initiatives.

CONCLUSION

Our study highlighted the frequent risk of falls in patients with RA. Factors associated with fall occurrence involved the number of falls, a history of vertigo as well as TUG test. Enhancing our comprehension of these risk factors is crucial for implementing preventive measures effectively, ensuring that all RA patients could benefit from fall prevention strategies, regardless of their fall history.

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