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Gender differences in disease severity in patients with gout: A single-center study

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Abstract

Aim:Gouty arthritis is the most common inflammatory arthritis characterized by high serum uric acid levels (hyperuricemia), recurrent arthritis attacks and accumulation of monosodium urate crystals in tissues.The aim of our study is to examine the differences in clinical and demographic features according to gender in patients diagnosed with gouty arthritis. Material and Methods:Gout patients who met the ACR acute gouty arthritis classification criteria were included in our study. Age, gender,smoking,alcohol use,body mass index,concomitant diseases and medications used, pain scores according to visual pain score, and number of attacks per year were recorded.In addition,complete blood count,biochemistry data,erythrocyte sedimentation rates and c-reactive protein levels were recorded. Results: 30 patients were female and 70 were male with an average age. Gout severity assessment scale (GAS) was negatively correlated with gender (r= - 0,202; p= 0,047), and directely with gVAS (r=0,927; p= 0,000) and with erythrocyte sedimentation rate (ESR) (r=0,243; p= 0,025). GAS was correlated with ESR (β = 0,090; p= 0,020) and gVAS (β = 0,922; p= 0,000) in a subsequent stepwise multivariate analysis Conclusion: In our retrospective, database-based, single centre cohort study, GAS was higher in female than in male patients. However, a worse perception of pain by female patients seemed a conditioning factor.

Key words: *gouty arthritis, gender, clinic,disease severity, difference*

INTRODUCTION

Gout is a common form of inflammatory arthritis, and its incidence is highest in middle-aged and older patients [1-3]. Its prevalence is about 4% in United States, Europe, and Southeast Asia; however, its prevalence exceeds 10% in over-65 aged men [4]. The male sex is an important risk factor for gout, with men being affected 4-5 times more often than women. Menopause increases the risk for gout providing evidence that female hormones have a protective role [5]. Sex differences decline with increasing age, but men still far exceed women in the prevalence of gout, even in older populations [6]. Clinical characteristics have been reported according to gender. In particular, females with elevated serum urate (SU) levels have increased risk of associated co-morbidities, including hypertension, chronic kidney disease, and type 2 diabetes [7-9]. On the other hand, gender differences in disease severity have been scarcely assessed in published literature.

We performed a study to assess whether gender differences could affect the disease severity in patients with gout.

MATERIALS AND METHODS

Study design

This is an observational, retrospective, single center cohort study. We assessed all patients consecutively referred to our rheumatologic clinic between the twentieth of September and the fourth of March, september 2022 and december 2022 and december 2022 Aydın State Hospital also between fourth of july and september 2022 Ataturk State Hospital and december 2022 Ataturk State Hospital who could be classified as gout according to the American College of Rheumatology (ACR) preliminary criteria for the clinical diagnosis of gout [10]. Patients who have a concominant rheumatic disease, malignancy, pregnacy, breast feeding, and under the age of 18 were excluded.

Some demographic and clinic parameters were analysed.

Gout severity assessment scale **(**GAS) is a composite disease-specific activity score including self-reported number of gout attacks in the previous 12 months, SU levels, patient reported visual analog scale of pain about gout (gVAS), and number of tophi [11].

Statistical analysis

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The statistical analyses were carried out by Statistical Package for Social Sciences (SPSS) for Windows (SPSS version 19.0, IBM, USA). Values were presented as number (%), mean±standart deviation. One-Way ANOVA test was used to determine differences between independent groups. Pearson's test was used to determine the relationship between variables according to the normality distribution. A p-value of less than 0.05 was considered as statistically significant.

RESULTS

A total of 100 patients were included in the study: 70 men (mean age: 59,27±13,68) and 30 females (mean age: 68,60 ± 9,72). We listed their main demographic features and laboratory findings in **Table 1**. Additional diseases and number of drugs showed differences according to sex.

Table 2 listed the statistically significant variables according to gender differences. An univariate analysis between GAS and different covariates in all enrolled patients highlighted that GAS negatively correlated with gender (r= - 0,202; p= 0,047), and directely with gVAS (r=0,927; p= 0,000) and with erythrocyte sedimentation rate (ESR) (r=0,243; p= 0,025) (**Table 3**). GAS correlated with ESR (β = 0,090; p= 0,020) and gVAS (β = 0,922; p= 0,000) in a subsequent stepwise multivariate analysis (**Table 4**).

DISCUSSION

Our study confirmed that the clinical profile of women with gout is different when compared to the male patients' one. However, we found in our cohort some differences compared to those reported in published literature [6,7]. For example, females had a number of additional diseases < their male counterparts (7,17±7,64 vs 8,49±7,57), even if this difference was not statistically significant (p=0,428).

There is very little literature on the correlation between gender and disease activity in patients with gout. We chose GAS to assess gout activity. GAS is a composite disease activity score for gout developed and validated in 2016 by the Italian network for gout study [11]. This score includes domains such as SUA levels, number of flares, patient-reported outcomes, and tophus burden. GAS is able to discriminate between different states of disease. In particular, according to the Italian network for gout study, a GAS <2.5 had the best ability to discriminate gout cases in remission [11]. According to de Lautour *et al*, GAS was defined as remission when there were no gout attacks in the last 12 months, no tophi, SU levels were < 6 mg/dL, and both patient global assessment for gout activity and gout pain ≤2 on a 1-10 scale [12]. Higher scores indicate worse disease activity, and increasing scores correlate with risk of gout flares over a 12 month period. Finally, GAS has been validated in both a hospital and a primary care cohort [13,14], and it demonstrated to be more responsive to change in clinical practice than Gout Impact Scale (GIS) [13].

In our cohort, GAS ranged from 2 to 6.86. It was higher in women than in men (4,66±1,19 vs 4,13±1,18) and the difference was statistically significant (p=0.047). However, when we analysed the correlations between GAS and all covariates (including those present in GAS) through a stepwise multivariate analysis, only ESR and gVAS correlated with GAS in a statistically significant way.

Our study has limitations that must be declared. First of all, ours was a single-center study and data we presented need to be confirmed by other multicenter studies. In addition, ours was a retrospective, database-based study. Therefore, it had the limitations of this type of study. In particular, the number of the enrolled patients did not allow us to assess the role of type of drugs and comorbidities. Indeed, all these our evaluations were quantitative and not qualitative.

On the other hand, according to our best knowledge, this is the first study on the impact of gender differences on the severity of gout, assessed by GAS. In particular, our study highlighted that in female patients, pain perception due to gout (gVAS) is worse than in male ones to the point of conditioning the total GAS. If other studies will confirm this data (that is gVAS depends on gender differences), we should perhaps ask our selves if different scores such as GIS are to be prefereable. This could be taken into account in future studies.

CONCLUSİONS

In our retrospective, database-based, single centre cohort study, GAS was higher in female than in male patients. However, a worse perception of pain by female patients seemed a conditioning factor.

The results of our study can be an input for new multicenter studies in order to clarify whether and to what extent there are gender differences in relation to disease activity in patients with gout.

Conflict of Interest: The authors declare no conflict of interest.

Data availability: The data used to support the findings of this study are available from the corresponding author upon request.

Table 1. Demographic features and laboratory findings of enrolled patients, according to sex

Characteristic	Females (n=30)	Males (n=70)
Age (years)	68,60±9,72	59,27±13,68
Cigarette Use	1,90±0,30	1,94±0,72
Alcohol Use	1,97±0,18	1,87±0,55
Body Mass Index (BMI) (kg/m²)	32,0±5,66	29,33±5,91
Additional Diseases	**7,17±7,64**	**8,49±7,57**
Drugs (number)	**5,63±2,55**	**4,86±3,19**
Leukocyte Count (µl/L)	7,91±2,37	9,25±2,40
Hemoglobin (g/dL)	13,05±1,27	15,11±8,60
Platelet (µl/L)	285,00±82,21	261,10±76,25
Aspartate Transaminase (U/L)	23,71±11,74	26,99±19,01
Alanine Transaminase (U/L)	22,58±16,24	28,75±27,47
Urea (mg/dL)	21,54±8,70	21,68±19,01
Creatinine (mg/dL)	1,07±0,37	1,23±0,95
Uric Acid(mg/dL)	8,29±1,87	7,61±2,23

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Table 2. Statistically significant variables according to gender differences

	All	Male (n=70)	Female(n=30)	P
Age, years	62,07±13,29	59,27±13,68	68,60±9,72	0,001
BMI , Kg/m^2	30,13±5,94	29,35±5,91	32,09±5,66	0,038
GAS	4,29±1,20	4,13±1,18	4,66±1,19	0,047

Table 3: Univariate analysis between GAS and different covariates in all population

GAS		
	r	P
Gender	-0,202	0,047
Visual Assessment Scale for gout (gVAS)	0,927	0,000
Erithocyte Sedimentation Rate (ESR)	0,243	0,025

r=Coefficient of variation; **P=** Pearson's coefficient

Table 4: GAS and different covariates in all population: stepwise multivariate analysis

GAS		
	β	**P**
ESR	0,090	0,020
gVAS	0,922	0,000

ESR= erythrocyte sedimentation rate; gVAS= visual assessement scale for gout **β=** Coefficient of regression; P= Pearson's coefficient

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