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(RESEARCH ARTICLE)

DEGENERATIVE DISORDERS, METABOLIC SYNDROME AND FUNCTIONAL IMPACT IN RHEUMATOLOGY IN CHAD: A COMPARATIVE STUDY WITH AUTOINFLAMMATORY DISEASES AND CONNECTIVE TISSUE DISEASES

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ABSTRACT

Objective: To compare the prevalence and characteristics of metabolic syndrome (MS) according to the type of rheumatic disease, including connective tissue diseases, degenerative disorders, and autoinflammatory diseases, in Chad.

Methods: A retrospective, cross-sectional, comparative study was conducted in the Department of Internal Medicine of the National Reference Hospital (CHURN) in N'Djamena from January 2018 to May 2024. Among 5,000 patients followed for various rheumatic diseases, 330 met the 2005 International Diabetes Federation (IDF) criteria for MS. Patients were classified into three groups: connective tissue diseases, degenerative disorders, and autoinflammatory diseases. Clinical, biological, and functional data (SF-36, DAS28, BASFI, and WOMAC) were analyzed using SPSS version 25.0.

Results: The prevalence of MS was 40.9% among patients with connective tissue diseases, 34.3% among those with degenerative disorders, and 24.8% among those with autoinflammatory diseases. Connective tissue diseases showed the highest rates of abdominal obesity (93.7%), hypertension (88.1%), and hyperglycemia (66.5%). Functional scores were significantly more impaired in the connective tissue disease group (mean SF-36 score = 50.2 ± 10.3) compared with the degenerative (56.8 ± 11.1) and autoinflammatory groups (59.7 ± 10.8; $p < 0.01$).

Conclusion: Metabolic syndrome was more prevalent and had a greater impact among patients with connective tissue diseases than among those with other rheumatic diseases in Chad. A multidisciplinary approach is necessary to reduce cardiovascular complications in this high-risk population.

Keywords: Connective Tissue Diseases; Metabolic Syndrome; Autoinflammatory Diseases; Degenerative Disorders; Chad.

1 INTRODUCTION

Metabolic syndrome (MS) encompasses several metabolic abnormalities, including abdominal obesity, hypertension, dyslipidemia, and hyperglycemia. It represents a major determinant of cardiovascular risk and premature mortality (1). Among patients with rheumatic diseases, chronic inflammation and corticosteroid therapy contribute to the development of MS (2).

Systemic connective tissue diseases, including systemic lupus erythematosus, Sjögren's syndrome, and systemic sclerosis, are particularly at risk because of their inflammatory, hormonal, and immunological background (3,4). In contrast, degenerative disorders, such as osteoarthritis and chronic low back pain, and autoinflammatory diseases, including spondyloarthritis and psoriatic arthritis, present distinct metabolic profiles depending on the level of inflammation and associated comorbidities (5).

In Africa, few studies have compared metabolic profiles according to the type of rheumatic disease. Studies conducted by Savadogo et al. (6) in Togo, and Abandazegoué-Andjembé et al. (7-9) in Senegal have reported variable rates ranging from 10% to 48%. In Chad, no comparative study had been conducted before the present study.

Study objective: To compare the prevalence, characteristics, and functional impact of metabolic syndrome among patients with connective tissue diseases, degenerative disorders, and autoinflammatory diseases in Chad.

2 METHODS

2.1 Study Design and Setting

This was a retrospective, cross-sectional, comparative study conducted in the Department of Internal Medicine of the National Reference Hospital (CHURN) in N'Djamena, Chad, from January 1, 2018, to May 31, 2024.

2.2 Study Population

The study population consisted of all patients followed for a chronic rheumatic disease, including connective tissue diseases, degenerative disorders, or autoinflammatory diseases.

2.3 Inclusion Criteria

Patients aged ≥18 years with an established diagnosis according to international classification criteria (ACR/EULAR 2010, SLICC 2012, ESSDAI 2016, ASAS 2009, and ACR 1990) were eligible for inclusion. Patients were required to have complete medical records containing the anthropometric and biological parameters necessary for the assessment of metabolic syndrome.

2.4 Exclusion Criteria

Patients with incomplete medical records, concomitant endocrine disorders that could confound the analysis, or those receiving corticosteroid therapy at a dose >10 mg/day for more than 6 months without regular follow-up were excluded.

2.5 Definition of Metabolic Syndrome

Metabolic syndrome was defined according to the International Diabetes Federation (IDF) 2005 criteria as abdominal obesity associated with at least two of the following criteria: triglyceride level ≥1.50 g/L; low high-density lipoprotein (HDL) cholesterol level; blood pressure ≥130/85 mmHg; blood glucose level ≥1.10 g/L.

2.6 Study Variables

The variables assessed included demographic, biological, functional, and therapeutic data. Functional assessment was based on the SF-36, DAS28, BASFI, and WOMAC scores.

2.7 Statistical Analysis

Statistical analyses were performed using SPSS version 25.0. The Chi-square test, Student's t-test, and analysis of variance (ANOVA) were used for comparisons, while Pearson's correlation coefficient was used to assess correlations. Statistical significance was set at $p < 0.05$.

2.8 Ethical Considerations

The study protocol was conducted in accordance with the principles of anonymity and confidentiality of patient data. Authorization to collect and use the data was obtained from the administration of the CHU-RN and from the research coordinator of the Faculty of Human Health Sciences of the University of N'Djamena.

3 RESULTS

3.1 General Characteristics of the Study Population

Among the 5,000 patients who attended consultations between 2018 and 2024, 330 (6.6%) had metabolic syndrome (MS). Females accounted for 81.8% of cases, with a mean age of 51.7 ± 11.2 years. The mean disease duration was 7.2 ± 3.5 years.

3.2 Prevalence of Metabolic Syndrome According to the Type of Rheumatic Disease

Metabolic syndrome was more prevalent among patients with connective tissue diseases (40.9%) than among those with degenerative disorders (34.3%) and autoinflammatory diseases (24.8%). This difference was statistically significant ($p < 0.05$).

3.3 Components of Metabolic Syndrome

Patients with connective tissue diseases had the highest rates of abdominal obesity (93.7%), hypertension (88.1%), and hyperglycemia (66.5%). Patients with degenerative and autoinflammatory diseases had lower rates for all components of metabolic syndrome.

3.4 Functional Impact and Clinical Scores

The mean SF-36 score was 50.2 ± 10.3 in patients with connective tissue diseases, 56.8 ± 11.1 in those with degenerative disorders, and 59.7 ± 10.8 in those with autoinflammatory diseases ($p < 0.01$). The DAS28 score was higher in patients with connective tissue diseases (5.3 ± 1.1) than in the other groups ($p = 0.04$).

3.5 Factors Associated with Metabolic Syndrome

The main factors independently associated with metabolic syndrome were age >50 years (OR = 1.9; 95% CI [1.3–2.8]), female sex (OR = 1.6; 95% CI [1.1–2.3]), prolonged corticosteroid therapy (OR = 2.4; 95% CI [1.5–3.8]), and physical inactivity (OR = 1.8; 95% CI [1.2–2.7]).

Table 1: Prevalence of Metabolic Syndrome According to the Type of Rheumatic Disease

Type of rheumatic disease	Total number	MS cases (n)	Prevalence (%)	p-value
Systemic connective tissue diseases	136	56	40.9	<0.05
Degenerative disorders	118	40	34.3	—
Autoinflammatory diseases	76	19	24.8	—
Total	330	—	—	—

The prevalence of metabolic syndrome was significantly higher among patients with systemic connective tissue diseases.

Table 2: Main Components of Metabolic Syndrome According to the Type of Disease

Component	Connective tissue diseases (%)	Degenerative disorders (%)	Autoinflammatory diseases (%)	Overall mean (%)
Abdominal obesity	93.7	88.4	76.2	86.1
Hypertension	88.1	80.5	69.4	79.3
Hyperglycemia	66.5	54.7	46.8	56.0
Hypertriglyceridemia	41.2	37.3	29.5	36.0
Low HDL cholesterol	36.9	33.9	28.7	33.2

Connective tissue diseases showed the highest rates for all components of metabolic syndrome.

Table 3: Functional Impact and Clinical Scores According to the Type of Disease

Score	Connective tissue diseases (mean ± SD)	Degenerative disorders (mean ± SD)	Autoinflammatory diseases (mean ± SD)	p-value
SF-36 (overall score)	50.2 ± 10.3	56.8 ± 11.1	59.7 ± 10.8	<0.01
DAS28	5.3 ± 1.1	4.8 ± 1.0	4.6 ± 1.1	0.04
BASFI	—	—	5.1 ± 1.4	0.18
WOMAC	—	54.2 ± 9.6	—	—
NHP (total score)	48.4 ± 9.1	44.3 ± 8.6	41.2 ± 9.3	0.02

Connective tissue diseases were associated with a higher DAS28 score and greater impairment of the SF-36 and NHP scores, indicating a more severe functional impact.

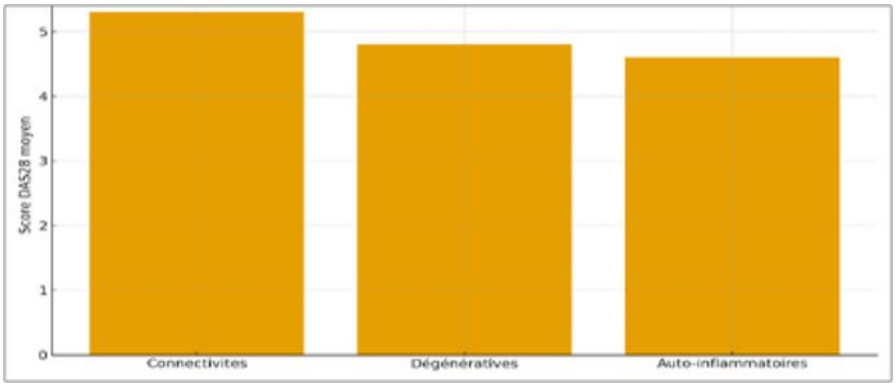

Figure 1: Mean DAS28 score according to type of rheumatic disease.

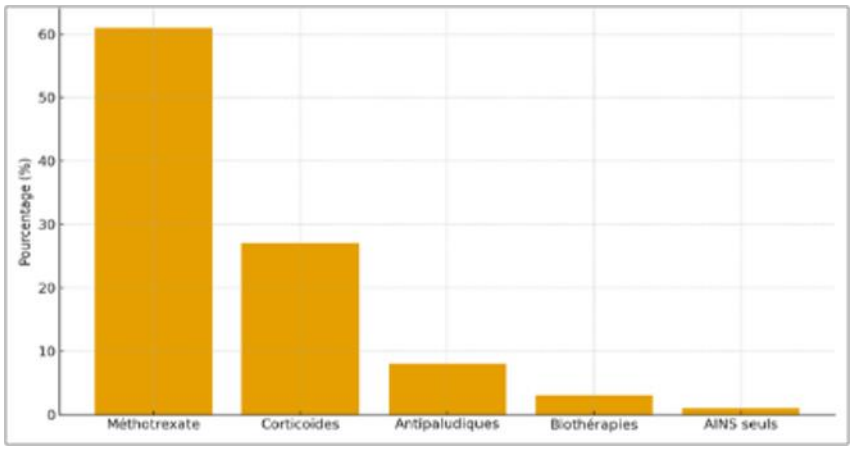

Figure 2: Distribution of treatments in patients with connective tissue diseases

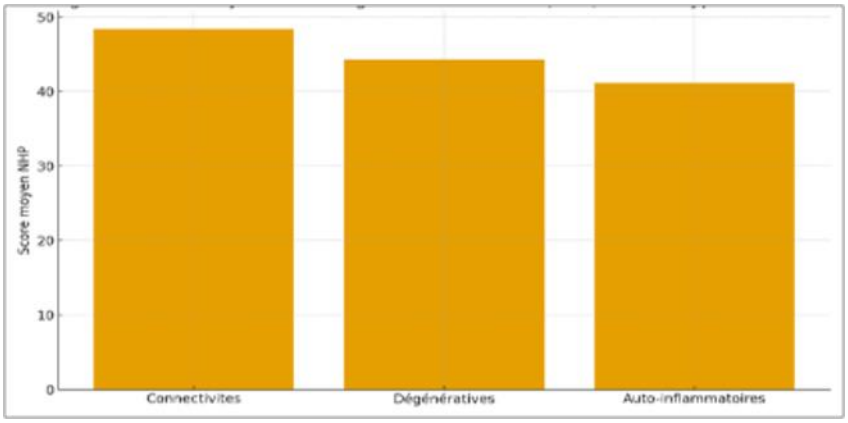

Figure 3: Mean Nottingham Health Profile (NHP) score according to disease type.

4 DISCUSSION

This study is the first in Chad to compare metabolic syndrome (MS) among patients with connective tissue diseases, degenerative disorders, and autoinflammatory diseases.

The overall prevalence of MS was 6.6%, which remains lower than that reported in West Africa (8–12%) but higher than that reported in the general Chadian population (3–4%)

MS was significantly more prevalent among patients with connective tissue diseases (40.9%), as also observed in Morocco (Abourazzak et al., 2014: 38%) and Tunisia (Tekaya et al., 2022: 36%) (4-10).

The inflammatory profile and prolonged corticosteroid use may explain this predominance (11).

The most frequent components—abdominal obesity and hypertension—confirm the central role of inflammatory dysregulation in the pathophysiology of MS (12-13).

The impairment of SF-36 scores and the increased DAS28 scores confirm the major functional impact of MS, as previously described by Santos-Moreno et al (14).

Among women, menopause and prolonged corticosteroid therapy constitute aggravating factors (15).

Our findings support the need for systematic screening for MS from the time of diagnosis of connective tissue diseases, together with multidisciplinary management incorporating nutritional counseling, physical activity, and cardiometabolic monitoring (16-17).

The limitations of this study include its retrospective design, single-center setting, and the absence of insulin level measurements.

However, the sample size and the diversity of rheumatic diseases included provide good internal validity.

5 CONCLUSION

Metabolic syndrome is common among patients with connective tissue diseases in Chad and is associated with greater functional impairment than in patients with degenerative or autoinflammatory diseases.

Early screening and integrated management are essential to reduce cardiovascular morbidity and improve quality of life.

Prospective multicenter studies are needed to confirm these findings.

COMPLIANCE WITH ETHICAL STANDARDS

Disclosure of conflict of interest

The authors declare that they have no conflict of interest regarding this work.

Authors' contribution

All authors contributed equally to the design, data collection, analysis, and writing of the manuscript.

Statement of ethical approval

The study protocol was conducted in accordance with the principles of anonymity and confidentiality of patient data. Authorization to collect and use the data was obtained from the administration of the CHU-RN and from the research coordinator of the Faculty of Human Health Sciences of the University of N'Djamena.

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