

Acute Gout Attack in Cameroonians and Oxidative Stress: Cause and Effect?

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Abstract

Aim: Hyperuricemia and urates crystals deposition which lead to acute gout are responsible for inflammatory processes and possibly oxidative stress. However uric acid has been described to have both oxidant and antioxidant properties. The aim of this study was to determine if there is an oxidative stress in acute gout in Cameroonians.

Methods: We made a case control study on 60 Cameroonians subjects including 30 people with acute gout and 30 other free of gout with same age and sex. Oxidative status where evaluated with 4 markers: Malondialdehyde, Catalase, Glutathione Peroxidase and Superoxide Dismutase.

Results: Acute gout was associated with high levels of Malondialdehyde, but no difference was observed between the other stress markers in the groups.

Conclusion: Acute gout patients have oxidative damages to lipids which could play a role in the pathogenesis of diseases associated with gout and represent a potential target for prevention of these affections.

Keywords: Gout attack; Lipid peroxidation; Oxidative stress; Cameroonians

Introduction

Gout is an old disease which presents in the acute form as a painful inflammatory arthritis [1]. In Cameroon, the prevalence of gout is increasing [2]. Uric acid plays a central role in the pathogenesis of gout and has been associated to hypertension, diabetes, kidney disease, cardiovascular events and cerebrovascular diseases whose prevalence's are also increasing [3-6]. Oxidative stress could be part of this pathogenesis responsible for chronic inflammation and damages of several organs [7]. Uric acid possess both antioxidant and oxidant properties, but the cutoff of this activity is not yet defined [7-9]. To understand the relationship between gout and oxidative stress, first we started by investigating whether there is an oxidative stress in gout attack or not in Cameroonians.

In the Cameroonian population, we chose for this study 30 participants with gout attack according to the criteria of ACR 1977 [10]. These subjects had clinical and paraclinical parameters similar to those described in Cameroonian's literature [11,12].

Table 1: Characteristics of the study population.

Different parameters	Group with acute gout (30)	Control Group (30)	p-value
Mean age (years)	58 ± 8	57.8 ± 8	p>0.05
Mean uric acid level (mg/L)	81.19 ± 20.95	47.69 ± 11.84	p<0.001
Mean malondialdehyde level (µmol/L)	1.37 ± 0.46	1.14 ± 0.39	p<0.05
Mean catalase level (IU/min/mg of proteins)	831.07 ± 154.09	890.29 ± 160.30	p>0.05
Mean superoxide dismutase level (nIU/min/mg of proteins)	128.07 ± 79.24	111.29 ± 69.86	p>0.05
Mean glutathione peroxidase level (IU/min/mg of proteins)	0.031 ± 0.012	0.033 ± 0.011	p>0.05

Means between groups were compared with Student's T-test.

They were matched with 30 people of the same sex and age without gout. All the participants were free of diseases or drug consumption which are known sources of oxidative stress. We used 4 serum markers for oxidative stress: malondialdehyde, glutathione peroxidase, superoxide dismutase, and catalase. Statistical analysis was performed with the software S.P.S.S. version 21.0. A p value less than 0.05 was considered significant. We observed that, Malondialdehyde concentrations were higher among gout patients ($p < 0.05$) (Table 1). The concentrations of the other markers were quite similar in both groups (Table 1).

The raise in the concentration of Malondialdehyde express oxidative damages to lipids probably due to metabolic syndrome which prevalence is high in Cameroonians with gout (Table 2). However, it may not reflect the oxidative activity of uric acid when it crystalizes and deposit in joints. Acharya et al. also described an elevation in Malondialdehyde concentrations with a change in catalase, glutathione peroxidase and superoxide dismutase concentration in gout attack which really express oxidative stress [7]. However, our different populations of study are not comparable with their diet, genetic background and some other selection criteria.

Table 2: Comorbidities associated with acute gout.

Comorbidities	Patient with acute gout (30)
Type II Diabetes	7 (23.3%)
Hypertension	27 (90%)
Abdominal obesity	13 (43.33%)
General obesity	10 (33.33%)

Conclusion

Cameroonians with gout attack have an increased level of malondialdehyde which reflect lipid peroxidation. Oxidative damages to lipids could play a central role in the pathogenesis of diseases associated to gout in Cameroonians. Patricians should focus on the influence of antioxidant rich diet in this population.

Abbreviations

ACR: American College of Rheumatology; SPSS: Statistical Package for Social Sciences.

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Competing Interest

The authors declare there is no competing interest.

Consent for Publication

Not applicable.

Ethics Approval and Consent to Participate

All the patients read and signed an informed consent sheet. Research authorisations were obtained from the institutions concerned. Ethical clearance was obtained from the Institutional Ethical Review Board (IERB) of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I (Cameroon).

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