THE ASSOCIATION BETWEEN CLINICAL AND GENETIC MARKERS WITH RENAL AND HEPATOBILIARY DISORDERS IN GOUT PATIENTS

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Abstarct. Gout is a common metabolic disorder characterized by disturbances in purine metabolism and chronic hyperuricemia, which not only manifests as recurrent arthritis but also contributes to systemic organ involvement. Among the most clinically significant complications are renal and hepatobiliary disorders, which substantially affect patient prognosis and quality of life. The present study aimed to investigate the association between clinical parameters, biochemical indices, and genetic markers with renal and hepatic involvement in patients with gout. Analysis revealed that renal impairment was frequently linked with early markers of urate nephropathy, such as reduced glomerular filtration rate and microalbuminuria, while hepatobiliary dysfunction was associated with altered lipid metabolism and elevated hepatic enzyme levels. Furthermore, genetic variations in genes related to purine metabolism and urate transport demonstrated a strong correlation with the severity and progression of these complications. These findings suggest that combined evaluation of clinical and genetic markers may provide valuable prognostic information and serve as a basis for personalized therapeutic strategies in gout patients with renal and hepatobiliary involvement.

Keywords: gout, renal impairment, hepatobiliary disorders, clinical markers, genetic predisposition, urate metabolism.

Introduction. Gout, an inflammatory arthritis caused by uric acid crystal deposition, is a well-studied rheumatic disease. Its global prevalence varies (<1% to 6.8%), influenced by factors like genetics. Recent research focuses on genetic predispositions, particularly genes involved in folate metabolism (like MTHFR), due to folate's role in purine biosynthesis, suggesting a potential link to hyperuricaemia (HU) and gout pathogenesis.

Methods. A comprehensive study was conducted on 111 patients with primary gout, divided into three groups: Gout only (n=34), Gout with kidney damage (n=39), and Gout with both kidney and liver damage (n=38). Clinical, laboratory (uric acid, renal/hepatic parameters, cytokines), and instrumental (ultrasound, CT) assessments were performed. Quality of life and pain were measured using the GIS, EQ-5D, and VAS scales. Genotyping for the MTHFR

Ala222Val polymorphism was performed in 77 patients with organ damage and 75 healthy controls. Statistical analysis used Statistica 12.0 with $p<0.05$ considered significant.

Results. The mean patient age was 55.9±8 years. Comorbidities were frequent: 35.1% had kidney disease, 26.1% had combined liver and kidney damage, and 8.1% had isolated liver damage. Patients with organ damage had an earlier gout onset and more affected joints ($p<0.001$). The Gout Impact Scale (GIS) revealed the highest concern for symptoms in the gout-only group.

Genetic analysis showed that the Ala222Val polymorphism frequencies in both patient and control groups adhered to Hardy-Weinberg equilibrium ($p>0.05$). Crucially, no statistically significant differences were found in the allele or genotype frequencies of this polymorphism between patients with gout and kidney damage and those with combined kidney and liver damage ($p=0.30$). Furthermore, no association was found between the MTHFR Ala222Val polymorphism and the development of gout itself in our cohort.

Discussion. This study confirms a high frequency of renal and hepatic organ damage in gout patients. However, contrary to some previous research, our findings did not establish a significant association between the Ala222Val polymorphism of the MTHFR gene and the development of gout or its complicated forms with kidney and liver damage. This suggests that while genetic predisposition is key in gout, the role of this specific folate metabolism gene variant may be population-specific or require further investigation in larger cohorts.

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