JAK2 GGCC (46/1) Haplotype and its Relationship with Other Mutations and Clinical Characteristics in Patients with Chronic Myeloproliferative Diseases

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Background

Chronic myeloproliferative diseases are group of blood diseases which have an increased number of blood cells in the peripheral blood. JAK2 positive chronic myeloproliferative diseases include essential thrombocytaemiaosis, polycythemia vera, and primary myelofibrosis. The association of the JAK2 GGCC (46/1) haplotype with JAK2 V617F is also disscused in the literature. This study investigated patients with chronic myeloproliferative diseases, the frequency of JAK2 mutation and the association with the JAK2 GGCC 46/1 haplotype.

Objectives

1. To determine the frequency of JAK2 GGCC (46/1) haplotype JAK2 rs10974944 (C / G) single nucleotide polymorphism in patients with chronic myeloproliferative diseases.

2. To investigate the frequency of JAK2 V617F mutation and its association with JAK2 GGCC (46/1) haplotype JAK2 rs10974944 (C / G) single nucleotide polymorphism.

3. To evaluate the association of JAK2 GGCC (46/1) haplotype JAK2 rs10974944 (C / G) single nucleotide polymorphism with CALR mutation in chronic myeloproliferative diseases.

Methods

- A retrospective study has included **104** patients with **chronic myeloproliferative diseases** who was diagnosed and treated in the LSMU KK Oncology and Hematology clinic from 2001. January to 2019 December.
- Analysis of the medical records of patients with MPN will be done and **clinical, laboratory data, information on advanced arterial and venous thrombosis**, and **JAK2 V617F mutation status** was be collected.
- Patients with MPN will undergo a molecular genetic study of the **rs10974944 (C/G) 46/1 haplotype**.
- Data collection and statistical analysis will be performed using Excel and SPSS 23.0. The difference between the study groups is considered statistically significant if p was <0.05

Conclusions

1. In our research **75.5 percent**. of subjects we identified with **haplotype 46/1 JAK2 rs10974944 SNP.**

2. In patients with chronic myeloproliferative diseases, we determined the **frequency** of **JAK2 V617F mutation** and its **relationship** with **haplotype JAK2 rs10974944 SNP**.

3. **No association** was found between the **haplotype JAK2 rs10974944 SNP** and **CALR mutation** in patients with chronic myeloproliferative diseases.

Key words

JAK2, chronic myeloproliferative diseases, JAK2 GGCC 46/1 haplotype, myeloproliferative neoplasias, policitemia vera, primary myelofibrosis, essential thrombocythaemia, calreticulin

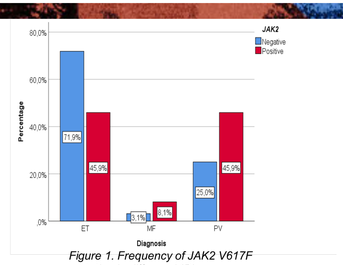

Figure 1. Frequency of JAK2 V617F mutation in different MPLs

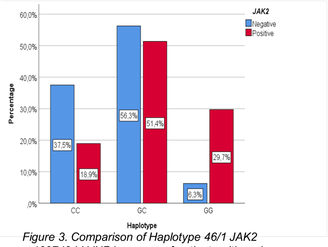

Figure 3. Comparison of Haplotype 46/1 JAK2 rs10974944 VNP in groups of patients with and without JAK2 V617F mutation

Results

- The most common LMPLs were: 53.8% ET, 39.6% PV, 6.6% MF.
- The JAK2 V617F mutation was detected in 69.8% of patients.
- The genotypes of Haplotype 46/1 JAK2 rs10974944 (C / G) SNP were distributed as follows: 24.5% were CC, 52.8% were GC (heterozygous) and 22.6% were GG (homozygous).
- CALR was studied in 13.2% of patients, of whom 8.5% were found.
- Venous or arterial thrombosis was detected in 46.2% of patients, and both arterial and venous thrombosis were detected in 3.8% of patients.
- Arterial hypertension occurred in 49.1% of patients. Data on ischemic heart disease were collected from 75.5% of patients studied, of whom 19.8% had IHD.
- Diabetes mellitus occurred in 10.4% of patients.
- The duration of disease was statistically significantly longer in the group of JAK2 mutations than in the group of JAK2-negative patients.
- The GG genotype of haplotype 46/1 JAK2 rs10974944 was statistically significantly higher in the JAK2-positive group compared to the JAK2-negative group.
- Haplotype 46/1 JAK2 rs10974944 (C / G) SNP GG and CG genotypes were identified in 75.5% of patients.
- Patients in the G allele group were statistically significantly older than those in the CC genotype group.
- Disease duration was statistically significantly longer in the G allele group than in the CC genotype group.
- Patients with the GG genotype had a longer duration of disease than those with the GC / CC genotype.
- The incidence of JAK2 V617F mutation was statistically significantly higher in the GG genotype group than in the CG / CC genotype group (91.7% and 61.4%).
- The number of monocytes and MPV in patients with the GG genotype were statistically significantly lower than those with lower activity haplotype 46/1 JAK2 rs10974944 genotypes, respectively.

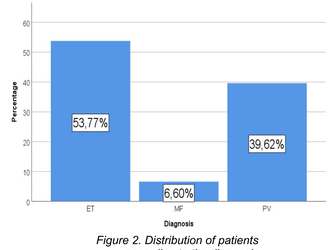

Figure 2. Distribution of patients according to the diagnosis

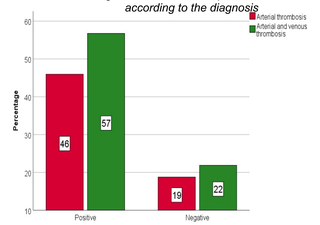

Figure 4. Percentage distribution of arterial thrombosis and total thrombosis in groups of patients with and without the JAK2 V617F mutation