Usefulness of P574R Polymorphism of Matrix Metalloprotease 9 (MMP-9) in the Diagnosis and Prognosis of Prostate Cancer

Introduction and Objectives: An increase in the activity and expression of matrix metalloprotease 9 (MMP-9) has been noted in tumoral prostate tissue. The P574R polymorphism is found in a hemopexin domain of MMP-9, a binding site of the endogenous inhibitors which regulate the proteolytic activity of the MMP-9. The aim of this study is to analyze the association of the P574R polymorphism and the risk of having prostate cancer and to study the link with prognosis of prostate cancer.
Material and Methods: A hospital-based prospective cohort of 245 was studied. All the patients were suspected of having prostate cancer and were subjected to a blood extraction and to a prostate biopsy later. The identification of the genotype of the P574R polymorphism was carried out based on the leukocyte DNA using RFLP technique (restriction fragment length polymorphism). The Stata/SE 8.2 program was used for the statistical analysis.
Results: The allelic frequencies were 95% wild allele (C) and 5% polymorphic allele (G). The population is Hardy-Weinberg balanced (p=0.076). No statistical differences were found comparing genotypical frequencies based on the prostatic biopsy results (p=0.09). Statistically significant differences were found comparing genotypical frequencies based on the prostatic biopsy results in the subgroup of patients with PSA levels of 4-10 ng/dl (p=0.031). This subgroup was subjected to a logistical regression study and significant data was obtained (OR =2.92; 95%CI[1.05-8.11] p= 0.031; OR age = 3.38; 95%CI[1.20-9.53] p=0.021; OR age and PSA= 3.33 95%CI[1.17-9.43] p=0.023). No statistical differences were found comparing genotypical frequencies based on Gleason score (p=0,645), nor when comparing patients without tumor with patients with prostate cancer stratified by Gleason score (p=0,18; p=0,083; p=0,405). No statistical differences were found when the link with tumoral stage (TNM) was studied (p=0,952; p=0,632; p=0,763)
Conclusions: The presence of one polymorphic allele at least in the genotype of P574R polymorphism of MMP-9 increases the risk of suffering prostate cancer three times in the subgroup of patients with PSA level 4-10 ng/dl. P574R polymorphism is not associated with specific aggressiveness of prostate cancer. P574R polymorphism could be used as a diagnostic marker of prostate cancer at PSA levels 4-10 ng/dl.