Genetic Variation of Matrix Metalloprotease 9 (MMP-9) Predominant in Asian Populations Associated with Good Prognosis Prostate Cancer

Introduction and Objectives: MMP-9 has been related to prostate cancer development. Q279R is a functional polymorphism of MMP-9. Polymorphic allele (R) of Q279R polymorphism is associated with prostate cancer with low Gleason score in patients subjected to radical prostatectomy but is not linked with non-risk-stratified prostate cancer. In Asian populations allele R is the wild allele not the polymorphic allele, the contrary to what occurs in the rest of the population. The aim of this study is to analyze the association of the Q279R polymorphism with the risk and prognosis of prostate cancer.
Materials and Methods: A hospital-based prospective cohort of 238 Caucasian patients was studied. Prostate biopsy and blood extraction was performed on all patients. Q279R genotype was identified using RFLP technique (restriction fragment length polymorphism) on leukocyte DNA.
Results: Statistically significant differences were found comparing genotypical frequencies based on the prostate biopsy results (p=0,023) and in the subgroup with PSA 4-10 ng/dl (p=0,024). Because all the patients with doubtful lesions (prostatic intraepithelial neoplasia or atypical proliferation) in prostate biopsies had one polymorphic allele at least of genotype of Q279R. No statistical differences were found when comparing genotypical frequencies based on Gleason score (p=0,304) nor when comparing patients without tumor with patients with prostate cancer stratified by Gleason score (p=0,102; p=0,811; p=0,924). Statistically significant differences were found comparing genotypical frequencies based on Gleason score in subgroup with PSA 4-10 ng/dl (p=0,019). Around 85% of polymorphic genotypes (RR) are associated with Gleason score under 6. No statistical differences were found when comparing genotypical frequencies based on tumoral stage (p=0,746; p=0,487; p=0,672).
Conclusion: Polymorphic allele (R) of Q279R polymorphism in Caucasian population is associated with prostate cancer with low Gleason score in PSA levels 4-10 ng/dl. Doubtful lesions have one polymorphic allele at least on genotype of Q279R. These findings support the theory that Q279R polymorphism is linked with good prognosis prostate tumors. Given that in Asian countries the allele R is more common than the Q, the Q279R polymorphism could be one of the genetic components responsible for the epidemiological differences between Asian populations and those in the rest of the world.