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Clinical Relevance of TMPRSS2-ERG Fusion Marker for Prostate Cancer

Authors : Shalu Jain, Anju Bansal, Anup Kumar, Sunita Saxena

Abstract : Objectives: The novel TMPRSS2:ERG gene fusion is a common somatic event in prostate cancer that in some studies is linked with a more aggressive disease phenotype. Thus, this study aims to determine whether clinical variables are associated with the presence of TMPRSS2:ERG-fusion gene transcript in Indian patients of prostate cancer. Methods: We evaluated the clinical variables with presence and absence of TMPRSS2:ERG gene fusion in prostate cancer and BPH association of clinical patients. Patients referred for prostate biopsy because of abnormal DRE or/and elevated sPSA were enrolled for this prospective clinical study. TMPRSS2:ERG mRNA copies in samples were quantified using a Taqman chemistry by real time PCR assay in prostate biopsy samples (N=42). The T2:ERG assay detects the gene fusion mRNA isoform TMPRSS2 exon1 to ERG exon4. Results: Histopathology report has confirmed 25 cases as prostate cancer adenocarcinoma (PCa) and 17 patients as benign prostate hyperplasia (BPH). Out of 25 PCa cases, 16 (64%) were T2: ERG fusion positive. All 17 BPH controls were fusion negative. The T2:ERG fusion transcript was exclusively specific for prostate cancer as no case of BPH was detected having T2:ERG fusion, showing 100% specificity. The positive predictive value of fusion marker for prostate cancer is thus 100% and the negative predictive value is 65.3%. The T2:ERG fusion marker is significantly associated with clinical variables like no. of positive cores in prostate biopsy, Gleason score, serum PSA, perineural invasion, perivascular invasion and periprostatic fat involvement. Conclusions: Prostate cancer is a heterogeneous disease that may be defined by molecular subtypes such as the TMPRSS2:ERG fusion. In the present prospective study, the T2:ERG quantitative assay demonstrated high specificity for predicting biopsy outcome; sensitivity was similar to the prevalence of T2:ERG gene fusions in prostate tumors. These data suggest that further improvement in diagnostic accuracy could be achieved using a nomogram that combines T2:ERG with other markers and risk factors for prostate cancer.

Keywords : prostate cancer, genetic rearrangement, TMPRSS2:ERG fusion, clinical variables
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