CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

Tammy Rubin; Ali Tradonsky

Project Number

S0535

Project Title

A Search for Reliable Molecular Cytogenetic Markers of Prostate Cancer Prognosis

Abstract

Objectives/Goals

The purpose of this study was to find a test in the form of molecular cytogenetic markers that can reliably predict prostate cancer prognosis at the time of diagnosis/biopsy. This would separate the minority of prostate cancers that are potentially aggressive and life-threatening, warranting radical treatment from the vast majority of clinically indolent cases, that can be safely watched without therapeutic intervention.

Methods/Materials

The study is a retrospective evaluation of 240 patients who underwent radical prostatectomy and comprehensive follow up. For each case paired cancer and benign tissue samples were made into tissue microarrays and stained with antibodies against protein products of 20 targeted gene sequences. All traditional clinical and pathologic prognostic indicators and all antibody stains were assessed, recorded and correlated with patient outcomes in univariable analysis. Statistically significant prognosticators evaluable on biopsy and significant antibodies were evaluated for independently significant outcome predictability in multivariate analysis, using Cox analysis, logistic regression and Kaplan Meier plots as appropriate, p values and hazard ratios.

Results

By univariable analysis a number of clinical and pathologic indicators and 4 of the antibodies showed statistically significant outcome predictability. Antibodies targeting Stathmin 1, E-Cadhedrin, Cytochrome p450-4z1 and Hey2 were significant by univariable analysis. By multivariable analysis Gleason score, Hey2 and Cytochrome p450-4z1 were independently predictive of outcome. Stathmin 1 and E-Cadherin were not independent of Gleason score but remain clinically useful as antibody interpretation is objective while Gleason score is subjective, and Gleason score on biopsy often differs from prostatectomy Gleason score.

Conclusions/Discussion

There is no reliable test of prostate cancer prognosis. Most cases are treated even though more than 80% remain clinically insignificant and less than 3% are fatal. Screening PSA results in detection and overtreatment of millions of cases. In the USA last year 48 men were treated for each life saved at a cost of over $600 million. Stathmin 1, Cytochrome p450-4z1, E-Cadhedrin and Hey2 hold promise for a future reliable test of prostate cancer prognosis and therapeutic response that can reduce overtreatment, adverse side effects and healthcare dollars.

Summary Statement

A search for a reliable test of prostate cancer prognosis that can safely limit treatment to the small minority of cases that have aggressive disease, saving milliions of men from unneccessary treatment, side effects and healthcare expense.

Help Received

Scientific advisor Dr. Sharon Mair; Sharp Healthcare tumor registrar; consultants at Clarient Lab. Inc who advised on molecular marker testing and biostatistics.