

Targeted Biopsy to Detect Gleason Score Upgrading during Active Surveillance for Men with Low versus Intermediate Risk Prostate Cancer

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Abstract

Purpose:

We sought to determine the rate of upgrading to Gleason score 4 + 3 or greater using targeted biopsy for diagnosis and monitoring in men undergoing active surveillance of prostate cancer.

Materials and Methods:

Study subjects comprised all 259 men, including 196 with Gleason score 3 + 3 and 63 with Gleason score 3 + 4, who were diagnosed by magnetic resonance imaging/ultrasound fusion guided biopsy from 2009 to 2015 and underwent subsequent fusion biopsy for as long as 4 years of active surveillance. The primary end point was the discovery of Gleason score 4 + 3 or greater prostate cancer. Followup biopsies included targeting of positive sites, which were tracked in an Artemis™ device. Kaplan-Meier curves were generated to determine upgrading rates, stratified by initial Gleason score and prostate specific antigen density.

Results:

Based on a Cox proportional hazard model, men with Gleason score 3 + 4 were 4.65 times more likely to have upgrading than men with an initial Gleason score of 3 + 3 at 3 years ($p < 0.01$). By the third surveillance year 63% of men with Gleason score 3 + 4 had been upgraded compared with 18.0% who started with Gleason score 3 + 3 ($p < 0.01$). Of all 33 upgrades 32 (97%) occurred at a magnetic resonance imaging visible or a tracked site of tumor, rather than at a previously negative systematic site. Independent predictors of upgrading were Gleason score 3 + 4, prostate specific antigen density 0.15

ng/ml/cm³ or greater and a grade 5 lesion on magnetic resonance imaging. The incidence rate ratio of upgrading (Gleason score 3 + 4 vs 3 + 3) was 4.25 per year of patient followup ($p < 0.01$).

Conclusions:

During active surveillance of prostate cancer, targeting of tracked tumor foci by magnetic resonance imaging/ultrasound fusion biopsy allows for heightened detection of Gleason score 4 + 3 or greater cancers. Baseline variables directly related to important upgrading that warrant increased vigilance include Gleason score 3 + 4, prostate specific antigen density 0.15 ng/ml/cm³ or greater and grade 5 lesions on magnetic resonance imaging.