2018 Endourological Society Summer Student Scholarship Summary Report
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A Predictive Nomogram to Determine Active Surveillance Candidacy Incorporating Multiparametric MRI and Fusion-guided Biopsy as Variables: Preliminary Findings

The use of active surveillance (AS) for prostate cancer (PCa) management in the United States is accelerating, with 40.4% of low-risk tumors being managed by AS or watchful waiting. AS is even more popular among men ages 75 and up, with 76% of these individuals choosing to pursue AS. Currently, the National Comprehensive Cancer Network (NCCN) guidelines recommend AS for very-low risk PCa, and advises that it may be considered for low-risk prostate cancer as well. Still, the fear remains that men with both very low and low-risk cancers may be harboring foci of high-risk PCa that was not detected on diagnosis or repeat systematic 12-core biopsy.

Existing data demonstrates that targeted magnetic resonance/ultrasound fusion prostate biopsy has improved the identification of clinically significant prostate cancer, and fusion biopsy outcomes have shown multiparametric MRI (mpMRI) to be predictive of risk levels in patients undergoing biopsy. The recently reported ASIST trial, did not demonstrate a significant degree of upgrading on confirmatory biopsy with the inclusion of MRI targets (27% vs 33%, p=0.3). However, a number of retrospective studies have demonstrated the identification of clinically significant disease and provided insight into the role of MR and fusion biopsy in treatment decision-making irrespective of confirmatory biopsy pathology. The goal of this study was to evaluate the potential diagnostic advantage of prostate MRI in AS patients to ultimately develop a predictive nomogram that would determine the risk of upgrading on confirmatory and surveillance fusion-guided biopsy. Here, I discuss our study design and preliminary findings.

Patients considering active surveillance who were initially diagnosed with favorable risk prostate cancer on 12-core biopsy who subsequently underwent a confirmatory prostate MRI and MR/US Fusion-guided biopsy at the University of Michigan were identified. This project initially involved chart review of more than 1000 patients to collect data according to the following parameters: race, age, pre-biopsy PSA, total prostate volume, largest lesion diameter, largest lesion volume, lesion suspicion based on the PIRADSv2 scoring system, and biopsy pathology characteristics. Biopsy pathology was recorded in detail per biopsy core, delineating which cores were part of a standard 12-core biopsy vs. regions of interest (ROI) that corresponded to PIRADSv2 lesions on mpMRI. However, during the course of the study, our database was completely re-designed to allow for per-lesion and per-core analysis in addition to patient-level analysis.

Given the restructuring of the database, the entirety of the data has required re-entry and is ongoing. Currently we present the available analysis for 88 of 500 patients with complete data on active surveillance who underwent prostate MRI.

The overall cancer detection rate (CDR) by either targeted or systematic was 86.4% (76/88), which though high is consistent with a population undergoing confirmatory biopsy for known prostate cancer. All men with PIRADS 3-5 lesions underwent targeted sampling demonstrating a CDR of 62.5% vs 77% for systematic biopsy alone. Upgrading by biopsy type defined as any higher Gleason score on one biopsy vs another and upgrading to high grade (Gleason≥7) was assessed. Though overall upgrading by systematic biopsy was higher than targeted biopsy

(35.2% vs 13.6%) this was largely driven by the detection of Gleason 6 prostate cancer. Upgrading to high grade prostate cancer was found to be 8% in targeted biopsy vs 11.4% in systematic cores. The current data demonstrates the continued utility of systematic biopsy in the active surveillance population given the amount of clinically significant prostate cancer found on 12-core biopsy alone, even within institutions with high quality imaging and significant expertise in prostate MRI interpretation and fusion biopsy.

Our follow-up work will focus on a few specific things. Though the adoption of active surveillance continues to rise, a number of men continue to pursue definitive therapy for low risk disease despite a questionable long-term benefit. The ability of MRI to better identify men who are more likely to harbor clinically significant prostate cancer, that are more likely to derive benefit from definitive treatment, has previously been validated. However, the incorporation of MRI findings with conventional risk variables such as age, race, clinical stage, and PSA remains to be performed in a comprehensive manner that is easily adoptable.

As I look forward to making clinical research a part of my career as a physician, I am grateful to the Endourologic Society for the opportunity and support to fully delve into a research project, as I have gained an understanding of the constant need for re-evaluation of study goals, design, and methods required to be successful in this endeavor. There are unanticipated challenges – some which require redirection and re-assessment of goals, a valuable lesson when testing a hypothesis. This experience has shown me how clinical research allows us to approach problems with intention in order to find meaningful answers to questions that could significantly change patients' experiences within our healthcare system. That is precisely what makes this so exciting.