TITLE
Reduction of prostate biopsy morbidity and hospitalization through a modified biopsy protocol bundle and region-specific antibiogram.

STUDY DESIGN
Approach:
This will be a prospective multi-center cohort case-control study comparing a novel **transperineal prostate biopsy protocol** integrating measures to reduce post procedural infection (Cases) to **traditional transrectal prostate biopsies** (Controls). Eligible subjects will be identified through administrative records in the Urology clinics affiliated with Maimonides Medical Center. Eligible patients will be counseled about the risks and benefits of participation and offered enrollment into the study. Demographic data including age, comorbidities and past medical history will be extracted from the medical record.

Men meeting inclusion/exclusion criteria will be prospectively enrolled.
The novel transperineal protocol will include the following: (**Cases**)

1. Transperineal biopsy approach with avoidance of rectal flora
2. MRI-ultrasound fusion-guided biopsies with reduced number of biopsy cores, where clinically indicated
3. Rectal swab to identify the presence of fluoroquinolone resistant (FQR) bacteria
4. Multi-antibiotic prophylaxis
5. Urine culture, prostate tissue culture and rectal swab culture to define contemporary, region-specific antibiotic resistance patterns.

Traditional biopsy protocol includes: (**Controls**)

1. Transrectal approach
2. Standard 12-core template
3. Surgeon-specific antibiotic prophylaxis
4. Urine culture, prostate tissue culture and FQR rectal swab culture to define contemporary, region-specific antibiotic resistance patterns.

Inclusion criteria:

- Male patients greater than 18 years of age
- Indication for prostate biopsy

Exclusion criteria:

- Female patients
- Male patients under 18 years of age
- No indication for prostate biopsy

Statistical analysis and Sample Size Calculation:
The proposed study will consist of two treatment groups, the novel transperineal protocol and the Traditional biopsy protocol. The decision to conduct a prospective cohort case-control study compared to a randomized controlled trial was based on an assessment of feasibility.

Sample Size:
Sample size calculation was performed using the online sample size calculator at clincalc.com/stats/samplesize.aspx.

Study group design: Two independent study groups
Primary endpoint: Dichotomous (yes/no) [Any complication after biopsy]

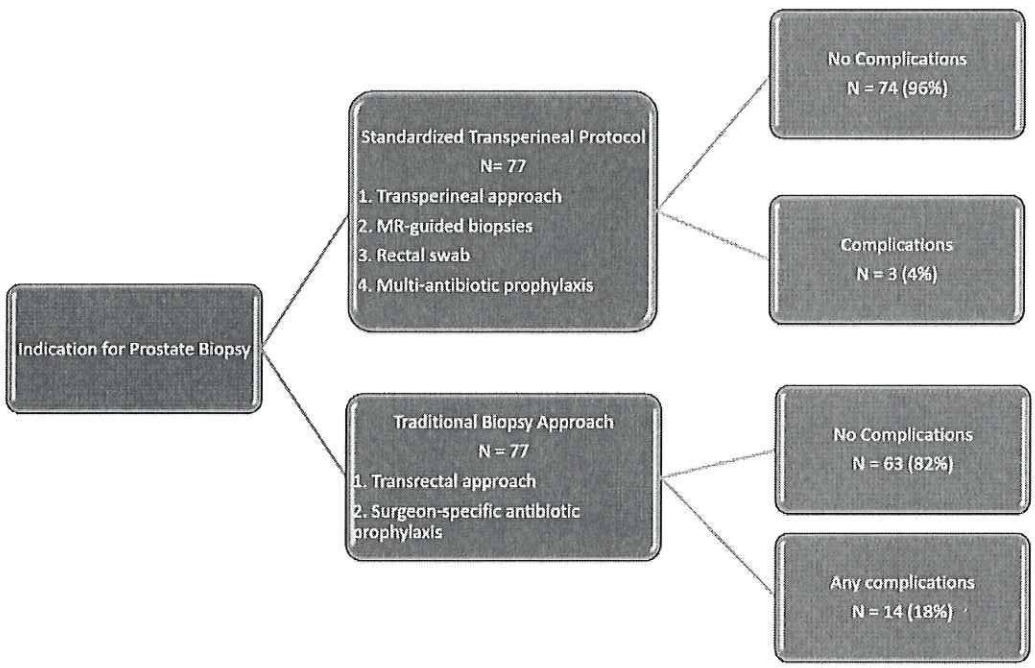
Statistical Parameters:
Anticipated Incidence
Group 1 (Traditional/**Controls**): 18% predicted rate of any complication (Ref: Gershman et al.)
Group 2 (Transperineal bundle/**Cases**): 4% rate of any complication

Enrollment ratio: 1:1

Type I/II Error Rate:
Alpha (Type 1 error): 0.05 [5% chance of false positive]
Power (Type II error): 80% [20% chance of false negative]

Sample Size:
Group 1 (Traditional): 77
Group 2 (Transperineal protocol): 77
Total: 154

Final statistical analysis will be performed under the guidance of the available professional biostatistician.



Expected Outcomes:
Our hypothesis is that a standardized transperineal prostate biopsy protocol avoiding rectal flora and incorporating anti-microbial measures will reduce infectious complications and hospital readmissions compared to current biopsy practices. This will provide an evidence-based platform to guide Urology practices for this commonly performed procedure. We will also use culture data from the study to construct a region-specific antibiogram to determine appropriate prophylactic antibiotic coverage and tailor antibiotics for patients that develop infectious complications.

Primary Outcome Measure:
1. Rate of **any clinically significant post-biopsy complications** including infectious complications and hospital readmissions within 30 days.

Secondary Outcome Measures:
1. **Individual complications within 30 days** including urinary retention, hematuria, urinary tract infection, hospitalization.
2. Presence of antibiotic resistant bacteria. (Region-specific antibiogram)

Data Collection, Transmission and Retention:
Study data will be stored on excel sheets in a dedicated, password-protected file within the Maimonides Medical Center Information Technology network. Data will only be available to members of the study team. HIPAA rules be followed. At the conclusion of data collection, the Excel sheet will be exported to statistical analyses software with the assistance of a professional biostatistician for analysis.

Collection and storage of specimens will be performed under the supervision of the medical director of clinical laboratory services (Dr. Zuretti).
The following specimens will be collected and analyzed:

i. Urine cultures
ii. Rectal swab cultures
iii. Prostate tissue cultures

Collection of specimens will not interfere with the appropriate clinical care pathway of study participants.

Quality of collected data will be monitored by the Principal Investigator and Co-Investigators who will work with radiologists, technicians, pathologists, and biostatisticians to ensure that information collected is accurate and reliable. Only the minimum amount of information necessary to perform the study will be collected and great care will be taken to ensure that PHI associated with the patient cases are protected, used, and destroyed according to federal and hospital policy and procedures.

The Investigator shall retain all study documentation for a period of at least (7) years or in accordance with retention policies of the GCP regulations in force or Hospital policy and IRB/EC of record, whichever is longer, following the formal discontinuation of the study.