Comparative Prostate Cancer Detection Rate of Transrectal Ultrasonography Guided versus Finger Guided Prostate Biopsy

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ARTICLE INFO
Received : 16 November 2019
Reviewed : 03 December 2019
Accepted : 18 January 2023

Keywords:
finger-guided, prostate biopsy, TRUS-guided

ABSTRACT
Background: Prostate biopsy was used to diagnose and establish a therapy for prostate cancer (PCa). Instead of using conventional finger-guided prostate biopsy (FGPB) to approximate prostatic architecture, transrectal ultrasonography-guided biopsies of the prostate (TRUSGB) have become more popular nowadays because of offer direct visualization. However, the lack of availability of transrectal ultrasound probes in less-developed regions raises concerns regarding the need to diagnose patients with PCa. Moreover, different conclusions have been found from prior studies that examined the efficacy of both methods. This study aims to compare the accuracy of TRUSGB to FGPB in prostate cancer.

Methods: This study was done retrospectively from 50 medical records of PCa in the Urology Division of Sardjito Hospital from January 2009 until December 2013. Patients’ age, PSA value, digital rectal examination, and histopathological examination were analyzed.

Results: The mean age was 65.18 ± 7.76 years in FGPB and 67.52 ± 10.79 years in TRUSGB group. The median PSA was 65.01 (range: 16.33–114.72) ng/mL in FGPB and 71.75 (range: 19.86–123.47) ng/mL in TRUSGB. Abnormal DRE was found in 75.75% of patients in FGPB group and 70.58% in TRUSGB. Comparable cancer detection rates were found in the FGPB and TRUSGB groups (45.45% vs. 52.94%) (p = 0.136).

Conclusions: The cancer detection rates for FGPB and TRUSGB procedures are comparable. This supports using FGPB as the first-line diagnostic technique, especially in low-resource situations where ultrasonography is unavailable.

INTRODUCTION
In older men, prostate cancer (PCa) is the most prevalent tumor and is one of the most frequent causes of cancer-related deaths worldwide [1]. The initial and fundamental stage in diagnosing the condition is the digital rectal examination (DRE). Transrectal ultrasonography (TRUS) and gland biopsy are advised in the case of an abnormal DRE finding, regardless of the serum prostate-specific antigen (PSA) level [1]. The most effective way to take biopsies after findings of an abnormal DRE is up for debate [2]. Studies comparing the efficacy of finger-guided prostate biopsy (FGPB) versus transrectal ultrasonography-guided biopsies of the prostate (TRUSGB) have yielded conflicting results. Additionally, it became less practical in some clinical settings because of the shortage of transrectal ultrasound probes in less-developed areas and the significant demand to diagnose patients with PCa. The current study intends to compare the two techniques of directing biopsy in individuals suspected of PCa to determine whether one method has superior cancer detection rates.

METHODS
A retrospective, cross-sectional research design was used to examine data from 50 medical records of PCa in the Urology Division of Sardjito Hospital from January 2009 until December 2013. Patients with more than 4 ng/mL PSA levels or abnormal DRE findings met the inclusion criteria. Apart from the incomplete data from medical records, patients with hyperuricemia,
uncontrolled hypertension, bleeding disorders, or using antithrombotic agents were excluded from the study. No patients were excluded due to eligibility criteria. Patients’ age, PSA value, digital rectal examination, and histopathological examination were analyzed. The tissue yield was used to determine the accuracy, measured based on a histopathological report verifying the tissue’s adequacy, and thus provided a histology diagnostic.

Descriptive statistics were used to compile the baseline characteristics of the patient. To calculate the p-value for quantitative variables, a two-sample t-test and one-way ANOVA were used. Using the SPSS v23 program (SPSS/IBM, Chicago, IL), all data were examined. A 0.05 p-value was regarded as statistically significant.

**Biopsy protocols**

In this study, a lithotomy position was adopted for the biopsy procedure, in which the patients were under spinal or general anesthesia. Antibiotics were administered prior to surgery, and the perineum was scrubbed and draped in a sterile fashion.

The TRUSGB procedure was carried out with the prostate biopsy needle guided by a transrectal ultrasonography triplane probe (simultaneous biplane and end-fire) at a configurable frequency of 4 to 12 MHz (8818 probes, B-K Medical, Copenhagen, Denmark). Using a BARD Magnum biopsy gun (MG1522, Bard Company, Covington, U.S.), 14-gauge or 17-gauge needles were used to provide 15-mm-long tissue cores during the biopsies.

For the FGPB approach, the BARD Magnum biopsy gun (MG1522, Bard Company, Covington, U.S.) with the aid of a spring-loaded 14G or 17G biopsy needle was used to obtain prostate tissue. The biopsied region was then palpated with the index finger. The needle was positioned against the index finger and advanced until it reached the prostate gland. Following the biopsy, the needle was removed from the sheath to release the retrieved tissue core.

The 12 regions of the prostate were covered by the systematic biopsy, which was carried out by putting the needle following an in-house scheme (medial and lateral apex, medial and lateral mid prostate, and medial and lateral base in both lobes). The obtained number of systematic cores varied, depending on the patient’s age, prostate volume, and PSA value.

**RESULTS**

Of the 50 patients, thirty-three underwent FGPB, and the remaining (17) patients underwent TRUSGB. The mean age was 65.29 ± 8.28 years in FGPB and 68.28 ± 10.58 years in TRUSGB group. The median PSA was 65.01 (range: 16.33–114.72) ng/mL in FGPB and 71.75 (range: 19.86–123.47) ng/mL in TRUSGB. Abnormal DRE that leads to suspicious PCa was found in 75.75% of patients in FGPB group and 70.58% in TRUSGB. Prostatic adenocarcinoma was diagnosed after further histopathology examination, to determine the cancer detection rate of 45.45% of patients with FGPB and 52.94% with TRUSGB (Table 1).

**DISCUSSION**

TRUSGB has been established as one of the most helpful modalities for diagnosing and staging PCa since its introduction into clinical practice [3]. TRUS guidance enables direct vision, which results in greater anatomical detail and lesion identification than DRE [3]. Despite its many advantages, it is not a routinely used early diagnosis tool for PCa due to the additional time and expense required, particularly in less developed areas with limited ultrasound access.

There is disagreement over the appropriate biopsy guidance technique when there is a noticeable lesion in the prostate. One prior study examined 45 patients using both biopsy procedures and discovered PCa in 14 with the histopathologic examination, 12 with TRUS-guided biopsies, and 13 with digitally directed biopsies. When a distinct nodule was palpable, the author urged that additional TRUS-guided biopsies are irrelevant [4]. Another study evaluated 51 patients with prostatic anomalies, and nine cases of PCa were discovered using digitally guided biopsies. TRUS-guided biopsies in 23 patients, including those identified digitally, confirmed adenocarcinoma [5]. According to the findings of the

*Table 1. Patients Characteristics*

<table>
<thead>
<tr>
<th>Variable</th>
<th>FGPB (n=33)</th>
<th>TRUSGB (n=17)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean</td>
<td>65.29 ± 8.28</td>
<td>68.28 ± 10.58</td>
<td>0.378</td>
</tr>
<tr>
<td>PSA, median (range)</td>
<td>65.01 (16.33-114.72)</td>
<td>71.75 (19.86-123.47)</td>
<td>0.76</td>
</tr>
<tr>
<td>DRE suspicious for malignancy</td>
<td>25 (75.75%)</td>
<td>12 (70.58%)</td>
<td>0.475</td>
</tr>
<tr>
<td>Prostate cancer detection rate</td>
<td>15 (45.45%)</td>
<td>9 (52.94%)</td>
<td>0.136</td>
</tr>
</tbody>
</table>

PSA: Prostate Specific Antigen; DRE: Digital Rectal Examination; FGPB: finger-guided prostate biopsy; TRUSGB: transrectal ultrasonography-guided biopsies of the prostate
latter investigation, a TRUS-guided biopsy is required to evaluate palpable abnormalities.

It is interesting to note that a newer study found that patients with suspicious DRE and PSA above 10 ng/ml do not have a statistically significant difference in cancer detection rates, with 45.6 and 48.6% for finger guidance and TRUS, respectively (P = 0.27) [6]. Finger-guided biopsies are still employed to diagnose PCa in some low-resource units when TRUS is unavailable and are indicated in the case of locally advanced disease or palpable prostatic nodules.

The current study’s data suggest that the cancer detection rates for FGPB and TRUSGB (45.45% and 52.94%, respectively) were comparable statistically (p = 0.136). This shows that FGPB is a main diagnostic tool comparable to TRUSGB. In general, FGPB is an alternative approach when ultrasonography facilities are unavailable. Digitally guided biopsies are less expensive and easier to perform, and they are typically reliable in establishing PCa diagnosis.

The risk of a surgeon’s injury is one of the major issues with doing FGPB. With more prostate biopsies performed and as the learning curve flattens out, this risk can be reduced. Furthermore, some experts advocated innovative and allegedly safer techniques to lower the risk of injury during finger-guided prostate biopsy [7,8].

Despite dependable practicality and a reasonable cancer detection rate in FGPB, various limitations of the current investigation should be considered. First, there were a limited number of patients, and as part of the study’s design, only men with positive DRE results were included in the analysis. Second, this carefully chosen patient population from a single institution series may favor the number of tumors found. Third, prior to the surgery, the trial also lacked randomization. As a result, these findings must be interpreted with caution.

CONCLUSIONS

Both finger-guided (FG) and transrectal ultrasonography-guided (TRUSG) prostate biopsy techniques have comparable cancer detection rates. This supports using FGPB as the first-line diagnostic approach, particularly in low-resource settings where ultrasonography is not currently available.

DECLARATIONS

Ethics Approval
According to the Medical and Health Research Ethics Committee (MHREC), the preceding paper fulfills the ethical principles specified in the International and National Guidelines on Ethical Standards and Procedures for Human Research. The study was conducted after appropriate institutional ethical approval (No: KE/FK/1178/EC/2019).

Competing of Interest
The authors declare no competing interest in this study.

Acknowledgment
We want to thank our supervisor, dr. Tanaya Ginorawa, Sp. U(K), for giving his constructive feedback for the entirety of this study, and the Faculty of Medicine Universitas Gadjah Mada/Dr. Sardjito Hospital for providing the facilities required to carry out this work.

REFERENCES