ORIGINAL ARTICLE

Infectious complications of transrectal prostate biopsy with bowel preparation based on levofloxacin and mineral oil

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Biopsy; Prostate; Complications; Infectious

Abstract
Background: Transrectal prostate biopsy (TRPB) is considered the appropriate procedure for making prostate cancer (CaP) diagnosis, but it can also result in infectious complications that include fever, orchiepididymitis, prostatitis, and sepsis.
Aims: The aim of our study was to report the frequency of infectious complications following TRPB.
Methods: A retrospective, analytic, cross-sectional study was conducted on patients that underwent TRPB within a 3-year time frame at a hospital in Mexico City. The data were obtained through telephone interviews. The descriptive statistics of means and percentages of the complications resulting from this procedure were carried out.
Results: The study included 505 patients with a mean age of 65 years and a mean prostate-specific antigen (PSA) level of 49.7 ng/ml. There were 14 complications: 10 patients presented with fever, 2 with urosepsis, and 2 with prostatitis.
Discussion: Antibiotic administration and bowel preparation are routinely used to reduce infectious complications and currently there is no criterion standard in this respect. Our results coincided with those reported in the medical literature.
Introduction

Currently cancer of the prostate (CaP) is considered one of the most important medical problems facing the male population. In the United States and Europe, CaP is the most frequent solid neoplasia, with an incidence of 272 cases per 100,000 men in the United States and 214 cases per every 1,000 men in Europe, surpassing lung cancer and colorectal cancer in numbers. \(^1\) In addition, CaP is presently the second most frequent cause of death by cancer in men. \(^2\)

Since 1985, there has been a slight increase in the number of deaths by CaP in the majority of countries, including the nations or regions in which CaP is uncommon because of the introduction of prostate-specific antigen (PSA) determination. \(^3\) CaP affects elderly men more frequently than young men, and therefore it supposes a greater health problem in the developed countries due to their larger populations of elderly men. Likewise, around 15% of the cancers in men in the developed countries are CaP, compared with 4% in the developing countries. \(^4\) It should be pointed out that there are notable regional differences in CaP incidence rates. For example, in Sweden, which has a prolonged life expectancy and where mortality from tobacco-related diseases is relatively small, CaP is the most frequent malignant neoplasia in men, representing 37% of all new cancer cases in 2004. \(^5\)

The factors that determine the risk for presenting with clinical CaP are not well known, but the 3 known CaP risk factors are: increased age, ethnicity, and heredity. When one first-degree relative has CaP, there is a minimum doubled risk for the disease. When 2 or more first-degree relatives are affected, the risk increases from 5 to 11-fold. \(^6\) A small subpopulation of CaP patients (approximately 9%) presents with hereditary CaP, which is defined as 3 or more affected relatives, or at least 2 relatives with early disease onset, that is to say, before 55 years of age. \(^7\) Patients with hereditary CaP usually have disease onset 6-7 years before.
those with spontaneous disease, but there are no differences in relation to other aspects of the pathology.9

Transrectal prostate biopsy (TRPB) is regarded as a simple and precise method for obtaining prostate tissue for histologic evaluation. It is generally considered safe and is commonly performed as an outpatient procedure. However, it is not exempt from infectious complications and bleeding. The range of possible infectious complications includes urinary tract infection, epididymitis, orchitis, prostatitis, and sepsis. Other morbidities are rectal bleeding, hematuria, vasovagal syncope, hematospermia, and dysuria.10

A significant increase in the incidence of infectious complications following prostate biopsy has been reported in the last few years, whereas the incidence of noninfectious complications has remained relatively stable.11 Oral or intravenous antibiotics are the most recent treatment for attempting to reduce infectious complications. optimum dosage and treatment duration are variable. Quinolones are the drugs of choice, with ciprofloxacin being superior to ofloxacin.12 Bowel preparation with different antibiotics has been carried out, not only for purgative purposes, but also in an effort to reduce the risks involved in this procedure. In the Urology Service of the Hospital Juárez de México, bowel preparation with levofloxacin and mineral oil has been used systematically since performing the first prostate biopsies and continues up to the present, in an attempt to reduce the risks of this study.

Methods

Patients with a clinical suspicion of CaP that underwent TRPB at the Urology Service of the Hospital Juárez de México within the time frame of July 2011 and January 2014 were included in the study. Telephone interviews of the patients were carried out 4 weeks after the procedure, in which they were asked about presenting with the infectious complications of orchiepididymitis, prostatitis, urosepsis, and fever.

The variables were considered as described: orchiepididymitis (increase in volume of one or both testes, accompanied with pain, fever, and scrotal hyperemia); prostatitis (micturition difficulty, pain in the perineal region, low caliber and strength of urinary stream); urosepsis (urinary symptoms accompanied by tachycardia, hypothermia, chills, general malaise, and requiring hospitalization); and fever (a procedure-related temperature above 38.2 °C).

Technique

Prior to the procedure, all patients included in the study had bowel preparation with 500 mg of oral levofloxacin/24 h/5 days, starting the day before the procedure, and a mineral oil enema the night before. The ultrasound equipment utilized in the TRPB included a 6.6 MHz monoplanar endocavity transducer. The patient was first placed in the left lateral decubitus position. After a digital rectal examination, the transducer was introduced; the prostate was visualized and measured and a periprostatic block was carried out with 2% lidocaine. Next, samples were taken with a semi-automatic biopsy gun using a 20 cm long 18G needle. Sextant biopsies were performed, taking 12 cores. Eighteen cores were taken during the procedure in the patients that had undergone previous biopsy.

Frequency, standard deviation, and percentages of the results were analyzed using the IBM SPSS v.19 program.

Ethical considerations

All the patients signed authorized informed consent statements that explained the risks and benefits of the procedure.

Results

A total of 505 patients that answered the telephone survey were included in the study. The mean age was 65.31 years (range of 41-98 years). The mean PSA level was 49.79 ng/ml with a standard deviation of 367.156 ng/ml (range of 2 to 249 ng/ml).

In accordance with the data obtained in relation to infectious complications, 14 patients with a mean age of 63.5 years and a mean PSA level of 18.66 ng/dl and a standard deviation of 14.28 nd/dl presented with complications.

The main complication was fever. It presented in 10 patients, corresponding to a frequency of 1.98%, which was higher than the 0.8% reported in the literature, according to the NCCN Clinical Practice Guidelines consensus, version 1, 201413 (fig. 1).

Only 2 patients presented with urosepsis, representing a frequency of 0.39% that corresponded to the 0.39% reported

<table>
<thead>
<tr>
<th>Table 1</th>
<th>General patient characteristics.</th>
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<tr>
<td>Patients</td>
<td>Included: 505</td>
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<tr>
<td></td>
<td>Excluded: 30</td>
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<tr>
<td>Age</td>
<td>Mean: 65.31 years</td>
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<td>Range: 41-98 years</td>
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<td>PSA</td>
<td>Mean: 49.79 ng/ml</td>
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<td>Range: 2-249 ng/ml</td>
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in the literature vs. 0.3% according to the NCCN Clinical Practice Guidelines, version 1, 201413 (table 1).

Two patients had prostatitis, representing a frequency of 0.39%, which was lower than the 1% reported in the literature, according to the NCCN Consensus Clinical Practice Guidelines, version 1, 2014.13 It is important to mention that we found no cases of orchiepididymitis or deaths secondary to the procedure.

Conclusions

TRPB is the only procedure for diagnosing CaP. It has been associated with a low rate of infectious complications since the use of antimicrobial agents. However, there is no current standardized, appropriate prophylactic regimen. Each institution utilizes an adequate regimen in accordance with its needs.

TRPB continues to be the definitive diagnostic procedure for CaP. There is a risk for complications but their low percentage makes TRPB a suitable and relatively safe method.

Thanks to the use of antibiotics, dietary measures, and bowel preparation, TRPB has a low frequency of infectious complications. The procedure is definitely not complication-free, but its benefits outweigh its risks, which is why this method continues to be the cornerstone of CaP diagnosis.

Ethical responsibilities

Protection of persons and animals. The authors declare that the procedures followed conformed to the ethical standards of the responsible committee on human experimentation and were in accordance with the World Medical Association and the Declaration of Helsinki.

Data confidentiality. The authors declare that they have followed the protocols of their work center in relation to the publication of patient data.

Right to privacy and informed consent. The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the corresponding author.

Financial disclosure

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Conflict of interest

The authors declare that there is no conflict of interest.

References