

# The comparison of the influence between two different bowel preparation methods on sepsis after prostate biopsies

Mehmet Erol Yildirim<sup>1</sup>, Huseyin Badem<sup>2</sup>, Mucahit Cavis<sup>1</sup>, Omer Faruk Karatas<sup>1</sup>, Ersin Cimentepe<sup>1</sup>, Dogan Unal<sup>3</sup>, Ilkay Bekir Incebay<sup>1</sup>

<sup>1</sup>Turgut Ozal University School of Medicine Department of Urology, Ankara, Turkey

<sup>2</sup>Yüksek İhtisas Training and Research Hospital Department of Urology, Ankara, Turkey

<sup>3</sup>Hacettepe University School of Medicine Department of Urology, Ankara, Turkey

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## Corresponding author

Ilkay Bekir Incebay  
Turgut Ozal University  
School of Medicine  
Department of Urology  
06510 Yenimahalle  
Ankara, Turkey  
phone: +90 312 203 52 21  
doctorerol@yahoo.com

**Introduction** Transrectal ultrasonography (TRUS) guided prostate needle biopsy has been performed to diagnose and stage prostate cancer for many years. There are many different bowel preparation protocols to diminish the infectious complications, but there is no standardized consensus among urologists. Therefore, we aimed to assess two different bowel preparation methods on the rate of infectious complications in patients who underwent TRUS-guided prostate biopsy.

**Material and methods** A total of 387 cases of TRUS-guided prostate biopsy were included in this retrospective study. All patients received antibiotic prophylaxis with ciprofloxacin (500 mg) twice a day orally for 7 days starting on the day before the biopsy. The patients were divided into two groups according to the bowel preparation method used. Patients (Group 1, n = 164) only received self-administrated phosphate enema on the morning of the prostate biopsy. Other patients (Group 2, n = 223) received sennasoid a-b laxatives the night before the prostate biopsy. Infectious complications were classified as sepsis, fever (greater than 38°C) without sepsis, and other clinical infections.

**Results** Major complications developed in 14 cases (3.8%), including 3 cases (0.8%) of urinary retention, and 11 (3%) infectious complications, all of which were sepsis. There were 3 and 8 cases of urosepsis in Group 1 and Group 2, respectively. There were no statistically significant differences between both Groups regarding to the rates of urosepsis (p = 0.358).

**Conclusions** Despite both methods of bowel preparation, sodium phosphate enema or sennasoid a-b calcium laxatives, before TRUS-guided prostate biopsy have similar effect on the rate of urosepsis, so both methods of bowel preparation can be safely used.

**Key Words:** prostate cancer <> prostate biopsy <> bowel preparation

## INTRODUCTION

Transrectal ultrasonography (TRUS) guided prostate needle biopsy is a standard procedure that has been performed since the 1980's in urology to diagnose and stage prostate cancer [1]. With the increased use of TRUS guided prostate biopsy, accompanying complications have also risen [2]. Even though it is a well-tolerated outpatient procedure, some series reported a complication rate of 63–73%

[3]. Most of the complications that arise due to TRUS guided prostate biopsy are minor and self-limiting such as hematuria, hematospermia and rectal bleeding (0.6%) [4]. In addition, some major complications are urinary retention (0.2–2.6%), urinary tract infection and eventually urosepsis (0.1–22%) [5, 6]. There are many antibiotic regimens mostly including quinolones used prior, during or after the biopsy procedure, which have been used to reduce the infection rate [7, 8]. However, there are still higher rates

of infection even with antibiotics, and so additional bowel preparation may be required to diminish the infectious complications [9]. There are many different bowel preparation protocols, but there is no standardized consensus among urologists [10].

This study was aimed at evaluating the effects of self-administrated phosphate enema versus sennasoid a–b calcium laxatives on post–biopsy urosepsis.

## MATERIAL AND METHODS

Between March 2008 and February 2013, the medical records of 387 TRUS–guided prostate biopsies were retrospectively assessed. The main indication for TRUS guided prostate biopsies was a suspicion for prostate cancer based on abnormal prostate specific antigen levels (PSA), abnormal digital rectal examination or a combination thereof [11]. Age, PSA levels and prostate volumes were analyzed and recorded. Also, comorbidities such as diabetes and anticoagulant use were recorded. TRUS guided prostate biopsy was conducted after patients signed an informed consent. The biopsies were carried out by two urologists who used the same protocol. All patients received prophylactic antibiotics such as ciprofloxacin (500 mg orally) twice daily, starting a day before the procedure for seven days. The patients were divided into two groups according to the bowel preparation method used. Patients (Group 1, n = 164) only received self-administrated phosphate enema (Fleet, Kozmed, Bursa, TURKEY) (118 ml per bottle contains sodium biphosphate 19 gm and sodium phosphate 7 gm) on the morning of the prostate biopsy. Other patients (Group 2, n = 223) received sennasoid a–b laxatives (X–M Solüsyon Laksatif, Yenişehir İlaç, Ankara, TURKEY) the night before the biopsy. A total of 12 cores were taken from the prostate of all patients, consisting of 6 cores from each side. After the TRUS guided prostate biopsy, all patients were informed about the possible post–biopsy procedure complications. The patients were able to leave the hospital when they had smooth micturition. They were encouraged to drink more than 3000 ml of water following the prostate biopsy.

Patients were asked to return to the hospital if any symptoms of an infection or pain developed. Sepsis was defined as two or more of the following conditions as a result of infection: (a) body temperature greater than 38°C or less than 36°C, (b) heart rate greater than 90 beats per minute, (c) respiration rate greater than 20 breaths per minute or arterial partial pressure of carbon dioxide less than 32 mmHg, and (d) white blood cell count greater than 12000 cells/cm<sup>3</sup> or less than 4000 cells/cm<sup>3</sup>, or more than 10% immature (band) forms [12]. Patients readmitted to the

hospital in 1–5 days after the biopsy with fever and tachycardia. Any patients who had these symptoms received a course of intravenous antibiotics and expectant management.

Clinically significant complications were defined as an unexpected treatment or procedure or even hospitalization for associated symptoms. According to ‘Harrison’s Principles of Internal Medicine’, infection was defined as an oral temperature of more than 37.7°C or any episode of chills within seven days after the biopsy [9]. The complications were classified as minor or major. Minor complications were defined as the expected side effects of the biopsy requiring no additional treatment, such as pain or dysuria, mild fever, mild hematuria, hematospermia, and hematochezia. Major complications were defined as serious side effects requiring additional treatment, such as vasovagal episode, acute urinary retention, and infectious complications. Infectious complications included acute prostatitis, acute epididymitis, and site–unspecified fever and were classified as sepsis, fever (temperature greater than 38°C) without sepsis, and other clinical infections. Quantitative data was tested using a Student’s t–test as appropriate. Chi square test was performed for non–parametric measures. A double–sided p–value <0.05 was considered statistically significant. All data was analyzed using SPSS v.16.0 software (SPSS, Chicago, IL, USA).

## RESULTS

Preoperative and postoperative antibiotics prescribed, the number of biopsy cores and biopsy techniques were similar for Group 1 and Group 2. There were also no significant differences in the patients’ mean age, PSA or prostate volume between the two groups (as shown in Table 1).

Prostate cancer was detected in 22.6% (87 out of 387) of all TRUS guided prostate biopsies. There were 32 patients with diabetes in group 1 and 43 patients with diabetes in Group 2. Only one case of urosepsis occurred in a patient with diabetes in Group 1.

Patients were readmitted to hospital within 2.70 ±1.87 days (range 1–5 days) after the TRUS guided

**Table 1.** Demographic data of two groups

	Group 1	Group 2	p*
Prostate volume	53.7 (±25.5)	52.2 (±25.2)	0.538
Patient age	65.7 (±8.3)	66.6 (±8.5)	0.529
PSA	14.12 (±57.2)	15.74 (±27.8)	0.916
Infection rate %	1.82% (3/164)	3.57% (8/224)	0.358

\*p<0.05 Mann Whitney U

prostate biopsy procedures. All patients were still under fluoroquinolone (FQ) prophylaxis. Even so, only three cases of sepsis were recorded in Group 1 (1.82%) and 8 cases of sepsis were recorded in Group 2 (3.57%). Despite the numerical higher rate of infection which occurred in Group 2, there were no statistically significant differences between the groups ( $p = 0.358$ ) regarding sepsis. Three patients were also admitted for the urinary retention and an urethral catheter indwelled for a week.

In all urosepsis cases, the urine cultures were positive for FQ-resistant *Escherichia coli*, and symptoms included fever, tachycardia, abnormal leukocyte count and microbiologically confirmed infection. All patients were prescribed an intravenous antibiotic treatment including a third generation cephalosporin (ceftriaxone) and were treated with the intravenous antibiotics at the hospital with successful recovery; there were no fatalities. All patients were discharged after a period of 24 hours with no fever.

## DISCUSSION

Along with the development of imaging techniques and the common use of PSA in the diagnosis of prostate cancer, the use of TRUS guided prostate biopsy has increased. TRUS guided prostate biopsy is a safe outpatient procedure with major complication rates such as sepsis, needle tract seeding and mortality between 0.6% and 3.3% [13]. There has been a 4-fold rise in infection rates during the past decade, mainly due to FQ-resistant *E. coli* [14]. The increase in core biopsy templates from 6 to 12 has not been implicated as a risk factor for morbidity [15].

There is no consensus in current literature for protocols regarding the antibiotic based prophylaxis and enemas before TRUS guided prostate biopsy [2]. But in daily practice almost all patients (79% to 81%) receive bowel preparation before the biopsy [14]. Therefore, we aimed to compare the impact of two different pre-biopsy bowel preparation methods on the rate of urosepsis.

However, the risk factors for the development of FQ-resistant *E. coli* are age >50 years, previous FQ treatment, and previous complicated urinary tract infections; apart from age most of our patients had none of the previously mentioned risk factors during the biopsy [16]. Also, other reports showed that patient comorbidities such as diabetes mellitus, indwelling catheters, former pyuria and the use of anticoagulants are not significant risk factors for infectious complications. We could not find any significant difference in patients' mean age, PSA or prostate volume between the two groups.

There are 11 different antibiotics that have been used before TRUS biopsy in the recent literature including penicillin-based beta-lactamase inhibitors and aminoglycosides (amikacin and gentamicin) [10]. We used the same quinolone regimen (500 mg ciprofloxacin twice a daily orally, starting one day before the biopsy, lasting 7 days) for all patients.

There is conflicting data about pre-biopsy enemas. Although some authors indicate that pre-biopsy enemas increase the infectious complications; most investigators suggested that rectal preparation reduces the rate of bacteremia [9, 17]. Although the pre-use of antibiotics is a standard procedure for TRUS guided prostate biopsy, there is no sufficient answer for the efficacy of enemas as a monotherapy [2]. Lindert et al. reported a reduction in post-biopsy bacteremia with the use of pre-biopsy enema (from 28% to 4%) [18]. We used rectal preparation in all patients, so that we could not compare our sepsis rates with an only antibiotic regimen. Sepsis is frequently caused by *Escherichia coli*, *Enterococcus* and *Klebsiella* [19]. Ciprofloxacin-resistant *Escherichia coli* was isolated from urine and blood cultures in all of our patients.

Traditionally bowel cleansing was achieved by using Sodium-Phosphate enemas because of their hyperosmolar characteristics. It is done by distending the rectum and all enemas stimulate the colon to contract and eliminate the stool. The main bowel preparation method used before prostate biopsy is phosphate enema, but there are few reports about alternative methods in literature. Huang et al. administered povidone-iodine enema to a group of patients and saw a reduction in infection rate from 9.23% to 0% compared with the only enema administered group [20]. It is hard to use the phosphate enema for patients because most of them are old aged and cannot understand how to use it effectively. They tend to dispose of the enema in the first defecation and therefore cannot see the accurate effect. So we decided to give the patients laxatives instead of enemas, the night before the biopsy and compared their effects on infectious complications. The active principles of Senna laxatives were reported to accelerate spontaneous ileal contractions, to induce purgative effects and draw water into the lumen of the colon to evacuate the stool with an osmotic effect [21]. Phosphate enema, directly stimulate the muscles of the colon to contract and eliminate the stool [22]. The urosepsis rate was numerically higher in the laxative group (3.57%) than the enema group (1.82%); however, there was no statistically significant difference between the two groups. Accordingly we continue to use laxatives in biopsy patients.

In conclusion, different bowel preparation methods still need to be investigated to reduce the infection rates. Even though there are no statistically significant impacts on post biopsy infection rates between phosphate enema and laxatives, we should choose

more comfortable methods for the patients. Furthermore, prospective case–controlled, large studies would be helpful to explore an effective and comfortable rectal preparation method to reduce the infectious complications.

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