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IS URINE CULTURE ROUTINELY NECESSARY BEFORE PROSTATE BIOPSY ?

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ABSTRACT

Objectives: The objective of this study was to assess the value of a urine bacterial culture performed before prostate biopsy.

Methods: We performed a prospective study on 353 patients who underwent prostate biopsy. All patients had a urine bacterial culture performed before biopsy. We compared the outcomes of patients with bacteriuria (left untreated) to those of patients without bacteriuria.

Results: Of the 353 men, 12 had a pre-biopsy positive bacterial culture and underwent prostate biopsy without any infectious complication. Fifteen patients with a negative pre-biopsy culture developed a post-biopsy positive bacterial culture, but remained asymptomatic without any treatment. Only 4 men from the group without pre-biopsy bacteriuria developed an infectious complication, requiring 3 weeks of antibiotic therapy. The complication rates were similar for both groups.

Conclusion: Our results suggest that routine urine bacterial culture before prostate biopsy is not useful when antibiotic prophylaxis and enema are performed. We do however suggest performing a urine bacterial culture before prostate biopsy for patients with a previous history of urinary tract infections.

INTRODUCTION

Transrectal needle biopsy procedure is one of the most common procedures performed by urologists. Although it is considered to be safe, post biopsy sepsis is commonly seen in practice. Infection reports vary across studies, and even if it is considered to be consensual, the use of antibiotic prophylaxis varies between institutions. In the literature, bacteriuria is seen in 20-53% ¹ and prostatitis 0.6 to 4% ² of the transrectal prostate biopsies. Urine bacterial culture before prostate biopsy has been performed by many institutions without proof of real benefit ¹. As the bacteria are apparently introduced into the urine and/or blood from the rectum we found that the routine urine culture is unnecessary before prostate biopsy. In our institution the prostatitis rate after prostate biopsy is between 1 and 3% and is similar to rates reported in the literature. We performed a prospective study to assess the value of urine bacterial culture performed before prostate biopsy.

MATERIALS AND METHODS

This study was conducted between 2002 and 2006 at our outpatient clinic and included data collected from 380 consecutive men. All men who underwent prostate biopsy in this time period were enrolled in the study. All subjects underwent urine bacterial culture 48-72 hours before prostatic biopsy with prospective analyses of temperature and infectious events. Inclusion criteria for the study were any indications for prostatic biopsy (PSA>4 or abnormal DRE). All patients signed an informed consent before inclusion. The exclusion criteria were any previous anal or rectal surgery, current antibiotic or anti-inflammatory treatment, immunosuppressive therapy, previous acute or chronic prostatitis or any symptoms evocating prostatitis. Patients receiving antiplatelet agents or anti-vitamin K treatment were asked to stop and substitute low-molecular-weight heparin (Lovenox®) for their current treatment. Five urologists performed the biopsies using the same protocol.

After an enema (Normacol®) performed on the morning of the biopsy, each patient underwent a trans-rectal ultrasound-guided prostate biopsy with an 18 G Trucut needle (Bioty-cut, Bard, Covington, Georgia). Median number of cores performed per patient was 10. All patients received 200 mg of ofloxacin 2 to 6 hours before biopsy. After an informed consent, patients were instructed to follow up 15 days after the biopsy. They were also asked to record their temperature at 1 hour, 12 hours, 24 hours, and 7 days after the biopsy and more frequently if fever appeared. All patients were given an emergency telephone number. Urine cultures were obtained from all patients 48 hours after biopsy. Positive urine cultures were defined as one type of bacteria for more than 10000 CFU/mL. Complications were recorded prospectively (hematuria, rectal bleeding, and fever (temperature >38°C)). Upon completion of patient enrollment, data were available for 353 patients.

Statistical analyses were performed using Excel software (Microsoft, Redmond WA). Significance was set at $P < 0.05$. Continuous variables were compared using analysis of variance, while comparisons of nominal variables were performed using Fisher's exact test and Chi-square analysis.

RESULTS

Incidence of infectious complications

Demographic and infectious characteristics are summarized in Tables 1 and 2. There were no differences between groups. The incidence of post biopsy septicaemia was 1.1% (defined as fever and irritative urinary symptoms), and none of these patients had pre-biopsy bacteriuria ($p=0.4$). For the men with post biopsy septicaemia, all bacterial cultures were positive for *Escherichia coli* and were found to be sensitive to all quinolones and β -lactamines. All men became asymptomatic in less than 2 days after the beginning of the association of ceftriaxone and gentamycin. A three-week course of ceftriaxone was prescribed following the patient's discharge. All patients attended an 8-week follow-up appointment and remained asymptomatic with sterile urinary bacterial cultures. No demographic or risk-factor-related (number of cores, diabetes) was found in patients with post biopsy septicaemia. None of them developed a chronic pelvic pain syndrome.

Correlation with prebiopsy urine analysis

In total, 12 of the 353 men had a positive pre-biopsy culture and underwent a prostate biopsy without any treatment. None had fever or complications following the procedure. Fifteen other men who had a negative pre-biopsy culture had a positive culture following the procedure (all more than 10^3 /ml: 3 *E. coli*; 7 *Streptococcus*, 5 *Staphylococcus*). None of these men were treated as they remained asymptomatic.

There was no difference in the complication rates within groups (Table 3). The rate of rectal bleeding during biopsy was 22-25%. Rectal bleeding occurred in 12 to 18.6% of biopsies (without any other symptom, such as fever) but these patients did not require hospitalization or transfusion. All complications resolved in three days or less.

DISCUSSION

Our study suggests that routine urine bacterial cultures before prostatic biopsy is not necessary as we found no difference in the complication rates between the groups for whom culture results were positive and for whom they were negative. The low bacteriuria rate is notable and likely linked to our department's use of prophylactic antibiotics and an enema before prostate biopsy.

Our study is the first to assess the value of a urine bacterial culture before prostate biopsy. The small number of patients with bacteriuria is a limitation; however, no trend towards group differences was observed. The number of patients involved in the study is insufficient to capture the rarer complication of septicaemia. Moreover, we have performed prostate biopsies in this way for many years with no more frequent complications than other departments that perform routine pre-biopsy urine bacterial cultures. Within our study, the fever rate was 0.4%. This rate is lower than that observed in the European screening study, which analyzed data from 5,676 prostate biopsies². This study reported a 3.5% fever rate, but antibiotic prophylaxis was provided (trimethoprim-sulfamethoxazole or ciprofloxacin) only if the patient had diabetes or a previous history of urinary tract infections. This choice of antibiotic prophylaxis seems to be less effective than that of ofloxacin which was used in our study. The efficacy of different antibiotics for prophylaxis has been examined. Quinolones are initially effective against most gram-negative and gram-positive bacteria and reach effective concentrations in the prostate and the urine³. We opted for ofloxacin based on the results of previous studies^{4,5}.

There is a rich literature regarding antibiotic prophylaxis and many different treatments and durations have been assessed. The use of routine antibiotic prophylaxis is now acceptable and has been shown to decrease the rate of infection following prostatic biopsy. The kinetic characteristics of an antibiotic should aid in the selection of the optimal treatment. The medication should achieve peak tissue concentration during the procedure, which is why the antibiotic should be administered 1-2 hours before prostatic biopsy.⁵ However, one study demonstrated that antibiotics can be administered during the biopsy without an increased incidence of complications.⁶ The authors of that study claim that it improved the rate of successful treatments. In their study, 11 patients (out of 1322) had bacteriuria before the procedure, 3 of whom developed asymptomatic infections (27%). This high rate was explained by the absence of a rectal enema. Also of note, one patient had a previous infection that was treated with quinolones, explaining the resistance to the prophylactic antibiotics. Thus, it is important to know if the patient has been recently treated with antibiotics so optimal antibiotic prophylaxis can be given. In our study, none of the patients with post-biopsy prostatitis had a positive preoperative bacterial culture. All these elements argue against the usefulness of routine urine bacterial cultures before prostatic biopsy.

Noninfectious complications of prostate biopsy have also been examined. In our study, the rates of hematuria and rectal bleeding after biopsy were 33% and 9.9%, respectively. These rates are similar to those reported in previous studies: 22-50% for hematuria and 1-22% for rectal bleeding^{6,7}.

We believe that the routine use of a urine bacterial culture before prostatic biopsy will increase the number of antibiotics prescribed, a factor directly related to the increased resistance rates of bacteria^{8,9}. However, if a physician does elect to perform a urine bacterial

culture and it is positive, the urologist may elect to perform the prostate biopsy with the patient taking antibiotics rather than delaying the procedure.

The cost of a routine bacterial culture was calculated by Lindstedt et al. as 8,000 euros per 1,000 cultures ¹⁰. This cost would likely increase if cultures were performed more routinely, especially given the increasing number of prostate biopsies performed each year.

Even though none of the culture-positive patients in our study were given extra antibiotic prophylaxis we believe that performing routine urine bacterial cultures before prostate biopsy will increase the number of antibiotics prescribed, ultimately increasing bacterial resistance and overall health care costs. In patients with antibiotic resistance who develop post-biopsy sepsis, hospitalization may result and may last as long as 13 days ¹¹. On the other hand, a past history of urinary tract infections, prostatitis, and urinary retention are important variables to consider and could be an indication for a pre-biopsy bacterial culture ².

We propose that not performing routine urinary bacterial cultures will help to reduce the total cost of a prostate biopsy and decrease rates of antibiotic resistance. Antibiotic resistance is a problem that is estimated to cost almost 5 billion euros per year ⁹. Reducing the use of routine urinary bacterial analyses would likely decrease the total cost of care to a greater degree than the initial cost of the urine analysis.

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CONCLUSIONS

Our results suggest that performing routinely a urinary bacterial culture before prostatic biopsy offers no added prognostic value for post biopsy infection. Further studies need to be conducted to determine how best to reduce the rate of infection without increasing the cost of a prostate biopsy, a procedure that is becoming increasingly common.

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Table 1. Characteristics of the 353 men who underwent prostate biopsy

| Characteristic | bacteriuria | no bacteriuria |
|------------------------------------|-------------|----------------|
| Number of patients | 12 | 341 |
| Mean age, years (SD) | 62.9 (7.6) | 66.1 (7.4) |
| Mean PSA, ng/ml (SD) | 12.7 (12.6) | 11.9 (9.5) |
| Mean Number of cores (SD) | 9.9 (2.5) | 10.8 (2.0) |
| Median [range] | 10 [3-12] | 12 [3-16] |
| Percentage of biopsies with cancer | 33% | 45% |

Table 2. Infectious characteristics of 353 patients who underwent prostate biopsy

| Characteristic | pre biopsy bacteriuria | pre biopsy without bacteriuria |
|--|---------------------------|-----------------------------------|
| Number of patients | 12 | 341 |
| Number of patients with post biopsy prostatitis (%) | 0 | 4 (1.1) |
| Number with post biopsy bacteriuria (%) | 0 (0) | 15 (4.4) |
| Temperature, °C (SD) | | |
| 1 hour after biopsy | 36.6 (0.37) | 36.8 (0.4) |
| 2 hours after biopsy | 36.4 (0.42) | 36.7 (0.4) |
| 7 days after biopsy | 37.0 (0.42) | 36.7 (0.3) |

Table 3. Noninfectious complications of prostate biopsy

| Complication | pre biopsy bacteriuria | negative pre biopsy urine culture |
|--|---------------------------|---|
| Number of patients | 12 | 341 |
| Number with rectal bleeding at biopsy (%) | 3 (25%) | 75 (22%) |
| Number with rectal bleeding > 24h after procedure | 3 (16%) | 32 (9.3%) |
| Number with hematuria > 24 h after procedure | 6 (50%) | 112 (32.8%) |
| Other | 0 | 0 |