

The Importance of the Host Factor in Infections Following Transrectal Biopsy

Transrektal Biyopsi Sonrası Gelişen Enfeksiyonlarda Konakçı Faktörünün Önemi

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ÖZET

AMAÇ: Transrektal ultrasonografi eşliğinde yapılan prostat biyopsi (TRUSPB) sonrası gelişen enfeksiyonlarda konakçı faktörünün etkisini ve önemini araştırdık

GEREÇ VE YÖNTEM: Mart 2016 ile Mart 2018 arasında TRUSPB yapılan 250 hasta çalışmaya dahil edildi. Tüm hastalardan TRUSPB sırasında doku kültürü ve biyopsi sonrası 3. günde idrar kültürü alındı. Doku kültüründe üreme olmasının biyopsi sonrası ateşe ve toplam enfeksiyon oranına etkisi araştırıldı. Ayrıca doku kültüründe üreme olan hastalarda ateş gelişme oranına bakıldı. Böylece konakçı faktörünün etkisi anlaşılmasına çalışıldı.

BULGULAR: Toplam 78 hastanın (%31,2) doku kültüründe üreme oldu. 40 hastada (%16) enfeksiyöz komplikasyon gelişti. Doku kültüründe üreme olmasının biyopsi sonrası ateş gelişiminde ve toplam enfeksiyöz komplikasyon gelişiminde istatistiksel olarak anlamlı etkisi olduğu görüldü. Ancak doku kültüründe üreme olan hastaların sadece 13'ünde (%16,6) ateş yüksekliği saptandı.

SONUÇ: Doku kültüründe üreme olması ile biyopsi sonrası ateş yüksekliği ve toplam enfeksiyöz komplikasyon gelişmesi açısından anlamlı bir ilişki saptanmıştır. Ancak doku kültüründe üreme olan hastaların büyük çoğunluğunda ateş yüksekliği olmaması ve doku kültüründe üreme olmayan hastaların bazılarında ateş yüksekliği olması konakçıya ait ek faktörlerin etkisi olduğunu düşündürmektedir.

Anahtar Kelimeler: doku kültürü, prostat biyopsi, ateş yüksekliği, konakçı faktör

ABSTRACT

OBJECTIVE: We investigated the effect and significance of the host factor in infections following transrectal ultrasound-guided prostate biopsy.

MATERIALS & METHODS: A total of 250 patients who underwent transrectal ultrasound-guided prostate biopsy between March 2016 and March 2018 were included in the study. The effects of positive tissue culture on post-biopsy fever and also on total infection rate were investigated. So, the effect of the host factor was tried to be clarified.

RESULTS: A total of 78 patients (31.2%) had growth in tissue culture. Infectious complications developed in 40 patients (16%) growth in tissue culture showed a statistically significant effect on the development of fever and total infectious complications after biopsy. However, only 13 (16,6%) of the patients who had tissue culture had a fever.

CONCLUSION: A significant relationship was found between growth in tissue culture and development of fever and total infectious complications following biopsy. However, the fact that the majority of the patients with positive tissue culture had no fever whereas some of the patients with negative tissue culture had fever may suggest that there might be some additional effects of host-related factors.

Keywords: Tissue culture, prostate biopsy, fever, host factor

INTRODUCTION

Prostate cancer is one of the most common types of cancer in men (1). Transrectal ultrasound-guided prostate biopsy (TRUSPB) is accepted as the standard procedure in diagnosing prostate cancer (2). Infection is one of the most

serious complications after TRUSPB (3). Colonic bacteria transported into the prostate tissue during biopsy pose a risk for infection (3). Rectal swab culture was found correlated with infection in many studies (4-6). However,

not all the patients undergoing prostate biopsy develop infection, and this may suggest host-related factor.

MATERIALS & METHODS

Two hundred fifty patients who underwent TRUSPB between March 2016 and March 2018 were included in the study. This study was approved by the Local Ethics Committee. High levels of serum prostate specific antigen (PSA) and abnormal findings of rectal examination were indications for TRUSPB. Demographic data of the patients were recorded.

Tissue culture was taken during TRUSPB and urine culture was taken on the 3rd day after biopsy. Fever and urinary symptoms detected within 72 hours after the procedure were recorded. Patients who had previous TRUSPB and administered antibiotherapy within the previous month were excluded from the study.

After the tissue sample was obtained, first the contamination around the biopsy specimen was cleaned by saline by immersion method. Tissue and urine specimens were then transported appropriately to the laboratory and inoculated onto McConkey agar. As a prophylactic antibiotherapy, Ciprofloxacin 500 mg 2x1 was given for 1 day before and after the biopsy to all patients. All patients received rectal enema 4 hours before biopsy. The rectal area was cleaned with povidone-iodine. All patients were performed 12 quadrant prostate biopsy using an 18-gauge automatic biopsy needle.

IBM SPSS v20 program (Statistical Package for Social Sciences, Chicago, IL) was used for statistical analysis. Differences between groups were assessed by Chi-square test for categorical variables. $p < 0,05$ was accepted statistically significant.

RESULTS

Bacterial growth was determined in tissue cultures in 78 of 250 patients (31.2%), namely Escherichia coli was found in 65 (83.4%) patients, Klebsiella pneumonia in 10 (12.8%) and Enterobacter spp. in 3 (3.8%) patients. As for positive urine cultures, Escherichia coli was found in 32 (80%) and Klebsiella pneumonia in 8 (20%) patients. There was a statistically significant correlation between the two groups ($p < 0.05$). The mean age of the patients was 63 ± 7.5 years. The mean value for PSA was 13.1 ± 18.5 ng/dL. The mean

value for prostate volume was 37.8 ± 18.4 mL. After biopsy, fever was detected in 18 patients (7.2%). Significant bacterial growth in urine culture was determined in 40 patients (16%). Growth in tissue culture was determined in 13 of 78 (78%) of the 18 patients having fever. Out of the 40 patients with positive urine culture, 24 (60%) had positive tissue culture (Table-1).

Table 1. Demographic and culture results of the patients with prostate biopsy

Age	63.3±7.5
PSA (ng/dl)	13.1±18.5
Tissue culture (+)	78 (31.2%)
Fever (+)	18 (7.2%)
Urine culture (+)	40 (16%)

Fever and positive urine culture was determined to be statistically significantly higher in patients with positive tissue culture (Table-2). However, only 13 (16.6%) of the patients with positive tissue culture had fever. The urine culture was positive in 24 (30.7%) of those with positive tissue culture (Table-3). Out of 13 patients who had both fever and positive tissue culture, urine culture was positive in 5 whereas negative in 8 patients. After empirical treatment, antibiotherapy was administered according to the tissue culture results in these patients.

Table 2. Correlation between tissue culture and fever and urine culture

	Tissue culture (+)	Tissue culture (-)	p Value
Fever (+) (%)	13 (78%)	5 (22%)	<0,05
Positive urine culture (+) (%)	24 (60%)	16 (40%)	<0,05

Table 3. Correlation between tissue culture and fever and urine culture

	Fever (+)	Fever (-)	Urine culture (+)	Urine culture (-)
Tissue culture (+)	13 (16.6%)	65 (83.4%)	24 (30.7%)	54 (69.3%)

DISCUSSION

Infection following TRUSPB is a significant cause of mortality and morbidity. Antibiotic prophylaxis before biopsy significantly reduced mortality and morbidity rates (7). Resistant bacteria in the colonic flora may pose a risk for infection after biopsy (8, 9). The possible mechanism here is thought to be inoculation of colonic bacteria directly into the prostate tissue through biopsy needle.

This study was based on the hypothesis that besides colonic contamination, bacteria residing in the prostate gland can cause fever after biopsy. For this reason, after the rectal area was cleaned with povidone iodine before biopsy, the first tissue sample of prostate was washed with physiological saline method, and then inoculated onto the medium.

Abughosh et al. (10) determined a 42% decrease in the risk of post-biopsy infectious-related complications by rectal cleaning with povidone iodine, which was not a statistically significant decrease in multivariate analysis. Dai et al. (11) compared the group receiving selective antibiotherapy according to rectal swab culture before biopsy with the group receiving empirical antibiotics in terms of post-biopsy infections. There was no significant difference between the two groups. However, there are studies reporting decreased risk of infectious complications following biopsy when targeted prophylaxis was given in accordance with rectal swab cultures (5,12-14).

In our study, patients with post-biopsy fever were found to have statistically significantly higher bacterial growth in their tissue cultures. However, urine culture was positive in 5 and negative in 8 of the 13 patients with both fever and positive prostate tissue culture results. These patients were given antibiotherapy according to their tissue culture results, after empirical treatment. This result indicates that, besides the colonic flora, bacteria present in the prostate tissue also had an effect on developing post-biopsy fever.

To the best of our knowledge, our study is the first study in the literature indicating the importance of host factor. Several methods were used so far to minimize post-biopsy fever, including cleaning rectal area with povidone iodine, washing biopsy needle with povidone iodine, and administering targeted prophylaxis based on rectal swab culture (6,10,15). In these studies, success was achieved to a certain extent in terms of infectious complications. However, as a host factor, the effect of residing bacteria in the prostate was always overlooked.

We attribute this to the difficulty of detecting the bacteria in the prostate gland. In this study, we tried to demonstrate the effect of host factor on developing fever after prostate biopsy. It is clear that tissue culture taken during biopsy will not contribute to preventing post-biopsy fever but will

guide antibiotherapy to be given after fever occurs. Nevertheless, we think that researchers should also consider the effect of residing bacteria in the prostate gland as the significant host factor in the prospective studies on prostate biopsy.

There are some limitations of this study. First of all, bacterial growth in tissue culture is difficult due to the risk of contamination from environmental tissues and its reliability may be questionable. Secondly, if rectal swab cultures and tissue cultures would be taken simultaneously in our study, and their culture results were compared, then we could have more information to rule out contamination factor.

CONCLUSION

There was a significant correlation between bacterial growth on tissue culture and post-biopsy fever as well as total infectious complications. This may suggest that residing bacteria in the prostate gland may be responsible for developing infectious complications after biopsy. However, the fact that some patients with positive tissue culture did not develop post-biopsy fever whereas some others with negative tissue culture did, may suggest host-related additional factors

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