



Incidence of Febrile Urinary Tract Infection after 14-Core Schematic Transrectal Ultrasound-Guided Biopsy Prostate in Vajira Hospital

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Abstract

Background: Fourteen core schematic transrectal ultrasound-guided biopsy prostate was started in Vajira hospital in 2017 substituted standard 12 core transrectal ultrasound-guided biopsy prostate. This study aims to present incidence of postoperative febrile urinary tract infection after this procedure and compared incidence of infection between preoperative antibiotic regimens.

Method: A retrospective descriptive study was conducted. 346 patients who underwent 14 core schematic transrectal ultrasound (TRUS) -guided biopsy prostate between 2017-2020 were enrolled. Patients demographic data, prostate specific antigen (PSA), preoperative antibiotic regimen, post operative febrile urinary tract infection (UTI) data, and urine culture were retrospectively review from electronic medical record.

Results: Three hundred and forty-six patients were included in this study. The incidence of febrile UTI after operation was 4.04%. Incidence of febrile UTI in Ciprofloxacin group was 7.1%, in Ceftriaxone group was 1.01%, in Cefixime group was 0%, and in Ofloxacin group was 1.8 %. There were no statistically different between Ciprofloxacin group and other groups ($P > 0.05$). Compared between Quinolone groups and third generation Cephalosporin group, the incidence of febrile UTI was higher in quinolone group with statistically significant ($P = 0.04$).

Conclusion: Fourteen core schematic TRUS-guided biopsy prostate is safe compared with other studies in the term of incidence of febrile UTI. Incidence of febrile UTI was higher in Ciprofloxacin group that should be monitored about rate of febrile UTI in the future in this group.

Keywords: TRUS -guided biopsy prostate, febrile urinary tract infection



อุบัติการณ์ของการเกิดการติดเชื้อในระบบทางเดินปัสสาวะแบบมีไข้ หลังการตัดชิ้นเนื้อต่อมลูกหมากผ่านทางทวารหนักด้วยเครื่องอัลตราซาวด์ โดยการสุ่มอย่างมีแบบแผนจำนวน 14 ชิ้น ในโรงพยาบาลวชิรพยาบาล

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บทคัดย่อ

บทนำ: การตัดชิ้นเนื้อต่อมลูกหมากผ่านทางทวารหนักด้วยเครื่องอัลตราซาวด์โดยการสุ่มอย่างมีแบบแผนจำนวน 14 ชิ้น ได้เริ่มต้นการผ่าตัดที่โรงพยาบาลวชิรพยาบาลในปีพ.ศ. 2560 การศึกษานี้เป็นการศึกษาถึงอุบัติการณ์ของการเกิดการติดเชื้อในระบบทางเดินปัสสาวะแบบมีไข้และความแตกต่างของอุบัติการณ์ของการติดเชื้อของระบบทางเดินปัสสาวะแบบมีไข้ หลังการตัดชิ้นเนื้อต่อมลูกหมากด้วยเครื่องอัลตราซาวด์ในผู้ป่วยที่ได้รับการยาปฏิชีวนะก่อนการผ่าตัดที่ต่างชนิดกัน

วิธีดำเนินการวิจัย: การศึกษาย้อนหลังเชิงพรรณนาและเปรียบเทียบ ในผู้ป่วยจำนวน 346 คน ที่ได้รับการตัดชิ้นเนื้อต่อมลูกหมากด้วยเครื่องอัลตราซาวด์โดยการสุ่มอย่างมีแบบแผนจำนวน 14 ชิ้น ในโรงพยาบาลวชิรพยาบาล ตั้งแต่ปี พ.ศ. 2560-2563 โดยการรวบรวมข้อมูลจากเวชระเบียนอิเล็กทรอนิกส์

ผลการวิจัย: จากการศึกษาพบอุบัติการณ์รวมของการติดเชื้อในระบบทางเดินปัสสาวะแบบมีไข้ คือ ร้อยละ 4.04 โดยเมื่อจำแนกตามชนิดของยาปฏิชีวนะที่ให้ก่อนผ่าตัด พบอุบัติการณ์ของการเกิดการติดเชื้อในระบบทางเดินปัสสาวะในกลุ่มที่ได้รับยา ก่อนทำการตัดการ Ciprofloxacin ร้อยละ 7.1 ในกลุ่มที่ได้รับยา Ceftriaxone ร้อยละ 1.01 ในกลุ่มที่ได้รับยา Cefixime ร้อยละ 0 และในกลุ่มที่ได้รับยา Ofloxacin อุบัติการณ์คือร้อยละ 1.8 ทั้งนี้ หากเปรียบเทียบระหว่างกลุ่มที่ได้รับยา ก่อนทำการตัดการ Ciprofloxacin กับกลุ่มอื่นๆ พบอุบัติการณ์ไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติ ($p>0.05$) แต่เมื่อเปรียบเทียบระหว่างกลุ่มที่ได้รับ quinolones กับกลุ่มที่ได้รับ third generation Cephalosporin พบอุบัติการณ์ของการเกิดการติดเชื้อในระบบทางเดินปัสสาวะแบบมีไข้ในกลุ่มที่ได้รับ Quinolones สูงกว่า อย่างมีนัยสำคัญทางสถิติ

สรุป: อุบัติการณ์ของการติดเชื้อในระบบทางเดินปัสสาวะแบบมีไข้หลังการตัดชิ้นเนื้อต่อมลูกหมากด้วยเครื่องอัลตราซาวด์ โดยการสุ่มอย่างมีแบบแผนจำนวน 14 ชิ้น ไม่มีความแตกต่างกับการตัดชิ้นเนื้อต่อมลูกหมากด้วยเครื่องอัลตราซาวด์แบบมาตรฐานจำนวน 12 ชิ้นจากการศึกษาอื่น แต่อุบัติการณ์ของการติดเชื้อในระบบทางเดินปัสสาวะแบบมีไข้ในกลุ่มที่ได้รับ Ciprofloxacin ก่อนการผ่าตัดสูงกว่ากลุ่มอื่น ซึ่งต้องมีการติดตามต่อไปในอนาคตว่าจะมีจำนวนสูงขึ้นอีกหรือไม่

คำสำคัญ: การตัดชิ้นเนื้อต่อมลูกหมากผ่านทางทวารหนักด้วยเครื่องอัลตราซาวด์, การติดเชื้อในระบบทางเดินปัสสาวะแบบมีไข้

Introduction

In 2020, Prostate cancer was the 7th cancer found in Thailand. Incidence of prostate cancer in Thailand was 14.6:100,000 of population and the mortality rate was 5.9: 100,000 of population¹. Transrectal ultrasound (TRUS) -guided biopsy prostate is the gold standard procedure to obtain prostatic tissue for diagnosis of prostate cancer². Urinary tract infection (UTI) is one of complications after TRUS biopsy prostate range from asymptomatic bacteriuria to sepsis. Febrile UTI and sepsis are complications those increased morbidity and mortality to patients³. Incidence of febrile UTI was about 3.1% to 9.4%³⁻⁵. Most common preoperative antibiotic usage for prevention post TRUS infection is Quinolones⁵. One of the causes of increasing incidence urinary tract infection after TRUS biopsy is quinolone-resistant pathogens⁶⁻⁸. The objective of this study aimed to evaluate the incidence of febrile UTI after 14 core schematic TRUS biopsy prostate⁹ and the difference of incidence of febrile UTI between each group of antibiotic regimen usage.

Material and Methods

After approval was obtained from Vajira institutional review board, we retrospectively reviewed electronic medical record of patients who underwent 14 core schematic TRUS -guided biopsy prostate from October 2017 to October 2020 in Vajira hospital. The biopsies were performed by residents and staff urologists. All patients received rectal enema in the morning before underwent biopsy. The patient received one of the following antibiotic regimens depend on staff preference: 1. Ciprofloxacin 500mg oral every 12 hours one day before operation and continued for 5 days after operation; 2. Ceftriaxone 2g intravenous in the morning before operation and continue with Cefixime 200 mg oral every 12 hours for 5 days after operation; 3. Cefixime 200 mg oral every 12 hours one day before operation and continued for 5 days after operation; 4. Ofloxacin 200 mg oral every 12 hours one day before operation and continued for 5 days after operation.

Procedure

The operation was performed while the patient was in lithotomy position. Before operation, perineal skin was painted with povidone-iodine solution and rectum was cleansed with povidone-iodine solution mixed with lidocaine jelly. Transrectal ultrasound probe covered by sterile condom and lidocaine jelly was introduced into rectum and used to guide for local anesthesia injection and needle biopsies. 14 core schematic biopsy was performed by using a re-sterilizable gun and 18 French disposable needle.

Data collection

Patients' data were reviewed including demographic data, underlying medical illness, PSA, prostatic pathology, antibiotic regimen usage, postoperative febrile UTI, urine culture, hemoculture and sensitivity and treatment after developed febrile UTI.

Statistical analysis

Statistical analyses were performed by Statistical Package for Social Sciences (SPSS) version 23.0. The Descriptive analytic data were reported as number and percentage. The continuous variables were reported as mean, standard deviation, median and interquartile range (IQR) where appropriate. The comparative analyses were assessed by Chi-square test with level of statistical significance of $p < 0.05$.

Results

This study included 346 patients. Of these, 169 received regimen 1 (oral Ciprofloxacin), 99 received regimen 2 (intravenous Ceftriaxone and oral Cefixime), 25 received regimen 3 (oral Cefixime), 53 received regimen 4 (oral Ofloxacin) as preoperative antibiotic prophylaxis. Average age was 69.5 years (SD=9.1). The prevalence of hypertension and diabetes mellitus were 4.9% and 12.1% respectively. The median PSA was 9.6 ng /mL (IQR=11.16). One hundred and seventeen patients (33.8%) were reported as prostate cancer. Fourteen patients (4.04 %) developed febrile UTI, 12 (7.1%) were in

regimen 1 group, 1 (1.01%) in regimen 2 group, 0 patient in regimen 3 group, and 1(1.8%) patient in regimen 4 group. One of 14 had diabetes mellitus. Compared between group 1 and group 2, group 1 and group 3, group 1 and group 4 there were not statistically significant ($p=0.07$), ($p=0.28$), ($p=0.38$) respectively. Compared between Quinolone regimen (group 1 and group 4) and third generation Cephalosporin regimen (group 2 and group 4), the incidence of febrile UTI was higher in quinolone regimen with statistically significant ($p=0.04$). Urine culture was positive in 7 of 14 patients. All of them were *E. coli* and all of them resisted to Ciprofloxacin. Bacterial sensitivity was showed in the table. One patient developed febrile UTI from Carbapenem resistant Enterobacteriaceae but responded to treatment with intravenous Meropenem and fully recovery.

Discussion

Transrectal ultrasound-guide biopsy prostate is the procedure to obtained prostatic tissue for pathological diagnosis of prostate cancer. European association of urology (EAU) guideline still recommended TRUS biopsy in biopsy naïve patients¹⁸. Febrile UTI is the complication causing

Table 1:

demographic data

Total number	N = 346 (%)
Age: mean (SD)	69.5 (SD = 9.1)
Diabetes mellitus	17 (4.9%)
Hypertension	42 (12.1%)
PSA: median (IQR)	9.6 (11.16)

Table 2:

antibiotic regimen and number of febrile UTI

Antibiotic	Febrile UTI, n (%)	No febrile UTI, n (%)	Total, n (%)
Ciprofloxacin	12 (7.1)	157 (92.8)	169 (48.8)
Ceftriaxone	1 (1.01)	98 (98.9)	99 (28.6)
Cefixime	0 (0)	25 (100)	25 (7)
Ofloxacin	1 (1.8)	52 (98.1)	53 (15.3)

Table 3:

Antibiotic sensitivity

Antibiotic	Susceptibility	Resistance
Amikacin	5	0
Amoxy / clavulanic acid	2	5
ceftriaxone	6	2
Ciprofloxacin	0	7
Ertapenem	6	1
Imipenem	6	1
Meropenem	6	1
Piperacillin /Tazobactam	6	1

significant morbidity. In this study, 14 cores schematic TRUS biopsy prostate had incidence of febrile UTI 4% that was similar to many studies those performed with standard 12 cores TRUS prostate biopsy³⁻⁵. In this study used variety techniques to reduced post-operative UTI such as rectal enema in the morning of the operative day, rectal cleansing with povidone iodine solution mixed with lidocaine jelly, and preoperative antibiotic usage¹⁰⁻¹⁴. There are many choices of preoperative antibiotic prophylaxis for TRUS biopsy in this study and the most frequently used were Ciprofloxacin. In international guidelines recommended usage Ciprofloxacin oral or intravenous form within twenty four hours of operation but in this study had many preoperative antibiotic regimens depended on surgeon preference¹⁸⁻²⁰. The incidence of febrile UTI in this study was higher in quinolones group compared with third generation Cephalosporins group. One risk factor may be from increasing number of quinolone resistant organisms. There were many studies showed that the prevalence of Quinolone resistant organisms isolated from rectal swab of patients before TRUS biopsy were increasing¹⁵⁻¹⁷. All pathogens isolated from urine culture in this study were E coli that was similar to the other studies³⁻⁸. All strains of E. coli isolated from patients' urine in this study resisted to Ciprofloxacin and those were more sensitive to third generation Cephalosporins. Compared between Quinolones and third generation Cephalosporins, the incidence of febrile UTI was higher in Quinolones group with statistically significant. All patients who developed UTI in this study were treated with Carbapenem and fully recovery even in one case of Carbapenem resistant E. coli. Limitation of this study is retrospective study the results may not generalized and the incidence of febrile UTI after TRUS biopsy is low.

Conclusion

14-core schematic TRUS biopsy of prostate is safe in terms of febrile UTI. Selection of adequate antibiotic prophylaxis regimen in the era of

Quinolones resistance may be one factor that reduce incidence of postoperative infection. The patient who developed post-operative febrile UTI should be concerned about antibiotic resistant organisms and treated with the other broad-spectrum antibiotics.

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