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Antibiotic drug use for the treatment of transrectal ultrasound guide core biopsy of prostate with sepsis (TRUS-sepsis)

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Objectives : *To study the effectiveness of antibiotic drug use for the treatment of sepsis after transrectal ultrasound guide core biopsy of prostate (TRUS-Bx).*

Methods : *This was a retrospective study from January 2004 to December 2008 of all men who received TRUS-Bx at the Department of Urology, King Chulalongkorn Memorial Hospital, for the elevation of prostatic specific antigen (PSA > 4.0 ng/ml) or abnormal digital rectal examination (DRE). A total of 1,246 patients underwent TRUS-Bx developed fever that required hospitalization for antibiotic treatment; 27 patients (2.17%). We excluded 11 patients from the study because no organism was identified from their urine or blood cultures. We recorded and the demographic data as follows: age, PSA, biopsy core, organism and antibiotic susceptibility, bacteriuria, bacteremia and underlying disease.*

Results : *We detected bacteria from urine or blood culture from 16 patients among a total of 27 who had fever after TRUS-Bx. The mean age was 65.5 years old (54 - 85 yr), the mean PSA was 11.19 ng/ml (5-42); their mean of biopsy cores was 9.06 (6 -12). We found bacteriuria in 13 patients (81.25%), and bacteremia in 6 patients (37.5%). There were 3 patients showing positive*

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culture in blood and urine; 3 had positive culture in blood only. E. coli was found in all positive cultures and every sample resisted to ciprofloxacin which was the most commonly use antibiotic for prophylaxis at our institute. However, all cases were sensitive to meropenem, imipenem and amikacin.

Conclusion : *The study shows that E.coli is the principle organism causing TRUS-sepsis and all of them resisted to ciprofloxacin. However, we found meropenem, imipenem and amikacin sensitive to all cases. They are therefore antibiotics of choice for treatment TRUS-sepsis.*

Keywords : *Prostate biopsy,septicemia, Antibiotic.*

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ทนงศักดิ์ หทัยวสีวงศ์, อภิรักษ์ สันติงามกุล. ยาฆ่าเชื้อที่เหมาะสมในผู้ป่วยที่ติดเชื้อในกระแสเลือดหรือปัสสาวะ หลังจากการเจาะชิ้นเนื้อต่อมลูกหมาก. จุฬาลงกรณ์เวชสาร 2553 ก.ย. –ต.ค.;54(5): 429 – 36

วัตถุประสงค์ : *เพื่อศึกษาผลการตอบสนองของยาฆ่าเชื้อในผู้ป่วยที่ติดเชื้อในกระแสเลือดหรือปัสสาวะ หลังจากการเจาะชิ้นเนื้อต่อมลูกหมาก*

วิธีการทำวิจัย : *การศึกษาข้อมูลย้อนหลังตั้งแต่เดือนกุมภาพันธ์ 2547 ถึงธันวาคม 2551 จากผู้ป่วยชาย 1,246 คนที่ทำการเจาะชิ้นเนื้อต่อมลูกหมาก เนื่องจากภาวะที่มีค่า PSA (prostatic specific antigen) มากกว่า 4 ng/ml หรือผลการตรวจต่อมลูกหมากทางทวารหนัก (DRE) ผิดปกติที่โรงพยาบาลจุฬาลงกรณ์ และมีผู้ป่วยสงสัยว่ามีการติดเชื้อหลังการเจาะชิ้นเนื้อต่อมลูกหมาก ที่เข้าโรงพยาบาลเพื่อได้ยาฆ่าเชื้อ 27 คน มี 11 คนใน 27 คนเราไม่สามารถเพาะเชื้อขึ้นได้ทั้งในปัสสาวะและกระแสเลือด ทำให้ผู้ป่วยที่ร่วมการศึกษาข้อมูลย้อนหลังมีอยู่ 16 คน เราวิเคราะห์ข้อมูลของผู้ป่วยเหล่านี้เช่น อายุ, ค่า PSA, จำนวนการเจาะชิ้นเนื้อต่อมลูกหมาก, โรคประจำตัวผู้ป่วย, การติดเชื้อในปัสสาวะ, การติดเชื้อในกระแสเลือด, ผลของยาฆ่าเชื้อที่ตอบสนองต่อเชื้อ*

ผลการศึกษา : *มีผู้ป่วยที่ร่วมการศึกษาข้อมูลย้อนหลังอยู่ 16 คน อายุเฉลี่ยอยู่ที่ 65.5 ปี, ค่า PSA เฉลี่ยอยู่ที่ 11.19 ng/ml, จำนวนการเจาะชิ้นเนื้อต่อมลูกหมากเฉลี่ยอยู่ที่ 9.06 ตำแหน่ง, ผู้ป่วยที่พบเชื้อในปัสสาวะ 13 คน, ผู้ป่วยที่พบเชื้อในกระแสเลือด 6 คน จากผลการเพาะเชื้อขึ้นเป็นเชื้อ E.coli ทุกคนและไม่ตอบสนองต่อยาฆ่าเชื้อ ciprofloxacin ซึ่งเป็นยาที่นิยมให้เพื่อป้องกันการติดเชื้อจากการเจาะชิ้นเนื้อต่อมลูกหมาก อย่างไรก็ตามจากผลการศึกษาข้อมูลพบว่ายาฆ่าเชื้อ meropenem, imipenem, amikacin ตอบสนองต่อเชื้อได้ 100 %*

สรุป : *เชื้อ E.coli เป็นสาเหตุหลักก่อให้เกิดการติดเชื้อในกระแสเลือด หลังการตรวจชิ้นเนื้อต่อมลูกหมาก และพบว่าเชื้อทั้งหมดที่พบดื้อต่อ ciprofloxacin ซึ่งเป็นยาหลักที่ใช้ในการป้องกัน อย่างไรก็ตามยาฆ่าเชื้อ meropenem, imipenem, amikacin ตอบสนองต่อเชื้อได้ร้อยละ100 เป็นไปได้ที่ยาฆ่าเชื้อดังกล่าวจะพิจารณาให้ในผู้ป่วยติดเชื้อกระแสเลือดจากสาเหตุดังกล่าว*

คำสำคัญ : *การเจาะชิ้นเนื้อต่อมลูกหมาก, การติดเชื้อในกระแสเลือด, ยาฆ่าเชื้อ.*

Transrectal-ultrasound guide core biopsy of prostate (TRUS-Bx) is a key procedure in the diagnosis of prostate cancer.[1] Transient adverse events such as local pain, hematuria, hematospermia, dysuria and rectal bleeding are reported in large number of patients.[2-4] Bacteriuria is seen in 20 - 35% and bacteremia in as many as 73% of patients. Fever associated with genitourinary symptoms was described in 3 - 10% or more, turning into septicemia in less than 5%.[5-8]

Antimicrobial agents lower the incidence of postbiopsy infectious complications. A wide variety of prophylactic regimens have been studied using both oral and intravenous antibiotics, with widely varying opinions of the use of antibiotic and the choice of agents. Our current practice is to give patients a dose of an oral fluoroquinolone 30 to 60 minutes before biopsy and continued therapy for 5 to 7 days. Recent studies showed that around 2% of patients after TRUS-Bx developed a febrile urinary tract infection or bacteremia (TRUS-sepsis) that required hospitalization for intravenous antibiotic treatment.[9-10]

The most common micro-organism causing TRUS-sepsis is *E.coli*, so any antibiotic given to patients should cover this organism. So far, currently there is no standard regimen for antibiotic treatment in transrectal ultrasound guided core biopsy of prostate with sepsis (TRUS-sepsis).

Material and methods

Study design

This is a retrospective study all men undergoing TRUS-Bx at the Departments of Urology of the King Chulalongkorn Memorial Hospital for elevation of prostatic specific antigen (PSA > 4.0 ng/ml) or abnormal digital rectal examination (DRE). We included only men with febrile urinary tract infection or bacteremia that required hospitalization for antibiotic treatment after TRUS-Bx. We recorded age, PSA, biopsy core, organism and antibiotic susceptibility, bacteriuria, bacteremia as well as the underlying diseases.

Antibiotic prophylaxis regimen

Most of the patients who received TRUS-Bx, we opted for oral ciprofloxacin (500 mg) 2 tablets after breakfast and at the time of TRUS-Bx around 12.00 a.m. then continue therapy for 5 to 7 days.

Population

From January 2004 to December 2008, a total of 1,246 prostate biopsies were performed Twenty-seven men required hospitalization after prostate biopsy because of septicemia. We analyzed only 16 cases who had positive bacterial culture from septic work up.

End point

A febrile genitourinary tract was defined as fever of more than 38°C after TRUS-Bx and positive urine or blood culture. The patients were hospitalized for intravenous antibiotic treatment for the suspicion of TRUS-sepsis. Sixteen patients were identified for antibiotic susceptibility of urine or blood culture.

Results

A total 1,246 patients underwent TRUS-Bx and had fever required hospitalization for antibiotic treatment 27 patients (2.17%). Eleven from 27 patients did not show positive bacterial culture in blood and urine tests. Thus, this information was brought to consideration whether or not antibiotic was

suitable for those 16 patients. Table 1 shows the characteristics of TRUS-sepsis patients, the mean age was 65.5 years old (54 - 85 yr); the mean PSA was 11.19 ng/ml (5 - 42); and, the mean biopsy core was 9.06 cores (6-12).

We found bacteriuria in 13 cases (81.25%) and bacteremia in 6 cases (37.5%). There were 3 patients who showed positive culture in blood and urine, and 3 patients showed only positive blood culture. *E.coli* was found in all positive cultures and in every sample that resisted to ciprofloxacin which was the most commonly used antibiotic for prophylaxis at our institute. However, all cases were sensitive to meropenem, imipenem and amikacin.

The underlying diseases of the patients were, namely: diabetic mellitus in 5 cases (31.25%), hypertension in 7 cases (43.75%) and coronary arterial disease in 1 case (6.25%).

Table 2 shows the drug-susceptibility of bacteria from urine culture the sensitivity tests found that meropenem, imipenem and amikacin effectively worked in all cases. However, ceftazidime, cefepime and cefoperazone/sulbactam either sensitive 100 percent by that test but the result of culture in urine did not affect all total sensitivity like that meropenem, imipenem and amikacin have done.

Table 1. Characteristic of patients with TRUS-sepsis.

Patients	Mean	Range
Age	65.5	54.0 - 85.0
PSA	11.19	5.0 - 42.0
Biopsy cores	9.06	6.0 - 12.0

Table 2. Drug-susceptibility of bacteria isolated from urine culture

	S	I	R
Ceftriaxone	6/7 (85.71%)		1
Cetazidime	12/12 (100%)		
Imipenem	13/13 (100%)		
Meropenem	13/13 (100%)		
Cefpirome	3/4 (75.0%)		1
Gentamicin	6/13 (46.15%)		7
Amikacin	13/13 (100%)		
Cefoperazone/sulbactam (Sulperazon)	7/7 (100%)		
Cefazolin	9/12 (75.0%)	2	1
Amoxicillin/clavulanic acid	9/13 (69.23%)	4	
Co-trimoxazole	1/7 (14.29%)	1	5
Cefepime	11/11 (100%)		
Ciprofloxacin			13

* (number of ATB susceptibility/number of ATB susceptibility test was perform from 13 sample) Because ATB susceptibility test was done differently between 13 sample, not all of ATB have been use in the test. Example ceftazidime was test 12 out of 13 sample.

Table 3 shows drug susceptibility of bacteria from blood culture which finds that the reflection of meropenem, imipenem, amikacin, ceftazidime and cefepime work with 100 percent effectively. Also, ceftriaxone and sulperazon worked in the same way. However, the culture of blood sensitivity does not give totally the same result as that of meropenem, imipenem, amikacin, ceftazidime and cefpime.

Discussions

Currently, digital rectal examination and serum PSA lead us to the diagnosis of prostate cancer, abnormal finding from physical exam or blood examination considered prostate biopsy (TRUS-Bx).

Adverse events after TRUS-Bx are hematuria, hematochezia, hematospermia, retention of urine, dysuria and TRUS-sepsis. Among all the side effects, TRUS-sepsis is the most dangerous situation which needs close monitoring and immediate care because the mortality rate could be as high as 40 percent.

The data of this study has been collected from patients who were admitted at King Chulalongkorn Memorial Hospital. There were 27 of them who had experience TRUS-Bx related infection and received antibiotic treatment; 11 from 27 patients did not show any result of positive bacterial culture either in urine or in blood. Sixteen patients who were included into this study had positive culture for *E.coli* in all samples.

From the basic demographic data such as age, PSA, biopsy core, organism and underlying disease among TRUS-Sepsis patients showed no difference in each case.

Table 3. Drug susceptibility of bacteria isolated from blood culture.

	S	I	R
Ceftriaxone	3/3 (100%)		
Cetazidime	6/6 (100%)		
Imipenem	6/6 (100%)		
Meropenem	6/6 (100%)		
Gentamicin	4/6 (66.66%)		2
Amikacin	6/6 (100%)		
Cefoperazone /sulbactam (Sulperazon)	3/3 (100%)		
Cefazolin	5/6 (83.33%)	1	
Amoxicillin/clavulanic acid	5/6 (83.33%)	1	
Cotrimoxazole			3
Cefepime	6/6 (100%)		
Ciprofloxacin			13

* (number of ATB susceptibility/number of ATB susceptibility test was perform from 6 sample)
Because ATB susceptibility test was done differently between 6 sample, not all of ATB have been use in the test. Example ceftriaxone was test 3 out of 6 sample.

The result of this study in urine sensitivity finds that meropenem, imipenem and amikacin work effectively in all patients. However, ceftazidime, cefepime and sulperazon either work 100 percent by that test but the result of urine culture does not affect the total sensitivity like meropenem, imipenem and amikacin have done.

While the culture in blood found that the reflection of meropenem, imipenem, amikacin, ceftazidime and cefepime worked 100 percent effectively. Also, ceftriaxone and sulperazon does the same way. However, the culture of blood sensitivity did not give entirely the same result of meropenem, imipenem, amikacin, ceftazidime and cefepime.

Unfortunately there are some limitations to this study due to limited number of patients and the results of blood and urine cultures that did not cover all the sensitivity of the antibiotics which should be considered for to the patients.

The result of this study may be used to change the regimen of antibiotic prophylaxis for TRUS-Bx which ciprofloxacin resisted to organism in case who had history of TRUS-sepsis before, not only that we considered antibiotic of choice for patient who had TRUS-sepsis such as meropenem, imipenem, amikacin.

Ceftazidime, cefoperazone/sulbactam, cefepime may be considered the primary treatment in these cases; however, our sensitivity tests were not completely examined also should be long term study.

Conclusion

The study shows the result of the culture test from those totally effect to *E.coli* which totally against Ciprofloxacin. However, meropenem, imipenem and amikacin are sensitive in all positive organisms both in urine and blood cultures, they are therefore antibiotic of choice for treatment TRUS-sepsis.

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