A Life-Threatening *Escherichia Coli* Meningitis After Prostate Biopsy

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INTRODUCTION

Transrectal prostate biopsy (TPB) is used for diagnosis of the prostate cancer. Although it seems to have fewer complications than other methods, infectious and non-infectious complications may occur following TPB. Antibiotic prophylaxis is commonly used before the procedure, but because the resistant bacteria are increasing in the every day clinical practice, it may be ineffective to prevent infectious complications. Life-threatening meningitis after TPB is a very rare complication and to the best of our knowledge, just eight cases have been reported up to now.[1-8]

Here, we present an extended spectrum beta-lactamase producing *Escherichia coli* (*E. coli*) meningitis after transrectal ultrasound guided prostate biopsy (TRUS-PB).

CASE REPORT

A 75-year-old man presented to the emergency department with fever, altered mental status, nausea, and vomiting. On physical examination, his fever was 38.2°C, mental status was disorientated, conscience level was fluctuating, neck stiffness was remarkable, and Kernig's sign was positive. Therefore, the patient was hospitalized with diagnosis of meningitis.

He had undergone a TRUS-PB 4 days earlier and had been prescribed oral ciprofloxacin as a prophylactic measure starting 3 days before the biopsy. When he was admitted to the hospital, he was still using the antibiotic.

Remarkable laboratory findings were as follows: white blood cell of $15.3 \times 10^3/\mu L$, erythrocyte sedimentation rate of 86 mm/h, and C-reactive protein of 6.6 mg/dL. Lumbar puncture was performed and cerebrospinal fluid (CSF) analysis revealed opening pressure of 150 mmHg, white blood cell of 2780/mm^3 (80% polymorphonuclear leukocytes), protein of 4285 mg/dL (Pandy 3+), and glucose level of 35 mg/dL (simultaneous serum level of glucose was 180 mg/dL). No bacterium was seen on direct microscopy of CSF and injection of meropenem, 2 gr three times daily, was started empirically.

Extended spectrum beta-lactamase producing *E. coli* grew in CSF culture. The bacterium was resistant to fluoroquinolones and amikacin as well as cephalosporins, but susceptible to carbapenems. On the 10th day of therapy, control lumbar puncture was performed

and all biochemical analysis of CSF turned to normal levels with a decreased cell count to 130 leukocyte/mm^3. Antibiotic therapy continued for 21 days and complete resolution of symptoms was achieved without any sequel.

DISCUSSION

Transrectal ultrasound guided prostate biopsy has been a frequently used outpatient procedure with low major complication rates. However, its infective complications, such as bacteremia, sepsis, and septic shock, can be life-threatening. The main causative organisms are *E. coli* (most frequent), *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Enterococcus* subspecies. Although the antibiotic prophylaxis has become a routine precaution before performing TPB, there is still no consensus on what to be used and when. Fluoroquinolones seem to be the most frequently used antibiotics for prophylaxis followed by aminoglycosides, doxycycline, and metronidazole in the routine practice.[9]

Meningitis after TPB is a very rare complication and since the majority of the cases were reported in other languages than English, it was very difficult to compare those with our patient (Table). It is not surprising that almost all the patients get prophylaxis with flouroquinolones, either ciprofloxacin or levofloxacin. Timing of the antibiotic administration varies; Shen and colleagues performed the procedure after three days of intravenous antibiotic prophylaxis while Rodríguez-Patrón and associates gave it two hours before.[1,7] Our patient was also using ciprofloxacin three days before and four days after the procedure. The timing of development of meningitis after the procedure also varies; it was seven days for Shen's patient [1] while it was two days for Erdogan's,[3] and four days for ours.

The organism responsible for the meningitis was *E.coli* for all the subjects and in ours as well. Despite the ability of ciprofloxacin to penetrate into the prostate, it has to be used carefully because of the emerging resistance of *E.coli* to quinolones. Feliciano and colleagues underlined the quinolone resistance in their article. They evaluated 1273 TRUS-PBs with 2.4% infective complications and found that the positive cultures of *E.coli* strains showed 89.5% quinolone resistance, while they were susceptible to amikacin, ceftriaxone, and ceftazidime.[10] Does it mean that we can use cephalosporins for prophylaxis? We do not suggest that, since the more antibiotics are used, the more resistant bacteria you get. The main challenge in multi-drug resistant *E. coli* strains, like in our case, is that they show resistance to cephalosporins as well. Starting the antibiotic treatment for meningitis with a cephalosporin, as is usually done, and waiting for the culture results could lead to a fatal outcome in patients who had undergone TRUS-PB and received some antibiotics already. With regard to this, we started carbapenem as the first-line medicine and the patient recovered quickly without any sequel.

We want to underscore that if a patient gets prophylaxis, but still develops meningitis after TRUS-PB, the underlying pathogen can be multi-drug resistant and the drug of choice has to be considered on this base.

Meningitis after transrectal prostate biopsy*

First Author	Prophylaxis	Microorganism in CSF	Therapy for meningitis	Outcome
Shen ZJ[1]	Metronidazole and Levofloxacine	Multi-resistant *E. coli*	Carbapenem	Healed
Erdogan H[3]	Ciprofloxacin	E.coli	Ceftriaxone	Healed
Alecsandru D[4]	Ciprofloxacin	Multi-resistant E.coli	Imipenem (followed by cefotaxime)	Healed
Samson D[5]	Ofloxacine and Metronidazole	Multi-resistant *E. coli*	Ceftriaxone + Gentamycin	Excitus
Meisel F[6]	Levofloxacine	E.coli	Cefotaxime (plus Ampicillin and Netilmicin)	Healed
Rodríguez-Patrón RR[7]	Ciprofloxacin	Multi-resistant *E. coli*	Meropenem	Healed
Sandvik A[8]	ND	E.coli	ND	ND
Nguyen BV[2]	Ciprofloxacin	E.coli	Ceftriaxone + Gentamycin	Healed

*CSF indicates cerebrospinal fluid; and ND, No data was found.

CONFLICT OF INTEREST

None declared.

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