Multi-resistant *Escherichia coli* sepsis following transrectal ultrasound-guided prostate biopsy

Introduction

Transrectal ultrasound-guided biopsy of the prostate is a common urological procedure for the diagnosis of prostate carcinoma. The risks and nature of complications for this procedure are well documented ranging from discomfort, haematuria and voiding difficulties to asymptomatic bacteruria and sepsis. Rarely, sepsis is fatal.

The use of prophylactic antibiotic chemotherapy is accepted practice before biopsy, and post biopsy infection rates range from 0.8–6% with *Escherichia coli* being the most common organism (Raaijmakers et al, 2002). Prophylactic antibiotic regimens vary but the use of quinolones (norfloxacin or ciprofloxacin) predominates (Sieber et al, 1997). Worldwide the prevalence of resistant strains of *E. coli* is increasing (Gupta et al, 1999). The authors report two cases of multi-resistant *E. coli* infection post prostate biopsy following travel to India and review the relevant literature.

Discussion

Transrectal ultrasound-guided biopsy of the prostate is the main method of obtaining tissue diagnosis of prostate cancer (*Figure 1*). The decision to biopsy is based on prostate-specific antigen (PSA) levels and digital rectal examination. Although the procedure is considered relatively safe, sepsis is still one of the more serious complications (Raaijmakers et al, 2002). It is commonly accepted that prophylactic antibiotics reduce the incidence of post biopsy infection, however, there still remains no definitive protocol in relation to the type and duration of antibiotic.

Multiple schedules involving multiple different antibiotics have been reported (Sieber et al, 1997; Raaijmakers et al, 2002). Overall quinolones are the most commonly prescribed prophylactic antibiotic and account for between 75 and 90% of those administered (Sieber et al, 1997). Furthermore, it has been demonstrated that longer courses of quinolone prophylaxis further reduce the risk of infection compared with shorter courses (Sieber et al, 1997).

The most common pathogen associated with post biopsy sepsis is *E. coli*, which is a normal bacterial gut flora. There are increasing reports of the emergence of resistant strains of *E. coli*. At present, multi-resistant *E. coli* isolates (resistant to more than four antibiotics) in developed countries remain low at less than 4%, but in particular those resistant to quinolones are increasing (Livermore et al, 2003; Nimmo et al, 2003). Rates are generally higher in developing countries (Otrock et al, 2004). It is likely that multi-resistant *E. coli* will continue to emerge in the community, as one of the primary mechanisms for resistance is the production of beta-lactamase by the organism that can confer resistance to carbapenems, as well as quinolones. It has been demonstrated that genes encoding for such resistance are easily transferred by plasmids between *E. coli*, making their spread imminent (Miriagou et al, 2003). Of note is that such resistant organisms often require treatment with prolonged courses of intravenous antibiotic, rather than oral agents, as in these cases.

Infection with multi-resistant organisms post prostate biopsy has not been widely reported in the English literature with only one case reported where *Klebsiella* and *Pseudomonas* sepsis developed despite prophylactic quinolones (Gilad et al, 1999). However, risk factors in acquiring multi-resistant urinary tract infections have been identified, and include: age greater than 64 years, previous quinolone therapy, presence of urinary catheter and urinary tract abnormalities (Ena et al, 1995).

It is important to identify patients who may be at risk of developing multi-resistant *E. coli* infections post prostate biopsy. Travel to a developing country and contracting diarrhoea appeared to be a relevant risk in the cases described. Through careful history taking risk factors such as those outlined for multi-resistant urinary tract infection above may alert doctors to the potential risk of being colonized with multi-resistant organisms at the time of biopsy.

While the use of prophylactic quinolones has been shown to decrease infectious complications it may not offer enough coverage in such patients. The challenge remains to identify at risk patients and cover appropriately with the addition of a broader spectrum antibiotic such as intravenous meropenem. Enemas have not been demonstrated to be helpful in reducing infection but there may a role in faecal screening for resistant *E. coli* in high-risk patients (Carey and Korman, 2001).Certainly, multi-resistant organisms will continue to be a problem after prostate biopsy and urologists must be aware and able to prevent and treat such infections. **BJHM**

Case Report 1

A 63-year-old man with a family history of prostate carcinoma underwent a transrectal ultrasound-guided biopsy of the prostate for investigation of a slowly raising prostate-specific antigen 5.0 ng/ml. The patient had recently returned from a 4-week holiday in India, where he experienced an episode of self-limiting diarrhoea. Before biopsy he was given prophylactic norfloxacin 400 mg orally twice daily, started 1 day before biopsy and continued for 1 day post biopsy with 240 mg intravenous (IV) gentamicin given during the procedure. Three days post procedure he was admitted to hospital with fevers and rigors. Gentamicin and ceftriaxone were commenced but he remained febrile. Forty-eight hours later urine culture grew a multi-resistant gram-negative rod, and the patient was started on IV imipenem. Final sensitivities reported *Escherichia coli* with resistance to amoxicillin, amoxicillin and clavulanic acid, norfloxacin, ciprofloxacin, gentamicin and ceftriaxone, and with sensitivity to meropenem and nitrofurantoin. The fever settled and the patient was discharged on oral nitrofurantoin for a further 2 weeks, making a complete recovery.

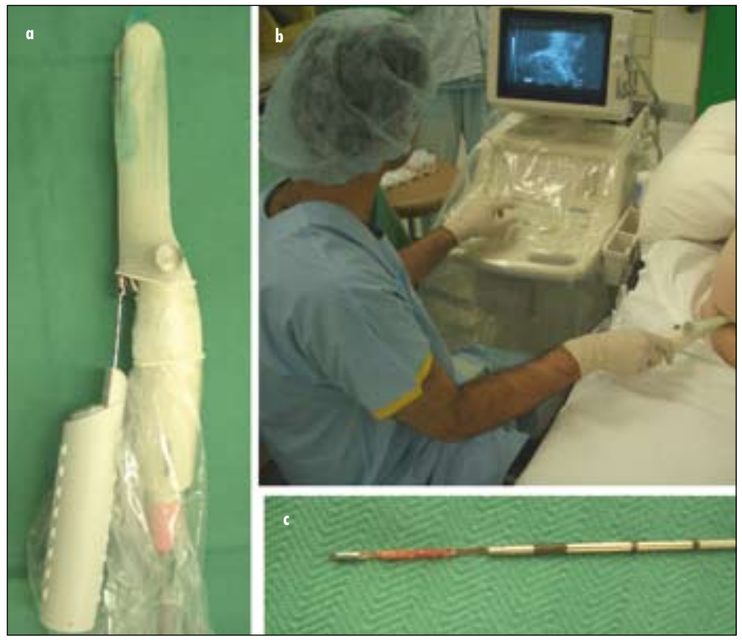
Case Report 2

A 64-year-old man underwent repeat biopsy for investigation of a continual prostate-specific antigen rise to 15.8 ng/ml, despite a previously negative biopsy result. He had also recently returned from a 5-week vacation in India where he experienced an episode of self-limiting diarrhoea. The same norfloxacin prophylactic antibiotic regimen as in Case 1 was used. Two days after the procedure he was admitted to hospital with fevers, rigors and difficulty voiding. He was started on intravenous (IV) gentamicin and amoxicillin. His fevers settled and he was discharged 48 hours later on oral norfloxacin. He represented the following day with fevers and rigors, by which time his urine culture had grown *Escherichia coli* resistant to gentamicin and norfloxacin; sensitive only to the intravenous agents amikacin, imipenem and meropenem. The patient had developed prostatitis so a percutaneous long-term IV cannula was inserted and he was treated with 4 weeks of IV meropenem to prevent relapse. He made a full recovery.

Dr Adee-Jonathan Davidson *is Urology Resident,* **Associate Professor David R Webb** *is Associate Professor and* **Dr Nathan Lawrentschuk** *is Urology Research Fellow, University of Melbourne, Department of Surgery and Department of Urology, Austin Hospital, Heidelberg, Victoria, 3084, Australia,* **Dr Ian D Jennens** *is Infectious Diseases Physician, University of Melbourne, Department of Medicine, Royal Melbourne Hospital, Parkville Victoria,* **Dr Michael Sutherland** *is Respiratory Physician, Monash University, Department of Medicine, Alfred Hospital, Prahran, Australia*

Correspondence to: Dr N Lawrentschuk

Figure 1. a. Transrectal ultrasound probe with cover and biopsy gun inserted through biopsy guide. b. An ultrasound of the prostate is undertaken before biopsy. c. An extracted core of tissue for histological analysis.



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