An Outbreak of Achromobacter xylosoxidans Associated With Ultrasound Gel Used During Transrectal Ultrasound Guided Prostate Biopsy

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Abbreviations and Acronyms

PFGE = pulsed field gel electrophoresis

TUPB = transrectal ultrasound guided prostate biopsy

Submitted for publication April 19, 2010.

* Financial interest and/or other relationship with Biocaniel.

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Purpose: We describe an outbreak of Achromobacter xylosoxidans after transrectal ultrasound guided prostate biopsy at a urology unit at a tertiary care center as well as clinical and microbiological investigation, and intervention.

Materials and Methods: In September 2008, several days after undergoing transrectal ultrasound guided prostate biopsy, 4 patients were hospitalized with fever. We reviewed the procedure and infection control practices in the urology service. Environmental cultures were obtained from equipment and materials used for the procedure. Isolates were identified by routine laboratory procedures with molecular confirmation and characterized by pulsed field gel electrophoresis.

Results: A. xylosoxidans was isolated from the urine of 2 patients, of whom 1 also had a positive blood culture. Review of transrectal ultrasound guided prostate biopsy revealed that the lubricant gel used in the procedure, which the biopsy needle passes through, was held in a plastic container that was repeatedly refilled from a large bag. A. xylosoxidans was isolated from this container. Pulsed field gel electrophoresis showed that the isolates obtained from patients and the gel were identical.

Conclusions: Contaminated lubricant gel was the cause of this outbreak. The practice of repeatedly refilling gel containers with nonsterile gel was replaced by the use of individual sterile gel sachets in each patient. No further cases occurred. During an invasive procedure involving a sterile body site, such as transrectal ultrasound guided prostate biopsy, using sterile gel is essential. Our experience emphasizes the crucial need to review all invasive procedures from an infection control perspective.

Key Words: prostate; ultrasound, high-intensity focused, transrectal; biopsy; Achromobacter denitrificans; lubricants

Transrectal ultrasound guided biopsy of the prostate is an essential procedure to diagnose prostate cancer. Given that this invasive procedure penetrates sterile tissue through the bowel, the potential for infection is high. Bacteriuria and bacteremia are among the most common complications after TUPB. Since antibiotic prophylaxis has become a common practice during TUPB, the infection rate has decreased from 30% to 1% to 3.6%.[1–3] Nevertheless, outbreaks of urinary tract infection after TUPB have been described that were attributable to contaminated equipment such as needle guides and ultrasound gel.[4–6]

0022-5347/11/1851-0144/0
THE JOURNAL OF UROLOGY®

Vol. 185, 144-147, January 2011
Printed in U.S.A.
DOI:10.1016/j.juro.2010.08.093

We describe an outbreak of Achromobacter xylosoxidans after TUPB procedure in a urology unit as well as the clinical and microbiological investigation that led to the organism source, and the intervention.

MATERIALS AND METHODS

Setting and Outbreak Description

Hadassah-Hebrew University Medical Center is a 750 bed, tertiary care hospital. It is the largest hospital in Jerusalem. At the urology service about 500 TUPBs are done yearly and infection after the procedure is rare.

Four patients were hospitalized at the urology department on September 28, 2008 due to fever and urinary symptoms (see table). All patients underwent TUPB 3 days before hospitalization. All had pyuria, and blood and urine samples were obtained for culture. The next day a gram-negative bacterium was isolated from blood and urine cultures in 2 patients. The bacterium was identified as Achromobacter xylosoxidans, also known as Alcaligenes xylosoxidans. The patients were treated with appropriate antibiotics and all 4 recovered.

TUPB and Reprocessing

During TUPB a condom filled with lubricant gel is placed over a Model 8551 ultrasound transducer (B-K Medical, Herlev, Denmark). The transducer is introduced into the rectum. After local anesthesia is administered through the transducer channel a sterile biopsy needle is inserted through the channel. During passage it penetrates the gel, the condom, the rectal mucosa and finally the prostate. The procedure is repeated to obtain 12 samples.

Cleaning and disinfection should then be done according to manufacturer recommendations, which refer to American Food and Drug Administration and German Robert Koch Institute regulations. Immediately after the procedure all equipment should be rinsed with tap water. Cleaning should be done with the enzymatic detergent in use according to local policy using a brush for thorough cleaning of channels and grooves. Disinfection is then done by immersing the transducer in the high level disinfectant solution used for this purpose. Equipment should then be rinsed with sterile water.

Outbreak Investigation

All procedures at the urology clinic were halted pending the investigation. The infection control team comprehensively reviewed the steps taken during TUPB as well as the cleaning and disinfection process after it. As guided by review findings, samples were collected for culture, including tap water, the transducer channel, ready to use needle guides and lubricant gel.

Patient characteristics and culture results

Pt No.—Age	Fever (C)	Other Symptoms	A. xylosoxidans Pos Culture
1—67	39	Chills	Blood + urine
2—50	38.8		Urine
3—57	38	Urinary	
4—63	39.4	Urinary	

Microbiological Methods

Tap water was collected in a sterile container and cultured quantitatively on tryptic soy agar. Also, 2 ml volumes were inoculated in tryptic soy broth, which provides a theoretically lower detection limit of 0.5 cfu/ml. Gel was sampled aseptically from the refilled bottle, the source bag and an unopened bag. All underwent the same procedure. The transducer channel was sampled using a moistened polyester swab plated directly on tryptic soy agar. Samples were also inoculated on regular laboratory medium composed of 5% sheep blood agar and MacConkey agar. Needle guides were placed in tryptic soy broth. Cultures were incubated at 35C. Cultures without growth were inspected daily for 7 days before being considered negative. Isolates were identified phenotypically using an API 20NE kit (bioMerieux, Durham, North Carolina).

Molecular Typing

We confirmed the identification molecularly by polymerase chain reaction, nucleic acid sequencing and comparison with public databases. Partial length 16S rRNA was amplified by polymerase chain reaction, as previously described.[7] Nucleic acid sequence manipulation and annotation were done using dedicated Geneious Pro 4.6 software (Biomatters, Auckland, New Zealand).[8] We compared isolates from patients as well as environmental samples using PFGE. DNA was digested with Xba I (New England BioLabs®) at 37C for 4 hours. Gels were analyzed with Molecular Analyst Fingerprinting Plus software on a CHEF Mapper (Bio-Rad®). PFGE patterns were interpreted by accepted criteria using 2009 Geneious, version 4.7.

RESULTS

Investigation

TUPB review revealed several breakdowns in reprocessing the transducer and the use of materials involved in performing TUPB on which the microbiological evaluation was based. Two recommendations in reprocessing were not properly done. 1) A brush was not used at any point during the cleaning and disinfection process. 2) Tap water was used to rinse the disinfectant during the final step instead of sterile water, as recommended. Also, the lubricant gel container, a 250 ml plastic gel bottle in which the gel product was originally obtained, was repeatedly refilled from a large bag of the product. There was no claim that the gel supplied was sterile. This bottle was not regularly replaced, cleaned or disinfected.

Cultures from tap water, transducer channels and needle guides (after decontamination) yielded no growth but those from the open gel bottle grew A. xylosoxidans. Cultures of gel obtained from the source bag and an unopened bag were negative.