

Evidence-Based Practice for Evaluation and Management of Female Urinary Tract Infection

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An inflammation of the bladder mucosa may be the result of a variety of bladder conditions including chronic cystitis, radiation, chemotherapy, or a urinary tract infection (UTI). UTIs are common in adult females, as a result of the anatomy of the urinary system of this population (Delzell & Fitzsimmons, 2005). Compared to the male urethra, the female urethra is shorter and in closer proximity to the rectum, thus allowing easier colonization of bacteria, and in turn, leading to a higher prevalence of UTIs. The management approach for adult females is distinctly different than the regimen for the same presenting signs and symptoms in males, children, or pregnant women. The treatment regimen is also different for complicated UTIs (for example, upper-tract infections). UTIs are the leading cause of morbidity and health care expenditures in persons of all ages (Orenstein & Wong, 1999). Thirty percent of females have at least one UTI in their lifetime and this diagnosis accounts for 7 million physician visits per year (Epocrates, 2004).

To maximize quality, evidence-based practice (EBP) should be the core of patient care. Health care providers must have the ability to analyze, cri-

Treatment and management of uncomplicated, lower urinary tract infections in adult females is unique in comparison to other patient populations. In this article, best practices and evidence-based research for treating a urinary tract infection in this group of patients are examined. A typical case of a female client in an outpatient urology setting is compared to recommendations in the literature. Interventions in the scenario are examined against available guidelines, revealing that some practices are supported, others are contraindicated, and gaps are identified.

tique, and apply evidence-based guidelines in a clinical setting. One of the first steps includes reviewing reputable EBP guidelines and resources, and applying them to selected patient populations. This involves weighing risks versus benefits for each particular patient as well as the health care system (Klardie, Johnson, McNaughton, & Meyers, 2004).

There are several different levels of and types of EBP; each varies slightly based on the author or sponsor. Generally, the highest, most reliable levels are systematic reviews (often found in the Cochrane Libraries) and randomized controlled trials (RCTs). Practice guidelines are based on various interventions, from sensitivity and specificity of diagnostic tests to relative and absolute risk of prescribing medications (Klardie et al., 2004). The levels then gradually decrease to the "expert opinion" category, which is the lowest level of EBP frameworks. For example, the United States Preventive Task Force lists three levels, with Level I based on the

RCT, and Level III based on descriptive studies or opinions. Alternately, the National Guideline Clearinghouse (NGC, 2000) lists grades of recommendations for practice (A, B, C, and good practice points). Grade A must be based on RCTs, B on non-RCTs, and C on expert opinion. Good practice points are based on recommendations by NGC group members.

Readers of *Urologic Nursing* may encounter UTIs in adult females often. New guidelines are established to ensure providers give the most current and best supported care to their patients. EBP is also crucial as nurses justify "why we do what we do." Evidence-based guidelines may or may not mimic the variety of practice settings where adult female UTIs are evaluated and treated; therefore, nurses may bring this new information to their practice settings.

UTIs are one of the most common problems encountered in urology. Continued research and publications are necessary to refine and acquire current skills that are necessary in managing this common problem. EBP sur-

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rounding uncomplicated, non-recurring, lower-tract UTIs, including management regimens for adult female clients (defined as ages 18 to 64) in an outpatient, urology setting is examined.

Background

Gram-negative bacteria, particularly *Escherichia coli*, are the most common culprits found in female UTIs, followed by *Staphylococcus saprophyticus* and *Proteus* (Katchman, Christiaens, Baerheim, Soares-Weiser, & Leibovici, 2004). Bacteria enter through the periurethral vaginal introitus and ascend into the bladder via the urethra (Howes, 2005). Complicated UTIs occur when lower-tract mechanisms fail, thus allowing bacteria to colonize the upper-urinary tract. The focus of this article is limited to a discussion of uncomplicated, non-recurring, lower UTIs.

Risk factors for UTI include a previous diagnosis, diabetes mellitus, pregnancy, more frequent or vigorous sexual activity, use of spermicides or diaphragm, or an underlying anomaly of the genitourinary tract such as tumors, calculi, strictures, or incomplete bladder emptying (Epocrates, 2004; Hooten, 2000). Although 3% to 8% of women have bacteriuria at any given time (Epocrates, 2004), treatment is based on symptomatology. Clinical presentation of a symptomatic UTI may include dysuria, urinary frequency, urgency, and pelvic pressure or pain. Patients often relate these findings to an inciting event such as recent sexual intercourse. Patients may treat initial symptoms with over-the-counter analgesics. Physical examination findings are often within normal limits. Positive nitrite (byproduct of bacterial colonization) dipsticks are 94% specific for UTI (Howes, 2005). Nitrite dipsticks may be negative in those who do not eat meat, may fail to detect bacteriuria in 30% to 50% of cases, and can be confounded by consumption of ascorbic acid (Epocrates, 2004; University of Michigan Health System [UMHS], 1999). A positive leukocyte esterase dip-

stick is 75% to 97% sensitive (Delzell & Fitzsimmons, 2005; UMHS, 1999).

The urinalysis typically is remarkable for pyuria, bacteriuria, and perhaps hematuria and nitrates. A positive urinalysis (midstream-voided technique) reveals greater than 10^5 leukocytes per high power field on microscopic examination which is indicative of significant pyuria (Tierney, McPhee & Papadakis, 2004). While urine culture is the most definitive diagnostic test, it is rarely necessary or cost effective in premenopausal women presenting with an uncomplicated, non-recurring UTI (Butler, Reed, & Bosker, 2001). Asymptomatic bacteriuria should not be treated with antibiotics in non-pregnant adult females (NGC, 2000).

Case Example

Consider the following case of a 27-year-old female presenting to an outpatient urology practice. Evaluation and management approaches included in the case example are then compared with EBP guidelines and similarities, differences, and gaps are discussed.

Subjective (S) information. A 27-year-old nulliparous female presents with chief complaints of burning with urination, urinary frequency (more than two times per hour), and a slightly foul odor to her urine. Symptom onset was 3 days ago and is progressively worsening. The patient reports no pain in her abdomen or back. She describes the pain as intermittent with urination and as a "burning" pain. The pain is more intense when initiating the urine stream and immediately upon urinating. Signs and symptoms are worse in the evenings, as the patient notices an increased sense of urinary urgency at that time. She denies any "accidents" or leakage of urine.

The patient denies fever, chills, anorexia, fatigue, weakness, flank pain, or back pain. She also denies abdominal pain, nausea, vomiting, diarrhea, or constipation. She complains of

burning with urination; her pain is improved with rest and with the absence of urination. She denies hematuria. In addition to daytime urinary frequency, she also describes nocturia of three to four times per night. Her sexual history is remarkable for regular sexual activity, no new partners, and no vaginal discharge. Her last menstrual period occurred 2 weeks prior to this visit. Her menstrual periods are regular.

The only medication she takes is Mircette[®] (desogestrel/ethinyl estradiol-oral contraceptive). She has no known drug allergies. Her past health history reveals up to date immunizations. She was treated with Paxil[®] (paroxetine) for depression several years ago and has had no recurrence. Her family history is significant for paternal hypertension and congestive heart failure. She has a five pack year history (one cigarette per day for 5 years) of cigarette smoking.

Objective (O) findings. The patient is well nourished, has an appropriate affect, and is in no acute distress. Her vital signs are within normal limits. Her lungs are clear to auscultation, regular sinus rhythm, no murmur. Bowel sounds are normal and her abdomen is soft, non-tender, and non-distended. There is no organomegaly, no costovertebral angle tenderness, and no flank pain.

Dipstick urinalysis reveals the following: color dark yellow, pH 6.5, specific gravity 1.025, nitrite positive, leukocyte positive, glucose negative, protein negative, and trace red blood cells (RBC). Microscopic urinalysis shows white blood cells: 20-30/high powered field (HPF), RBC: 0-2/HPF, epithelial cells: 0-2/HPF, and moderate bacteria.

Assessment (A)

1. The patient is diagnosed with an uncomplicated, lower UTI.

Plan (P)

1. The provider instructs the patient in the UTI disease process and emphasizes the

need to report worsening signs/symptoms to the emergency room. Examples of emergent findings include fever, chills, and/or flank pain, which may be indicative of pyelonephritis. The patient should avoid sexual intercourse until symptoms have resolved and return to the clinic if she has noticed no improvement within 48 hours.

2. A prescription was written for Bactrim® DS (trimethoprim/sulfamethoxazole) with instruction to take one tablet twice per day with food for 3 days.
3. The patient was cautioned regarding the potential interaction between new and pre-existing medications. Antibiotics may decrease the effectiveness of Mircette®, thus requiring a back-up method of contraception. The patient was also made aware of the potential side effect profile of Bactrim® DS and adverse reactions to report.
4. Measures to prevent future UTIs were given to the patient that included the need to maintain an adequate hydration status by increasing her fluid intake (particularly acidic fruit juices). Establishing voiding habits that prevent UTIs were discussed; these included voiding at first desire rather than “waiting;” urinating before and after intercourse; and maintaining a regular bowel movement pattern (avoiding constipation). She was also instructed that sanitary napkins should be changed frequently. Wearing cotton underwear, avoiding feminine hygiene sprays and scented douches, and wiping from front to back were also recommended.
5. Smoking cessation was discussed. Smoking greatly increases the risk of adverse effects associated with taking oral contraceptives. Risks associated with oral contra-



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ceptive pills can be explained utilizing the ACHES acronym: A – abdominal pain (severe), C – chest pain, H – headache (severe), E – eye problems, and S – severe localized leg pain. Providers should take the opportunity to recognize the danger of increased cardiac events for women who smoke while on oral contraceptives and use the ACHES acronym to screen for potential problems that the patient may be experiencing (Family Health International, 2006).

6. Schedule followup appointment in 2 weeks and repeat urinalysis at that time.

Analysis and EBP Research

Recommended EBP guidelines for treatment of UTI in this sex and age population were partially followed in the case example. Bactrim DS one tablet, twice daily for 3 days, is the most frequently recommended antibiotic regime for treating uncomplicated, lower UTI (Guidelines Advisory Committee [GAC], 2003; Katchman et al., 2004; NGC, 2000; Uphold & Graham, 2003). Antibiotic regimes of just 1 day have been associated with high failure rates and those greater than 3 days have been deemed unnecessary in this population (Delzell & Fitzsimmons, 2005; NGC, 2000). When Bactrim DS is contraindicated, as with an allergy or resistance, the recommended second-line treatment is with a quinolone drug for 3 days (GAC, 2003; NGC, 2000). Examples of quinolones include Cipro® (ciprofloxacin) 250 mg twice daily for 3 days, or Levaquin® (levofloxacin) 250 mg, once daily for 3 days. Finally, if the above recommendations are contraindicated, another option is for 7 days of Macrobid® (nitrofurantoin), Amoxil® (amoxicillin), or a first-generation cephalosporin such as Keflex®

(cephalexin) (GAC, 2003; NGC, 2000).

Signs and symptoms usually resolve within 2 to 3 days of antibiotic treatment. Bladder analgesics such as Pyridium® (phenazopyridine) are ill advised due to the possibility of masking signs or symptoms of complications such as pyelonephritis, renal abscess, or urinary outlet obstruction (Delzell & Fitzsimmons, 2005). One discrepancy in the case example and the published GAC and UMHS guidelines is with the followup appointment. Published guidelines suggest that no followup visit is necessary if symptoms resolve in 3 days and that a urine culture is only indicated when symptoms persists or do not subside within 3 days (GAC, 2003; UMHS, 1999).

Women ages 18 to 64, and particularly those on the younger end of that spectrum, have a unique risk of experiencing decreased oral contraceptive efficacy (if applicable) when simultaneously taking an antibiotic. Caution is advised as the antibiotic competes for sites with the oral contraceptive, thereby decreasing its efficacy. In the case example, a potential interaction between Mircette and Bactrim DS may occur. EBP guidelines suggest use of an alternative antibiotic such as a tetracycline drug or ampicillin (enterohepatic recirculation altered) (Epocrates, 2004). Thus, for the patient in this case study, an alternate antibiotic regime may have been warranted.

Interventions and EBP Research

Use of a SOAP (subjective, objective, assessment, plan) format for documentation aids in making an accurate diagnosis. In adult females, the diagnosis of UTI is made primarily by history; in combination with dysuria and urinary frequency (and in the

absence of vaginitis), the diagnosis is accurate 80% of the time (UMHS, 1999). Some research supports over the phone management to diagnose and treat UTIs in this population (NGC, 2000). If over the phone management is employed, it is vital that the nurse elicit subjective data (dysuria, urgency, frequency, nocturia) as well as personal habits (scented products, hygiene, fluid intake), sexual history (frequency, number of partners, use of latex or spermicides), obstetric and gynecologic history (last menstrual period, symptoms of atrophic changes), and medication history (anticholinergics, psychotropics, immunosuppressives) (Delzell & Fitzsimmons, 2005). The objective examination in the case example is within normal limits, which is also a consistent finding typical of a UTI diagnosis, and supported by EBP literature (Epocrates, 2004; Uphold & Graham, 2003).

Adjunct measures to antibiotic treatment regimens have the lowest level of EBP to support usage and represent the largest gap in the research. No RCTs have examined treatment outcomes for increasing hydration, urination after intercourse, cotton underwear, condom use, douching, or delayed voiding (Hooten, 2000; UMHS, 1999). Maintaining an adequate fluid intake (average daily intake) is effective in preventing recurrent UTIs only (Gray & Krissovich, 2003). Particular controversy exists with Vaccinium macrocarpon (cranberry juice) for treatment or prevention of UTIs. Lower-level evidence suggests that cranberry juice may inhibit bacterial adherence to the bladder epithelium, thereby reducing the new incidence of UTIs (Gray, 2002; Griffiths, 2003; Lavender, 2000). However, there is insufficient evidence to recommend advising cranberry juice for treatment of UTIs (Griffiths, 2003; Jepson, Mihaljevic, & Craig 2003). While this information points to lacking evidence sufficient to support higher levels of evidence, the benefits and risks by the provider

must be weighed. If the adjunct treatment measures are not harmful to the patient, do not pose an imposition or high cost, and could be beneficial, then they may be included in the education provided to the patient with a UTI. Adjunct interventions should continue to be offered to the patient, in addition to the antibiotic regimen, and may prove more pertinent in recurrent cases.

Conclusion

The provider must make the final decision and be able to rationalize and support his or her actions with research. Perhaps an explanation for the lack of EBP application is a lack of knowledge and application to the practice setting. The rate of nonadherence to recommended protocols is relatively high; for example, the recommended Bactrim DS 3-day regimen has a 91.33% nonadherence rate, thus suggesting a need for remediation and education (Kahan, Chinitz, & Kahan, 2004). To continue to validate and refine practice, documentation and participation in research is essential. Participation, whether in the form of direct research, or simply keeping abreast with new and developing EBP guidelines remains the responsibility of all health care providers. ■

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