How to avoid infections in Ramadan, especially urinary tract infections

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Abstract

Prolonged and poor control of diabetes has detrimental effects on the immune system by reducing both B and T cell function, causing neutrophilic dysfunction and less production of inflammatory cytokines. This makes people with diabetes vulnerable to various bacterial, viral and fungal infections in all body organs. The commonest cause of chronic renal disease is uncontrolled diabetes, placing patients, particularly women, at high risk for recurrent and complicated urinary tract infections. Diabetic patients who opt to fast during Ramadan must be clearly counseled about keeping themselves hydrated between non-fasting hours and maintaining good glycaemic control through diet and antidiabetic drugs.

Keywords: Diabetes and infections, Kidney infections in diabetes, Ramadan, Diabetes and immune function, urinary infection in Ramadan.

Introduction

Urinary tract infection (UTI) is defined as significant numbers of bacteria in the urine in the setting of symptoms of cystitis or pyelonephritis. UTI is an important health problem for the individual as it can affect quality of life and also have the potential to cause renal damage if not treated properly. Patients with poorly controlled diabetes are at higher risk than non diabetics for getting recurrent or complicated UTIs.[1]

Epidemiology

Uncomplicated urinary tract infections are common in females, and thirty times more so than in males. Studies show that at least 25-40% of adult women experience an episode of UTI at some point in their lifetime. UTI in adult males younger than 50 years is rare, except if there are anatomical or structural abnormalities like stones. In men older than 60 years, the incidence of UTI increases due to prostate enlargement and equals the incidence in women.[1]

Pathophysiology of infections in people with diabetes

The prolonged effect of hyperglycaemia in people with diabetes has a deleterious effect on the immune system by causing reduced T cell responses, neutrophil dysfunction, and disorders of humoral immunity that is mediated through the complement system. Under healthy conditions macrophages and neutrophils cause opsonization and phagocytosis and ultimately lyse microorganisms. Decreased mobilization of neutrophils, chemotaxis and phagocytic activity occurs in a hyperglycaemia milieu. In addition, cells damaged by diabetes produce less inflammatory cytokines, particularly interleukins IL-1, IL-6 and IL-10. Consequently, diabetes increases susceptibility to infections in all body tissues.[2,3]

Infections in people with diabetes

Long-standing and poorly controlled diabetes places a person at high risk for systemic infections. Concurrent vascular disease and neuropathy further aggravate and predispose to infections. Hypoaesthesia in the feet frequently causes trauma to the soft tissue, resulting in infection. Commonly seen infections are those of the urinary tract, skin and soft tissues particularly the devastating effects of necrotizing fasciitis;[4] rising incidence of concomitant tuberculosis and diabetes have recently caught world attention;[5] infection of the foot can be limb threatening. Infections specifically seen only in poorly controlled diabetics are malignant otitis externa - a devastating and painful condition that frequently involves cranial nerves, and rhinocerebral mucormycosis with diabetic ketoacidosis, which leads to high fatality due to intracranial spread of the fungus. Oral and vaginal thrush due to candida is common, and although not life threatening, can be a problematic symptom. People with diabetes are also prone to most other lung infections that affect non diabetics, such as bacterial pneumonia and viral influenza, and may result in poor outcomes.[6,7]

Urinary tract infections and diabetes

The normal and healthy urinary tract is resistant to colonization by bacteria, and it efficiently and rapidly clears pathogenic and nonpathogenic microorganisms that gain access to the bladder through the urethra. This is achieved by the presence of several innate lower urinary tract antibacterial defense mechanisms. Uroepithelial and other cells produce cytokines and other proinflammatory factors from the mucosal site, which attract polymorphonuclear leukocytes, resulting in pyuria, and thus contributing to the eradication of bacteriuria.[8] The

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Common Infections in Diabetes

Urinary Tract	Gastrointestinal and Liver	Skin and soft tissue	Head and Neck	O Ther
Cystitis	Oral candidiasis	Foot infection	Malignant otitis	HIV
Pyelonephritis	Emphysematous cholecystitis	Necrotizing fasciitis	Rhinocerebral mucormycosis	
Perinephric abscess	Hepatitis B, C	Fournier's gangrene		
Intrarenal abscess	Enteroviruses			
Papillary necrosis				
Emphysematous pyelonephritis				
Aymptomatic bacteriuria				

flushing mechanism of the bladder exerts a major protective effect as well.

UTIs occur as a result of the interaction of bacterial virulence and host biologic and behavioural factors.[9] Urine is a good culture medium for most bacteria especially coliform microorganisms, and under circumstances of high glucose content, high pH and osmolality, outflow obstruction, or analgesic abuse, bacteria colonize and predispose to chronicity by virtue of impaired opsonization and decreased chemotactic activity of granulocytes and monocytes.

Women have a biologic tendency to UTI. Bacterial adherence and colonization of the vaginal introitus and periurethral region by coliforms is critical to the pathogenesis of UTIs. The presence of glucose makes urine an ideal culture medium. Women with diabetes have an increased frequency of asymptomatic bacteriuria as well as symptomatic disease. Diabetic persons also have a higher incidence of severe infection including severe pyelonephritis, and less common but more serious complications such as emphysematous pyelonephritis and perinephric abscess. Papillary necrosis is a severe complication of chronic pyelonephritis usually seen in diabetes. Necrotic renal papillae may slough off and cause ureteral obstruction. Intrarenal abscess may result from bacteraemia or as a complication of severe pyelonephritis. Perinephric abscesses form when bacteria from the renal parenchyma or blood accumulate in the soft tissues around the kidneys. Bilateral disease may progress rapidly to renal failure.[1]

At least 10% of men and 20% of women older than 65 years have asymptomatic bacteriuria, but this does not have a detrimental effect on the kidneys and is not an indication for treatment, except during pregnancy or preoperative prophylaxis for invasive urologic surgery. Women with diabetes, but not men, have been found to have a higher prevalence of asymptomatic bacteriuria than nondiabetic patients, but do not warrant routine screening or treatment.[1]

The symptoms of UTI in adults are easily recognizable. The lower tract symptoms resulting from bacteria produce irritation of urethral and vesical mucosa, causing frequent and painful urination with turbid urine. There is suprapubic pain or fullness, but no fever in cystitis. In upper UTI that involves the kidney parenchyma, the onset is usually acute with fever and chills, flank pain and often suprapubic discomfort and frequency of urination. Older men may have symptoms of prostatism, i.e. urinary hesitancy, frequency and nocturia along with fever.

Women with poorly controlled diabetes frequently get vulvovaginal candidiasis, which can be extremely vexing because of pruritis. There may be little or no discharge, dysuria or dyspareunia. Shallow, linear ulcerations may be present on the vulva. Treatment with topical antifungals may suffice in mild cases, however in moderate to severe cases a single dose of oral fluconazole 150 mg is likely to eradicate the yeast infection.[10] Control of blood glucose is essential to prevent recurrence.

The diagnosis of UTI rests on optimal midstream clean catch collection of the urine specimen. Significant pyuria is the hallmark and nitrite is usually positive, indicating nitrate reducing bacteria- usually E.coli or Proteus. These findings, along with high bacterial count on urine culture, i.e. > 10^5 colony count, are diagnostic of UTI.

Treatment of UTI depends upon the infecting organism. Selection of antibiotic should be based on urine culture and sensitivity. While treating acute or chronic pyelonephritis the currently high prevalence of drug resistant bacteria should be borne in mind, and a broad spectrum antibiotic prescribed. After culture and sensitivity result becomes available, the antibiotic should be de-escalated accordingly to a narrower spectrum antibiotic. Depending upon susceptibility pattern, an oral antibiotic may be selected, such as cotrimoxazole, fosfomycin, ciprofloxacin, or nitrofurantoin. In cases of recurrent UTI, prophylaxis with 50-100mg nitrofurantoin should be given daily for several weeks to months. Urine cultures must be done periodically to check for change in

flora or susceptibility.

Post menopausal women with recurrent UTIs may benefit from intravaginal estrogen cream applied for several days in a month, as it reduces the vaginal pH and increases colonization with lactobacilli and decreases colonization with enterobacteriacae. Some reports have shown reduction in episodes of UTI recurrence with cranberry juice. However there is no conclusive scientific evidence of its actual benefit, nor the quantity or duration to be used. Other remedies such as sodium bicarbonate, citrate, etc are popularly used, but there is no scientific data about actual benefits.

UTI in Ramadan

Physicians hold responsibility for advising patients regarding fasting and care of diabetes.[11] Group discussions are preferable, as patients can share experiences, but tailor-made regimens should be made available to those with mild, moderate or poorly controlled glucose. The only contention between UTI in the holy month of Ramadan and other months is, of course, abstinence of food and drink during fasting hours from dawn to dusk, which, especially in hot and dry weather, can lead to dehydration.

There are two areas of emphasis: hydration and diabetes control. Intake of fluids is necessary for the flushing effect, which clears the bladder of debris and prevents stagnation and colonization of bacteria to a great extent. Prolonged dehydration may further compromise renal function. It is advisable, therefore, to consume plenty of non-sweetened fluid between the time of iftar and suhur. This is even more important in the person with diabetes who has had previous episodes of UTI, since high glucose content in the bladder foments infection and can aggravate pre existing pyelonephritis and consequently worsen renal function.

Reasonable control of blood glucose is critical for prevention of infection not only in the urinary tract, but also in other body organs. A poorly controlled diabetic with recurrent UTIs and renal dysfunction should be persuaded to abstain from fasting. However, the physician must yield to patient preference and should counsel the patient about impending symptoms of UTI during the fast. Fever and urinary symptoms should be diagnosed and treated promptly. Comprehensive advice about avoidance of hypo or hyperglycaemic episodes and achieving desired blood glucose levels must be clearly given. Sugared food and drinks must be avoided. Counseling about oral antidiabetic drugs or insulin usage should be clearly defined for the fasting person with diabetes. Dietary advice should be obtained through a professional counselor.

Diabetes is recognized to be the leading cause of end stage renal disease globally. Infection of the kidney will no doubt hasten the process. Prevention of diabetes and kidney infection is of paramount importance towards preserving kidney function.[9]

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