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Asymptomatic Bacteriuria –a Hidden Cause of Renal Insufficiency

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ABSRACT

Asymptomatic bacteriuria is a bacterial urinary tract infection (UTI) that occurs without any of the usual symptoms. Repeated urinary tract infections may be associated with renal insufficiency and increased mortality in adults[1]. Asymptomatic bacteriuria may precede symptomatic urinary tract infection[2]. Urinary tract infection may be associated with renal insufficiency and increased mortality in adults, but these complications rarely occur among those without underlying structural and functional diseases of the urinary tract[1]. The risk of acquiring bacteriuria varies with age and sex. Bacteriuria occurs in 2-7% of pregnant women; of those who are not bacteriuric at initial screening, 1-2% will develop bacteriuria later in the pregnancy[13-15]. In children, asymptomatic bacteriuria may be a sign of underlying urinary tract abnormalities. Children with major structural abnormalities, chronic pyelonephritis, or severe vesicoureteral reflux are at increased risk of renal scarring, obstructive renal atrophy, hypertension, and renal insufficiency[1]. In pregnancy, 13-27% of untreated women with asymptomatic bacteriuria develop pyelonephritis, usually requiring hospitalization for treatment[22-25]. Individuals in high-risk groups have a significant risk of progressing to a true kidney infection if the bacteriuria is not treated. Asymptomatic bacteriuria eventually progresses to a full-blown UTI with the usual symptoms, in some individuals. Asymptomatic bacteriuria can be prevented by drinking several glasses of water each day and drinking juices or medications that acidify the urine. The prevalence of bacteriuria, whether symptomatic or asymptomatic, is not well documented in Nigeria and a high index of suspicion is advised.

INTRODUCTION

Asymptomatic bacteriuria is a bacterial urinary tract infection (UTI) that occurs without any of the usual symptoms. Microbiologically significant bacteriuria is said to be present if a properly collected clean-catch mid-stream urine sample on culture yields $=10^5$ bacterial organisms/mL. The post-centrifugation sediment of the urine sample should, on microscopy, contain >10WBCs per HPF. Repeated urinary tract infections may be associated with renal insufficiency and increased mortality in adults[1].

Asymptomatic bacteriuria may precede symptomatic urinary tract infection[2]. In my experience too, it may follow inadequately treated UTI. Urinary tract infection may be associated with renal insufficiency and increased mortality in adults, but these complications rarely occur among those without underlying structural and functional diseases of the urinary tract[1]. In the USA urinary tract infection is the most common cause of bacterimia in the elderly, which may be associated with a 10-30% case fatality rate[3, 4]. Most of such bacterimia occurs in those patients with indwelling catheters or urinary tract abnormalities[2].

The prevalence of bacteriuria, whether symptomatic or asymptomatic, is not well documented in Nigeria. In fact many clinics and hospitals do not go beyond routine urine examination even when patients complain of symptoms of urinary tract infection. Personal observations of a good number of doctors and healthcare givers showed that they do not even bother to order routine urine tests even when patients have symptoms of UTI. Experience spanning more than 30 years in the Hypertension Clinic of the Lagos University Teaching Hospital showed that one

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of the causes of inadequate control of hypertension was asymptomatic bacteriuria. Whenever a previously controlled hypertensive patient (whose compliance with medications and lifestyle modifications was not in doubt) was seen in the clinic and the blood pressure was uncontrolled, examination of the urine by microscopy and culture usually revealed significant bacteriuria despite the absence of symptoms. In some cases it was possible to elicit the history of a recent fever, which had been treated with antipyretics or antimalarials.

The purpose of this article is to remind all doctors and healthcare givers to be on the lookout for cases of asymptomatic bacteriuria, which if untreated or inadequately treated may result in, chronically scarred kidneys and renal insufficiency.

Age and Sex Distribution

The risk of acquiring bacteriuria varies with age and sex. Asymptomatic bacteriuria in term infants is more common in males (estimated prevalence of 2.0-2.9% vs. 0.0-1.0% in females), but it is considerably more common in girls after age 1 (0.7-2.7% in girls vs. 0.0-0.4% in boys)[1, 5, 6, 7, 8, 9]. Approximately 5-6% of girls have at least one episode of bacteriuria between first grade and their graduation from high school, and as many as 80% of these children experience recurrent infections[1]. Asymptomatic bacteriuria in adulthood is more prevalent in women than men (3-5% vs. <1% in those under 60 years), and its prevalence increases with age[10, 11, 12]. Asymptomatic bacteriuria is a common finding in older persons, especially those who are very old (20% of women and 10% of men >80 years old living in the community) or institutionalized (30-50% of women and 20-30% of men)[3, 4]. Bacteriuria occurs in 2-7% of pregnant women; of those who are not bacteriuric at initial screening, 1-2% will develop bacteriuria later in the pregnancy [13, 14, 15]. An increased prevalence of asymptomatic bacteriuria (about 10-20%) has been reported in asymptomatic diabetic women, although several studies have found no increase when compared to matched non-diabetic controls or to expected age- and sex-specific population rates [11, 16, 17 ,18 19].

Predisposing Factors

In children, asymptomatic bacteriuria may be a sign of underlying urinary tract abnormalities. About 10-35% of infants and children with asymptomatic bacteriuria have vesicoureteral reflux and 6-37% have renal scarring or other abnormalities (the lower prevalence generally reflecting more stringent definitions of abnormality)[1, 5, 6, 7, 8], whereas such abnormalities are uncommon in the general population of children [1, 20]. Children with major structural abnormalities, chronic pyelonephritis, or severe vesicoureteral reflux are at increased risk of renal scarring, obstructive renal atrophy, hypertension, and renal insufficiency[1]. Pyelonephritis, reflux nephropathy, and urinary tract malformations may cause as much as one fifth of cases of renal failure in children [21]. In pregnancy, 13-27% of untreated women with asymptomatic bacteriuria develop pyelonephritis, usually requiring hospitalization for treatment[22, 23, 24, 25]. Bacteriuria in pregnant women increases the risk for preterm delivery and low birth weight about 1.5-2-fold, and may also increase the risk of foetal and perinatal mortality[26, 27, 28, 29, 30, 31, 32, 33]. In adults the major risk factors are diabetes, renal stones and in-dwelling catheters.

Symptoms

Usually there is none. But a careful history may reveal that the patient may have developed fever, have difficulty emptying the bladder, feel pain with urination, or have flank or back pain. In particular one should look out for urgency, pant-wetting or bed-wetting in the elderly. The usual history is that 2 weeks ago "I had a fever and after taking antipyretic and antimalarials I felt better. But the fever relapsed a couple of days ago".

Diagnosis

High index of suspicion is essential for diagnosis. Prompt examination of mid-stream urine (MSU) collected in a manner to prevent contamination by hands, penis, prepuce, vulva or specimen bottle should be carried out in a competent laboratory. The urine sample should contain >10WBCs per HPF and culture should yield $=10^5$ bacteria per mL urine, which is regarded as significant bacteriuria.

Complications

Individuals in high-risk groups have a significant risk of progressing to a true kidney infection if the bacteriuria is not treated. In certain cases, such as renal transplant recipients, kidney infection may lead to loss of kidney function. Repeated episodes of UTI may result in chronic pyelonephritic scarring of the kidneys and end-stage renal disease.

Treatment

If asymptomatic bacteriuria is found prior to a urological procedure, it should be treated to prevent complications of the procedure. Appropriate use of antibacterials to which the organisms are sensitive is the key to successful drug treatment. Adjuvant treatment involving lifestyle modifications will also contribute to successful outcome. Liberal intake of water, measures to acidify the urine and good pelvic hygiene should be advised. Those with diabetes should ensure it is under good control. Pregnant women, children with vesicoureteral reflux, people with infected kidney stones and renal transplant recipients appear to be more likely to benefit from treatment with antibiotics. Surgical correction of the abnormality of urinary tract may be required in those with recurrent UTI. A Cochrane Systematic Review showed that the outcome of pregnancy is not significantly different in those patients treated with single dose of antibiotics when compared with those treated with antibiotics for seven days[34].

Prognosis

Asymptomatic bacteriuria eventually progresses to a full-blown UTI with the usual symptoms, in some individuals. In others, asymptomatic bacteriuria can continue for years without causing obvious illness or discomfort. Most individuals with asymptomatic bacteriuria who do not have risk factors for complications do extremely well and do not have any increased rates of symptomatic infections or decrease in kidney function. The prognosis for treatment in the high-risk group category is good if infection is detected early, but much depends on the underlying conditions or associated illness of the individual. Randomized controlled trials and cohort studies have shown that the detection and treatment of asymptomatic bacteriuria can decrease the occurrence of acute pyelonephritis later in pregnancy and decrease the occurrence of intrauterine growth retardation[35].

Prevention

Asymptomatic bacteriuria can be prevented by drinking several glasses of water including juices or medications that acidify the urine. This measure will discourage the growth of bacteria and flush out the urinary tract. To prevent the spread of intestinal bacteria from the rectum to the urinary tract, females should always use soap and water and wipe toilet tissue from front to back after having a bowel movement.

CONCLUSION

Asymptomatic bacteriuria may precede symptomatic urinary tract infection. Repeated urinary tract infections may be associated with renal insufficiency and increased mortality in adults. The prevalence of bacteriuria, whether symptomatic or asymptomatic, is not well documented in Nigeria and a high index of suspicion is advised.

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