

# Asymptomatic bacteriuria

## *La batteriuria asintomatica*

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Asymptomatic bacteriuria is defined as an urinary tract infection in which bacteria are present in the urine (the same pathogen must be isolated in two consecutive urine cultures: a number of colony-forming units of urinary tract pathogens per milliliter  $\geq 100.000$  is required,  $\geq 50.000$  if the specimen has been collected by catheter) but the bacteria are not causing general or local symptoms of urinary infection. In children, the presence of pyuria is not generally taken into consideration for the definition, since it can be influenced by the criteria for specimen preparation (centrifugation, staining) and by quantifying methods as well as by the definition criteria applied to the finding<sup>1</sup>.

Gram-negative bacteria are the most frequent pathogens and *Escherichia Coli* accounts for 70-80% of cases. Other pathogens are *S. aureus* and *S. saprophyticus*, group B and D *Streptococci*. Coagulase Negative Staphylococci,  $\alpha$  *Streptococci*, *Lactobacilli*, *Difteroides* and a mixed Gram-positive flora are not considered pathogens.

The prevalence of asymptomatic bacteriuria in childhood is influenced by the age and the sex of the patient. The overall incidence of bacteriuria in newborns and children has been reported as 0.6% to 2.5%. The male-to-female ratio is opposite to what observed in older children, with boys outnumbering girls 2.8:1 to 5.4:1<sup>2,3</sup>. During preschool age the sex ratio ranges between 0.8% of girls and 0.2% of boys, while during school age, the sex ratio is different, ranging from 1-2% of girls to 0.04% of boys.

Recently, 796 sexually active, nonpregnant women between 18 and 40 years of age, over a period of six months, have been evaluated for the occurrence of asymptomatic bacteriuria. The prevalence of asymptomatic bacteriuria was 5 percent and it was associated with the same risk factors as for symptomatic urinary tract infection, in particular, the use of diaphragm plus

spermicide and sexual intercourse. Thus, it was concluded that asymptomatic bacteriuria in young women is a strong predictor of subsequent symptomatic urinary tract infection<sup>4</sup>.

Bacteriuria was observed in schoolgirls (1-2%) and in sexually active young women (2-5%). Higher percentages were observed in selected patients, such as subjects with permanent urinary catheter (100%), with intermittent catheterization (50%) and in old institutionalized patients (15-50%)<sup>2</sup>.

Moreover, in pregnant women, asymptomatic bacteriuria is a common finding and may lead to pyelonephritis (30%) and preterm labor. These events may be prevented by an adequate antibiotic treatment. In fact antibiotic treatment, compared to placebo or to no treatment, was effective in clearing asymptomatic bacteriuria. The incidence of pyelonephritis was also reduced. Finally, antibiotic treatment was associated with a reduction in the incidence of preterm delivery or low-birth-weight babies<sup>5</sup>.

Comparative studies of asymptomatic bacteriuria and urinary tract infection in infants under 1 year of age, reveal differences in the 2 populations.

In infants with asymptomatic bacteriuria only mild vesicoureteric reflux was observed, occurring in 11% of patients. Recurrences developed in 13% of children; however, pyelonephritis was observed only in 4% of cases.

36% of infants with urinary tract infection had vesicoureteric reflux, including high grade cases; recurrences developed in 35% of children, mainly due to pyelonephritis<sup>2,6</sup>.

Consequently, infants with asymptomatic bacteriuria represent a low risk group with a tendency to spontaneous resolution, usually within few weeks-months.

In school-age children, found with bacteriuria on screening programs, vesicoureteric reflux was observed in 19-35% and renal scars in 10-26% of cases. However, many of them had previous urinary tract infections and others had overlooked or misdiagnosed infections<sup>2</sup>.

Follow-up by the Cardiff-Oxford Bacteriuria Study Group revealed that schoolchildren who initially had a radiographi-

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cally normal urinary tract, remained normal despite persistent asymptomatic bacteriuria. Conversely, only children with previous renal scarring developed new scars, and all of them had vesico-ureteric reflux<sup>2</sup>.

Epidemiologic studies revealed that, in asymptomatic bacteriuria, only 14-18% of *E. coli* are P-fimbriated, compared with 76-94% of pyelonephritogenic strains<sup>7</sup>. Thus asymptomatic bacteriuria is associated with low-virulence bacterial strains lacking the ability to adhere and to cause damage. Moreover, these bacteria may be commensal with the host and even protect against infection of more virulent strains<sup>8</sup>. These bacteria should not be treated, even in presence of renal scarring, especially in older girls. In fact the risk of developing renal damage as a result of asymptomatic bacteriuria in schoolgirls with a normal urinary tract seems to be small. It is also suggested that, for the majority of these patients, therapy is not necessary. Conversely, in patients who underwent antibiotic treatment, the presence of more virulent strains could be observed<sup>8</sup>.

In asymptomatic bacteriuria, just like in urinary tract infection, it is important to investigate a family history of urinary tract infections, the presence of fecaloma, constipation, encopresis, phimosis, urethral stenosis in boys, vaginal irritation in girls, enuresis and voiding dysfunction<sup>2,9</sup>.

Children with voiding disorders, including infrequent voiding and bladder instability, are not truly asymptomatic. They should not actually be considered in this chapter. Thus, these patients should receive a combined treatment of voiding disorders and bacteriuria, even for long periods, in association with a prolonged antibiotic prophylaxis (oral cephalosporins, such as cefaclor and cefixime, are effective and safe, even at the renal level)<sup>10-15</sup>. There are interesting data on prevention of bacteriuria with the administration of *Lactobacillus GG*<sup>15</sup> and cranberry juice/products<sup>16</sup>, although further data are required. It is equally important to identify children presenting with fever and a concomitant, though unrelated, bacteriuria: in this case, the presence of pyuria (> 10 white blood cells mm<sup>3</sup>) may be helpful<sup>1</sup>.

It is important to discuss the critical molecular events that determine whether the host response will be activated by P-fimbriated uropathogenic *E. coli* as well as factors determining whether the patient develops acute pyelonephritis or asymptomatic bacteriuria. A molecular and genetic explanation for disease susceptibility in some patients with UTI could be suggested. Finally, further studies are required to optimize new therapeutic strategies such as vaccination and colonization with non virulent strains<sup>17</sup>.

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