

## CLINICAL INVESTIGATION ON THE SIGNIFICANCE OF BACTERIURIA IN MOTHER FOR DEVELOPMENT OF URINARY TRACT INFECTION IN NEWBORN

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*ABSTRACT* - Newborns at risk for early renal impairment were selected after a screening of 1200 neonates. We investigated intrapartum transmission of uropathogenic bacteria from mother to a predisposed child. The most common pathogens of urinary tract infections (UTI) and significant asymptomatic bacteriuria (SAB) in the perinatal period, the origin (maternal foci) and the route of neonatal infection were documented. Two groups of newborns with their mothers were included. The first had UTI (N=54) and the second had SAB (N=52). Urine and stool cultures of the newborns and their mothers were analyzed. Bacterial transmission from mother was documented in 90.7% of newborns with UTI. The most common agent found in that group was uropathogenic *E. coli* (59.3%). It originated mostly from maternal urine (53.7%), stool (33.3%) and blood (7.5%). Neonatal infection was acquired by a direct contact with maternal excretions and followed by ascension through urinary tract in 61.1% of cases, by swallowing them in 22.2%, and in 7.5% of children the bacteria were transmitted via blood. Uropathogenic *E. coli* was found in 48% of the newborns with SAB. Bacterial transmission from mother was documented in 73.1% of newborns. The bacteria originated from maternal urine and stool with equal frequency (42.3%, each). Neonatal infection was acquired by a direct contact with maternal excretions and ascension in 55%, and by swallowing them in 23.1% of cases. Maternal bacteriuria should be adequately cured, thus preventing bacterial transmission into newborn and early renal damage in a prone child.

**Key words:** bacteriuria in pregnancy, route of urinary tract infection, significant asymptomatic neonatal bacteriuria, origin of infection

### INTRODUCTION

Next to respiratory, urinary tract infections are the most common infections in childhood. They can ensue even perinatally in predisposed children. Symptoms of UTI in that period are not specific and can be overlooked easily. Sometimes only the first attack of infection presents with symptoms, while the others remain asymptomatic or oligosymptomatic (1). If the first infection

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passed unrecognized, even the most serious urinary tract anomalies could be overlooked.

Unrecognized or uncured UTI is the cause of 27% of cases of chronic renal failure in children, while 16% of CRF result from obstructive uropathy (2,3). Perinatal UTI is sometimes difficult to diagnose, therefore it seems reasonable to prevent it by screening pregnant women for UTI, and by its eradication. Thus one also delays the first attack of infection in a predisposed child for a later period when it presents with more symptoms.

## SCOPE

The aim of the study was to document that uncured bacteriuria in the mother can cause UTI or SAB in a predisposed child. The most common causative agents, the origin of the infection, and the route of intrapartal bacterial transmission were investigated.

## PATIENTS AND METHODS

The two groups of newborns were recruited after a screening of 1200 newborns at NICU for UTI and SAB. The selective criteria for both groups were three positive separately taken urine cultures (10,000 and more Gram positive or 100,000 or more Gram negative bacteria per 1 mL of urine). With respect to laboratory findings (at least one of the following: leukocytosis of more than  $30 \times 10^9$  white blood cells/L, leucopenia with less than  $8 \times 10^9$ /L, raised proportion of nonsegmented granulocytes - 5% and more, toxic neutrophilic granulations, raised CRP value - more than 20 g/L) (4,5,6) the newborns were selected into the first group with UTI (54 newborns). If laboratory findings were negative and bacteriuria was still documented in the fourth month of life, the newborn dropped into the second group with SAB (52 newborns). Asymptomatic bacteriuria was found in 212 neonates after birth, but disappeared in 160 of them during the first months of life.

In all newborns urine cultures were taken on the second day of life after morning bath. If the culture was positive, two additional urine cultures were taken. Thus the specificity of the procedure increased, as the data from literature suggest (7). In the newborns with all three positive urine cultures, urinalysis, CBC and CRP were determined. Biochemical analyses were performed using standard biochemical procedures. Stool cultures were analyzed in newborns of the both groups. In mothers of the newborns from both groups urine and stool cultures were taken. These specimens were taken in the first week after delivery. Clean - voided urine specimens were taken from the first morning voiding. Positive blood cultures findings were taken from the records during pregnancy. Urine and stool cultures were analyzed using standard microbiological procedures. The type of *E. coli* was determined by latex agglutination of antibodies for types O, D, E, F and R, and for serotypes.

