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Assessment of urinary tract infection in children admitted to a tertiary care centre of Bihar

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Abstract
Many risk factors are responsible for initial urinary tract infection and recurrent urinary tract infection. Hence, based on the literature findings, the present study was planned to assess clinical profile and risk factors which are associated with urinary tract infection in children.

75 children presenting in Out-Patient Department (OPD) and in-patient department (IPD) in Darbhanga Medical college and Hospital, Laheriasarai From Oct 2012 to Nov 2013 and found positive for urinary tract infections were included in this study. The patients were all children aged 1 year to 12 years with a history of fever, clinical symptoms of UTI and with positive urine culture with significant colony count.

Children with urinary tract infections usually present with nonspecific symptoms and signs and hence a urine analysis and culture should always be part of an initial diagnostic evaluation of urinary tract infections. The morbidity and mortality due to UTI still remains considerably high despite the advent of numerous effective antimicrobial agents. Besides this, early initiation of treatment prevents most complications of UTI, so the importance of early diagnosis cannot be overemphasized.

Keywords: UTI, febrile, infection, children

Introduction

A urinary tract infection (UTI) is an infection from microbes. These are organisms that are too small to be seen without a microscope. Most UTIs are caused by bacteria, but some are caused by fungi and in rare cases by viruses. UTIs are among the most common infections in humans.

A UTI can happen anywhere in the urinary tract. The urinary tract is made up of kidneys, ureters, bladder, and urethra. Most UTIs only involve the urethra and bladder, in the lower tract. However, UTIs can involve the ureters and kidneys, in the upper tract. Although upper tract UTIs are more rare than lower tract UTIs, they're also usually more severe.

Urinary tract infections typically occur when bacteria enter the urethra and migrate to the bladder and kidneys. While the immune system can usually neutralize these microbes, there are conditions by which they can take hold and multiply into a full-blown infection.

The most common cause of UTIs is the transfer of bacteria from the rectum or vagina to the urethra. Around 80 percent are caused by *E. coli* bacteria commonly found in the gut or feces. Others, like *Staphylococcus saprophyticus*, are naturally found in the vagina and can be transferred to the urethra during sexual intercourse.

Those who have had a UTI before usually know when they have had a recurrence. However, evaluation by a doctor is necessary before starting treatment to ensure a definitive diagnosis [1].

In addition to reviewing the symptoms, a physician can use a number of common diagnostic tests or procedures to confirm a UTI:

- A urinalysis can check for blood, pus, glucose, and other abnormalities in the urine.
- A urine culture can be used to identify the bacterial strain in urine.
- Magnetic resonance imaging (MRI) or computed tomography (CT)scans may be used to detect abnormalities in the urinary tract.
- A cystoscope, a long flexible viewing device, can be inserted into the urethra to get an up-close view of the bladder.

Additional test may be performed to see whether there may be other explanations for the symptoms, including a yeast infection, interstitial cystitis, or a sexually transmitted disease like gonorrhea or chlamydia(especially in young men).Urinary tract infections (UTIs) are relatively common in children, particularly young children. Girls are more likely than boys to develop a UTI, except in the first 12 months of life, when boys seem to be more susceptible. The most common organisms that infect the urine are bacteria that normally live in the bowel. Maintenance of proper hygiene and wiping a child's bottom from the front to the back (rather than from back to front) can help prevent carrying bacteria from the bowel to the urinary tract [2].

UTIs, especially ones that recur, can also be caused by child's bladder not emptying properly or sometimes by structural problems of the kidneys or bladder.

Empiric antibiotics should be started in:

- Children with specific urinary symptoms, e.g. painful and frequent urination
- Children aged > 3 months to < 3 years with non-specific symptoms that may be suggestive of UTI, e.g. fever, lethargy, abdominal pain
- Children aged > 3 years with urine dipstick positive for nitrites
- Children aged > 3 years with urine dipstick positive for leukocytes only, and urinary symptoms

Antibiotics for UTI should not be started in children aged > 3 years, with dipstick negative for nitrites and no specific urinary symptoms, until the results of urine culture and microscopy are available. Laboratory culture results are quantitative and organism counts of <100 x 10^6/L are not significant unless urinary symptoms are present. Asymptomatic bacteriuria in infants and children should not be treated with antibiotics [3].

A review of treatment is recommended at 48 hours, when the culture results are available and the child's response to treatment can be assessed. If the child's symptoms have not improved, the initial diagnosis and antibiotic choice may need to be reviewed. When the result of the urinary culture indicate a resistant strain of bacteria, but the child's condition is improving, the antibiotic course can be continued and a "test of cure" urine culture requested once the course is completed. If the child's condition is not improving, change the antibiotic and consider discussion with, or referral to, a paediatrician. Where symptoms have improved and culture indicates an appropriate antibiotic has been given, test for cure is not necessary [4].

The previous reported data suggesting that preventive antibiotics decrease urinary tract infections in children is questionable. However recurrent UTIs are a rare cause of further kidney problems if there are no underlying abnormalities of the kidneys, resulting in less than a third of a percent (0.33%) of chronic kidney disease in adults. Many risk factors are responsible for initial urinary tract infection and recurrent urinary tract infection. Hence based on the literature findings, present study was planned to assess clinical profile and risk factors which are associated with urinary tract infection in children.

Methodology

75 children presenting in Out-Patient Department (OPD) and in-patient department (IPD) in Darbhanga Medical College and Hospital, Laheriasarai from Oct 2012 to Nov 2013 and found positive for urinary tract infections and willing to participate were included in this study. The patients were all children aged 1 year to 12 years with a history of fever, clinical symptoms of UTI and with positive urine culture with significant colony count.

The approval of the institutional ethical committee was taken prior to conduct of the study. All the patients were informed and consent was taken. The aim and the objective of the study were conveyed to patients as well as their parents.

The inclusion criteria are patients positive for UTI and patients found with positive urine culture with significant colony count. The exclusion criteria include the patients with polyuria and children with positive urine cultures with suspected contamination.

Patients were then interviewed using structured questionnaire for urinary tract infection. Urine samples of all symptomatic children were sent for urine routine microscopy and for urine culture. Data was statistically analysed.

Result & Discussion

The data from the 75 children's of age 1 to 12 years diagnosed with symptoms of the urinary tract infections were collected and is presented as below.

Table 1: Age & Sex of the patients

Age	Number of Cases	Percentage
1 – 4 years	21	28
4 – 8 years	36	48
8 -12 years	18	24
Total	75	100%
Sex		
Girl	57	76
Boys	18	24
Total	75	100%

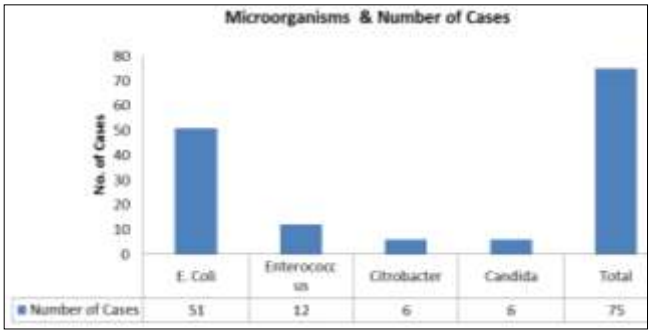

Fig 2: Microorganisms isolated from urine culture

Fig 3: Major risk factors associated with febrile UTI

Other risk factors such as dehydration status, neurological deficits, palpable faecal masses, labial adhesions (female), circumcision (male), post void dibbling, abnormal urinary stream, neurogenic bladder, H/O previous surgery, ano-rectal malformation and myelomeningocele were insignificant in our

study. Renal scars were detected only in 2 cases.

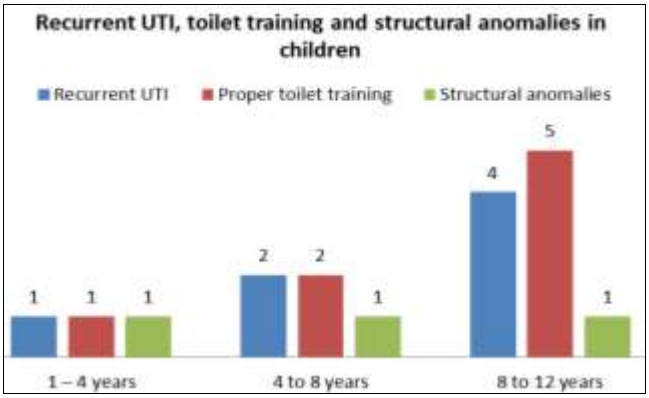

Fig 3: Recurrent UTI, toilet training and structural anomalies in children

Urinary tract infection is a common, potentially serious and often occult bacterial infection of childhood. Urinary tract infection causes acute morbidity as well as long term sequelae including hypertension and impaired renal function. In most studies incidence of UTI is more in females than males.

This variation in the results of the latter studies can be attributed to the data collected from developed countries with good hygiene practices and circumcision in male children in comparison to poor hygiene and illiteracy in the developing countries. Non-specificity of the symptoms and the presenting features especially in infancy are the major hindrance to the diagnosis of UTI. Non-specific symptoms including failure to thrive, vomiting, diarrhea, poor feeding, lethargy or jaundice may be caused by UTI. Fever without any obvious focus may be the only presentation in children up to 24 months of age [5].

In the Mingin *et al*. study [6], none of the boys and girls younger than 1 year old, all 7 (100%) of the 2 to 5 year old boys, 14 (82%) of the 17 girls 2 to 5 years old and all 12 (100%) of the girls older than 5 years were toilet trained at the time of the initial infection.

Most of the parents were unaware of toilet training and its importance due to their low level of education. Similar to Mingin *et al*. study, in our study about 83% and 58% were not toilet trained in case of 1-5 year and more than 5 year age groups respectively.

Toilet training helps children learn to completely empty their bladder, an ability that reduces the risk of infection [7]. The toilet training should begin after 18 months of age using a potty-chair and parents should assess readiness signs that show child's interest in toilet training. A study was conducted in 2002 to evaluate the age at which potty training readiness signs were attained. It was found that girls started potty training at an average age of 23 months and boys at an average age of 25 months. The length of time to potty train two year olds ranged from 6.9-14.6 months [8]. Most children in western countries achieve bladder and bowel control between 24 and 48 months of age. Girls tend to achieve this control at a slightly younger age than boys [9].

Conclusion

Children with urinary tract infections usually present with nonspecific symptoms and signs and hence a urine analysis and culture should always be part of an initial diagnostic evaluation of urinary tract infections. The morbidity and mortality due to UTI still remains considerably high despite the advent of numerous effective antimicrobial agents. Besides this, early initiation of treatment prevents most complications of UTI, so the importance of early diagnosis cannot be overemphasized.

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