

Urinary tract infection in children in Chennai-Mangadu area

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Abstract

Urinary tract infections are the most frequent bacterial infections. They occur most frequently in female children and uncircumcised male children. 10% of female getting an infection yearly and 60% get infection in some point of their life. Recurrences are common. Infection occurs four times more frequently in female than male sex. Urinary tract infection affects 10% of people during childhood. It is necessary to have the spectrum of infecting bacteria and antibiotic sensitivity pattern in the particular area, so that the treating physician is capable of treating the disease easily. That is the reason the author has taken this topic. Introduction in United States of America, urinary tract infection accounts for nearly seven million office visits, and one million emergency department visits. One hundred thousand hospitalisation every year. The cost of these infections is significant in terms of lost time at work and cost of medical care. In united states, the direct cost of treatment is estimated at 1.6 billion U.S. Dollars yearly. Urinary tract infections have been described since ancient times with first documented description in the ebers papyrus to 1550 b. c., it was described by egyptians as: sending forth heat from the bladder". Effective urinary tract infection treatment did not develop until the discovery of antibiotics in 1930. Before which time herbs, bloodletting and rest were re commended.

Keywords: Urinary tract, bladder, urethra, phimosis, ct scan , mri scan, pus cells, radio nucleotid scan, urodynamics, colony count, anti biotic sensitivity.

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INTRODUCTION

The urinary tract is the body's drainage system for removing the wastes and extra water. The urinary tract includes two kidneys, two ureters, a bladder and a urethra. The kidneys are a pair of bean shaped organs and located below the ribs one on each side of the spine towards the middle of the back. Every minute a persons kidneys filter about three ounces of blood . The urine travels from t he kidneys down two narrow tubes called

ureters. Then the urine is stored in urinary bladder. The bladder fills with urine until it is full enough to signal the need to urinate. In children the bladder can hold two ounces of urine plus one ounce per year of age. For example eight year boys bladder can hold ten ounces of urine.

MECHANISM OF URINARY TRACT INFECTION

the organisms that cause urinary tract infection (u t i) are bacteria, viruses, and fungi. Normally, the bacteria that enter the urinary tract are rapidly removed by the body before they cause symptoms or washed out in the urine. Sometimes the bacteria overcome the bodys natural defenses and cause infection. Predisposing factors of urinary tract infection. Infants and newborn, soiling of perineum with faeces predispose to urinary tract infections. In male children phimosis is a common predisposing cause. In female children and in adult female short urethra is a leading predisposing cause. Certain bacteria have strong ability to attach themselves

to the lining epithelium of the urinary tract. Children who often delay the urination are more likely to develop U.T.I. Regular urination helps to keep urinary tract sterile, by flushing away bacteria. Holding the urine allows bacteria to grow. Producing too little urine because of inadequate fluid intake, diarrhoea, dehydration, hot climate can also increase the risk of developing U.T.I. Chronic constipation—a condition in which a child has fewer than two bowel movements a week can also add to the risk of developing U.T.I. When the bowel is full of hard stool, it presses against the bladder and bladder neck, blocking the flow of urine allowing the bacteria to grow. Some children develop U.T.I.s because they are prone to such infections, just as other children are prone to getting cough, cold, or ear infection. Predisposition for bladder infections run in families. Diabetes mellitus, both juvenile diabetes mellitus (children) and maturity on set (type2) are also predisposing factors. Uncircumcised children are also at the risk of developing U.T.I. Renal calculus an y where in urinary tract like in bladder, urethra, urinary bladder, or calyses. Congenital conditions which predispose to U.T.I. Include posterior urethral valve, bladder neck obstruction, poly cystic kidney, single ureter, reduplication of the ureter and hydro nephrosis are predisposing factors. The other congenital conditions in new born recto vagina fistula, recto urethral fistula increases the risk of U.T.I. In children U.T.I. Are associated with vesico urethral reflux (an abnormal movement of urine from bladder into ureters), sometimes into kidneys predisposing anatomical abnormalities, functional abnormalities, metabolic abnormalities.

1. Mentally retarded
2. Crippled,
3. Bed ridden,
4. Patients with spinal cord injuries are also at the risk of developing U.T.I.
5. Urinary catheters--- children who are chronically bed ridden like crippled, mental retarded child, hemiplegic, paraplegic children. Those children with bladder incontinence under catheterisation have the risk of developing U.T.I.

Pathogenesis

The bacteria that cause urinary tract infections typically enter the bladder via urethra. However infection may also occur via blood and lymph. It is believed that bacteria are usually transmitted to urethra from the bowel. Female gender are at greater risk due to their anatomy. After gaining entry to the bladder wall and form a biofilm that resists the body's immune response.

Diagnosis

It is necessary to confirm the diagnosis by the laboratory investigations. By doing the simple urine analysis. Which

reveals leucocytes (white blood cells) or leucocyte esterase. Presence of urinary nitrates. Urinary microscopy will reveal the presence of R.B.C.S, WBCS (pus cells), Bacteria. Urine culture is positive if it shows 10 to the power 5 colony count per m.l. Of urine. Antibiotic sensitivity is done to facilitate treatment.

Further evaluation

Kidney and bladder ultrasound. The image can show certain abnormalities in the kidneys or bladder. However this test cannot reveal all important urinary abnormalities. While the bladder is full voiding cysto urethrogram, this test is an x-ray image of bladder and urethra taken while bladder is full. The childs bladder and urethra are filled with a special dye, called 'contrast medium'. The procedure is performed by technician, supervised by the radiologist. Anesthesia is not needed. But sedation may be needed in some cases. This test shows abnormalities inside the urethra and bladder. The test can also determine whether the flow of urine is normal. Computerised tomography (C.T.), C.T. Scan uses a combination of x-rays and computer technology to create (3 d.). 3 d imension image for children for the fear of confined spaces. Like C.T. Scan, M.R.I. Scan machine makes, radio waves and magnets to produce detailed pictures of the bodys internal organs, soft tissues without using x—rays. Light sedation may be needed for the fear of confined spaces. Like C.T. Scan, M.R.I. Can provide clear and more detailed images. Radio nucleotidescan. Special cameras and computers are used to create images of radioactive chemicals as they pass through the kidneys. And the images are interpreted by the radiologist. Anesthesia is not needed. Radioactive chemicals injected into the blood provide abnormalities about bladder and kidneys. Radio nucleotide image produce the same or less irradiation of x-ray. Urodynamics—this procedure tells how well the bladder, urethra , the sphincter are storing and releasing urine.

RESULTS AND DISCUSSION

For the treatment of urinary tract infections. Urinary tract infection is one of the common infection. Though common many of the physicians miss the diagnosis. When treated also, inadequate, in appropriate, improper antibiotics lead t o chronic infection. This in turn leads to pyelonephritis and /or renal failure. When landed into renal failure, there is a great working hours loss, monetary loss, morbidity , mortality etc. The infection pattern, the common organisms in and around Muthukumaran Medical College and Hospital area will help the doctors to treat the patients.

Table 1: Common organisms seen in the urine culture in Muthkumaran Medical College area, Mangadu, Chennai-600069

Sr. No	Name of the organism	No. Of cases	Percentage
1	Escherichia coli	22	39.28%
2	Staphylococcus aureus	9	16.07%
3	Klebsiella	8	14.28%
4	Proteus	5	8.92%
5	Pseudomonas	3	5.35%
6	Enterococcus	3	5.35%
7	Citrobacter	3	5.35%
8	Acinetobacter	2	3.57%
9	Morganella	1	1.785714%

Table 2: Percentage of antibiotic sensitivity

Antibiotics	Percentage sensitive	Percentage resistance
Amikacin	92.31%	7.69%
Piperacillin	90.99%	9.01%
Gentamycin	80.43%	19.57%
Netilmicin	76.92%	23.08%
Nitrofurantoin	65.78%	34.22%
Ciprofloxacin	62.85%	37.15%
Co-trimoxazole	55.27%	44.73%
Cefotaxime	52.38%	47.62%
Nalidixic acid	48.48%	51.52%
Ceftazidime	42.85%	57.15%
Ampicillin	25.81%	74.19%

The common organisms present in U.T.I. are 1. Escherichia coli 39.28%, 2. Klebsiella—14.2857%, 3. Proteus—8.92%, 4. Staphylococcus aureus—16.07%, 5. Pseudomonas—5.355%, 6. Enterococcus—5.35%, 7. Acinetobacter—3.57%, 8. Citrobacter—5.35%, 9. Morganella—1.785%

1. Amikacin has the highest sensitivity pattern of 92.3%. This drug is cheap, easily available. This drug administration is easy, can be given both intra muscular route and also by intravenous route.
2. The author has found that the second most sensitive drug is piperacillin with the sensitivity pattern of 90.90
3. Next most sensitive drug is gentamycin with sensitive rate of 80.43%. This can also be administered both intra muscular as well as intravenous route. Both gentamycin and amikacin belong to aminoglycoside group which are ototoxic and nephrotoxic drugs.
4. Nitrofurantoin has shown 65.78% sensitivity. This has been successfully used in chronic urinary tract infection, as it is an oral drug.

5. Netilmicin has also high percentage of sensitivity of 76.92%
6. Ciprofloxacin has good sensitivity rate of 62.85%. This has both oral and intravenous preparations.
7. In the present study cefotaxime and ceftazidime showed sensitivity of 52.3% and 42.85% respectively
8. Co-trimoxazole showed 55.2% sensitivity.
9. Ampicillin showed 25.8% sensitivity.

CONCLUSION

This article has been published to help doctors, pediatricians, and private practitioners to make awareness of the useful drugs in urinary tract infection.

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