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KEY WORDS: UTI, DMSA, MCU, USG, Calculi, VUR

A STUDY ON RADIOLOGICAL PROFILE OF URINARY TRACT INFECTIONS IN CHILDREN IN A TERTIARY CARE CENTRE

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ABSTRACT

Objectives: To study the radiological profile of children with urinary tract infections.
Design: Descriptive study
Setting: Tertiary care teaching hospital
Methods: All children <12 years attending OPD or admitted in wards with culture proven UTI / with symptoms suggestive of urosepsis. In children < 36 months presenting as fever alone without localizing signs. All were subjected to necessary investigations.
Results: In this study,X-RAY KUB had detected 3 cases with baldder calculi and 6 cases of renal calculi,all of which were more than 8mm in diameter.7% of renal calculi were detected by X-RAY KUB ,14% of cases were detected by Ultrasound abdomen,and 29% of cases were detected by both Ultrasound and X-RAY KUB. Hydro-uretero-nephrosis was found in 48% of the cases. VUR was confirmed by Micturating cystourethrogram,which diagnosed 16% of cases to have positive reflex disease. Children who presented with severe upper UTI symptoms(87),MCU picked up 27 cases of VUR ,of which 24(88%) had DMSA abnormality. This signifies that VUR had been the cause of renal parenchymal infection.DMSA had picked up 88% of VUR induced upper UTI .

INTRODUCTION:

Urinary tract infection constitutes a common cause of morbidity in infants and children. It occurs relatively frequent in infants and young children. The major significance of UTI in children is the accompanying morbidity and the possible association with anatomic abnormalities (pelvi-ureteric junction obstruction, vesico-ureteral reflux). Fever without localizing signs or symptoms is a common diagnostic dilemma for clinicians caring for infants.. Early and accurate diagnosis of acute UTI and pyelonephritis is essential for treatment and also helps to decrease the extent of cortical scarring and subsequent hypertension, which may land in renal failure later if not treated promptly.When associated with abnormalities of urinary tract, they may lead to long term complications including renal scarring, loss of function and hypertension. Prompt detection and treatment of UTI and any complicating factors are important.

SUBJECTS AND METHODS:

All children <12 years attending OPD or admitted in wards with culture proven UTI / with symptoms suggestive of urosepsis.In children < 36 months presenting as fever alone without localizing signs. All of these children were evaluated.

Children having fever with known foci other than urinary tract symptoms were excluded.All children meeting the inclusion criteria will be subjected to Detailed history, Clinical examination,Complete blood count,Renal Function Test,Urine routine & culture. Symptomatic UTI/culture positive UTI children were subjected to USG KUB, DMSA&MCU (abnormal USG- after acute phase over).

RESULTS:

In this study ,the incidence of symptoms of UTI was more among males <1year and 1-5 years of age and had a female preponderance in age group between 5-10 years and >10 years.
In this study, fever was the predominant symptom accounting for 87%,followed by vomiting in almost 59%of cases .41% of cases had abdominal pain as their symptoms. Urinary symptoms in the form of dysuria, hematuria, decreased urine output and increased of urination were noted in 67% of cases.

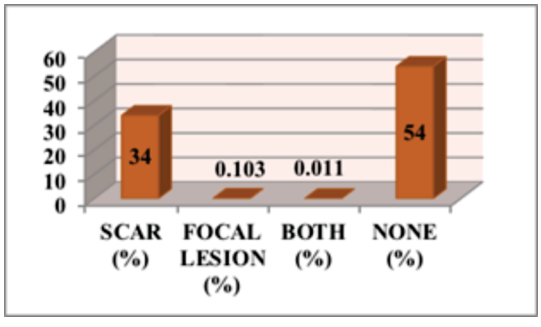
In this study,X-RAY KUB had detected 3 cases with baldder calculi and 6 cases of renal calculi,all of which were more than 8mm in diameter.7% of renal calculi were detected by X-RAY KUB ,14% by Ultrasound abdomen and 29% by both Ultrasound and X-RAY KUB. Hydro-uretero-nephrosis was found in 48% of the cases.

In this study,Renal calculi was detected in 16% of cases, of which 32 % had developed HUN following renal calculus and the remaining 68% had no such association.In this study,27% of the cases had Vesico-ureteral reflux, of which HUN was associated with 74 % of cases.

In this study,out of 100 cases 87 had severe upper UTI symptoms,in whom DMSA and MCU were done irrespective of age and culture sensitivity.Of the 87 cases ,46 (52.8%) were culture positive,41(47.1%) were culture negative.In this 41 culture negative cases 22(53%) turned to be DMSA which indicates significant upper urinary tract infection. 11(50%) turned to be VESICO-URETERAL REFLUX detected by MCU. In this study,19(46.3%)cases turned to be urine culture negative and DMSA negative. Of this 19 cases 2 (10%)cases had vesico-ureteral disease.

In this study of the cases which presented with severe upper UTI symptoms(87),MCU picked up 27 cases of VUR ,of which 24(88%) had DMSA abnormality. This signifies that VUR had been the cause of renal parenchymal infection.DMSA had picked up 88% of VUR induced upper UTI .

DMSA:



USG ABDOMEN:

Renal Abnormalities	Number
HUN	48
PUJO	13
PUV	10
Renal calculi	16
Vesicalcaluli	0
Cystitis	3

Pyelonephritis	4
Normal study	34
Left renal agenesis	1
Left double moiety	1

In this study, among those cases which presented with severe upper UTI symptoms (87),ultrasound has picked up renal abnormalities in 60 (68%)cases. Of the cases picked up ultrasound ,50% of the cases had showed DMSA abnormalities.

DISCUSSION:

Inthis study , the incidence of symptoms of UTI was more among males <1year and 1-5 years of age and had a female preponderance in age group between 5-10 years and >10 years. Urinary symptoms in the form of dysuria, hematuria, decreased urine output and increased of urination were noted in 67% of cases. In this study, X-RAY KUB had detected 3 cases with bladder calculi and 6 cases of renal calculi, all of which were more than 8mm in diameter. In this study,7% of renal calculi were detected by X-RAY KUB ,14% of cases were detected by Ultrasound abdomen and 29% of cases were detected by both Ultrasound and X-RAY KUB.The low detection rate of renal stones by X-RAY in our study may be because of the size and location of renal calculi.

100 cases presented with symptoms of urinary tract infection were included in the study All were subjected to ultrasonography .The common anatomical abnormality detected by ulrasonography was 48 % had HUN, 13% had PUJobstruction,10 % had PUV, renal calculi 16%, vesical calculi in 3%,pyelonephrtis in 4%, left renal agenesis and left double moiety each 1 case were diagnosed by ultrasound. Of the 100 cases 87 ,which had severe UTI symptoms underwent, MCU and DMSA.

Ultrasound was able to pick up renal abnormalities in 66 (66%) cases. DMSA detected abnormality in 40 cases.VUR diagnosed by MCU were 27 cases. Of the 48 cases of HUN , 5(10%) cases showed associated renal calculi and 20 (40%) cases had associated VUR as diagnosed by MCU. According to **Dr ShradhaSalunkhe et al[53],** it is said that VUR is responsible for 30 - 40% of UTI. USG abdomen also an increasingly popular technique in paediatric practice as it is painless, does not involve the use of ionizingradiation and is entirely safe in detecting VUR. Ultrasound is particularly effective in identifying the presence of obstruction and renal swelling. In all the patients with positive DMSA scan ultrasound was abnormal. No patient with negative risk factors and negative ultrasound had a positive DMSA scan.

CONCLUSION:

In this study,analysis of 100 cases with symptoms of UTI with or without fever, renal abnormalities were detected with radiological investigations. In 87 cases with symptoms of UTI with fever VUR was detected in 27 cases(31%) by MCU. The common organism causing UTI in our study was E.coli. Children who present with symptomatic UTI should be subjected to DMSA as 60% of them showed defect in DMSA scan which needs regular follow up.

Ultrasonography is always a sensitive , non invasive cheap imaging procedure in picking up renal abnormalities in children presenting with symptoms of UTI. In children with first episode of UTI with or without fever ultrasonography picked up 66%of renal abnormalities underscoring the importance of ultrasonography in first episode UTI in addition to treating the present infection.DMSA had good sensitivity in detecting VUR, as MCU positivity was strongly associated with DMSA positivity.In this study,19(46.3%)cases turned to be urine culture negative and DMSA negative. Of this 19 cases 2 (10%)cases had vesico-ureteral disease.Hence urine culture status alone is not the guide to further radiologically evaluate a case of febrile UTI, as may miss some cases.

Early detection and prompt treatment influences the prognosis. Undiagnosed or delayed treatment leads to renal scarring - hypertension and CKD. It is important that we recognise VUR and other congenital anomolies in asymptomatic UTI as they also carry the risk of progressive renal disease.

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