Comparison of urinary tract infection after kidney transplantation between adult and children

Original Article

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Abstract:

Background: Urinary tract infection (UTI) is an important complication after kidney transplantation (KT). UTI may cause kidney damage and dysfunction especially in children. Therefore, the aim of this study was to evaluate the risk of UTI after KT in adult and children and compare of them.

Methods: This study was done in Shaheed Beheshti Hospital (Babol Medical University). All patients, after KT and during one month after their operation were followed and divided to two groups (according their ages): more than 18 years old (adults) and under 18 years old (Children). Then, their urine samples were sent for culture every 2-3 days during admition and every week after discharged and more than 100000 single colony count were defined positive culture. Data were analyzed using t-test and $p<0.05$ was considered important.

Results: There were 508 cases and 450 patients were adult and others were children. Among them, 109 (24%) adult and 8(13.8%) children had positive urine culture, respectively ($P>0.05$) .In adult groups, 62 (21.6%) male and 47(28.8%) female patients had positive culture. However, in children group, 2 (6.3%) boys and 6 (23.1%) girls had positive culture, respectively ($P<0.05$).

Conclusions: According to positive culture, there was no difference between adult and children, but females had higher risk of positive U/C than males .So, more attention was needed after KT in females.

Keywords: Kidney, Transplantation, UTI, Child, Adult

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Introduction:

Since many years ago, kidney transplantation (KT) is the best method for kidney replacement therapy in adult and children [1]. However, one of the most problems in these patients is urinary tract infection (UTI) and UTI is one of the most common bacterial and viral infections after KT [2]. It is worth to mention that the risk of UTI in children and adult may be difference. In overall, the risk of UTI in KT patients was reported 6-8 % according to different definition of UTI and duration of follow up [3-5]. In pediatric group, the risk of UTI was reported 15-58% [6-8] and in adult patients up to 61% [9]. Of course, the incidence of UTI was high in children in recent study [10]. UTI in the first month after KT in children was reported with higher risk of kidney damage [11], but there is no agreement on the effect of UTI on kidney transplant function especially in adult [12]. At this time, change of surgical technique, early remove of ureteral stents, start of antibiotic prophylactic after KT and improvement of immunosuppressive drugs have been decreased the risk of UTI [13-14]. Therefore, this study was done to evaluate the risk of UTI in children an adult after kidney transplantation and compare them.

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Methods:

This cross-sectional study was conducted on all patients who had KT during 1999-2008. According to their age, the patients were divided to two groups, more than 18 years old (adult) and less than 18 years old (children).

Their urine cultures (U/C) were evaluated during one month after KT every week and every time with urinary tract symptoms. All U/C with more than 100000 colony counts were defined positive. Ureter stents were removed 2-4 weeks after KT and Foley catheter on at 3-5 days after KT, too. All patients were given antibiotic prophylaxes that were Co-trimoxazole (oral) and Cephalotin (intravenous for 5-7 day).

The immunosuppressive drugs were pulse of methylprednisolon (2days before and 3 day after KT), prednisolone, cyclosporine and mycofenolate mofetile. The data were analyzed by using SPSS and t-test and $P<0.05$ was considered significant.

Results:

Total of cases were 508 patients, 450 (85.5%) and 58 (11.5%) KT patients were adult and children, respectively. Among 450 adult patients, 287 (63.7%) cases were males and others were females (36.3%). In addition, in children group, 32 (55%) and 26 (45%) patients were boys and girls, respectively. In Adult group, the mean age was 43.3±13 years old and in pediatric group it was 13.5±3.2 years old.

Nine (15.5%) and 49(85.5%) children had less and more than 10 years old, respectively. One hundred nine (24 %) adult and 8 (13.8%) cases of children had positive urine culture, respectively (P>0.05) (Table -1).

The most common organisms in positive U/C were E.coli in 63 (52%) cases and Entrobacter in 31(26%) patients. In addition, both in males and females adult patients, E.coli was the most common organism that responsible of positive urine culture. But in children, E.coli was only seen in girls (Table -2) (P<0.05)

Table -1: Frequency of positive urine culture according to age and sex in kidney transplant patients

Groups	Sex	Urine Culture	Frequency	Percent (%)
Adults	Males	Negative	225	78.4
		Positive	62	21.6
	Females	Negative	116	71.2
		Positive	47	28.8
Children	Males	Negative	30	93.8
		Positive	2	6.3
	Females	Negative	20	76.9
		Positive	6	23.1

Table -2: Frequency of the most common microorganisms in positive urine culture according to age and sex in kidney transplant patients

Groups	Sex	Microorganisms	Frequency	Percent (%)
Adults	Males	E-Coli	35	11.8
		Entrobacter	16	5.5
		Pseudomonas Aeruginosa	6	2.1
		Citrobacter	4	1.3
		Others	3	1
		Negative	225	78.4
	Females	E-Coli	26	15.9
		Entrobacter	13	7.9
		Pseudomonas Aeruginosa	2	1.2
		Citrobacter	2	1.2
		Others	4	1.8
		Negative	116	71.2
Children	Males	Pseudomonas Aeruginosa	2	3.1
		Staphylococcus Aureus	2	3.1
		Negative	30	93.8
	Females	E-Coli	2	7.7
		Entrobacter	2	7.7
		Staphylococcus Aureus	2	7.7
		Negative	20	76.9

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Discussion:

In this study 26.4% of patients had positive urine culture that there was no significant difference between adult and children according to risk of positive U/C (P>0.05). There were some reports indicated that UTI may affect on graft function in long time [11, 15]. Of course, this idea was not accepted by some authors in recent studies [8, 16, 17].

However, febrile or symptomatic UTI may reason of admition in hospital and therefore the risk of drug nephrotoxicity may be increased. Spatenk FJ et al.'s reported that the risk of UTI was 28% in pediatric patients. They had followed the patients for 3.3±2 years and more frequency of UTI were found in first year after KT [18].Other study performed on adult group (45.5 – 66.5 years old) showed that 34% of patients had one episode of UTI that 25% of them was reported during first year after KT [19]. The risk of UTI and acute pyelonephritis were 75.1% and 18.7% during the five years follow up, respectively [15]. During three month follow up after KT, 19% of patients had positive urine culture [20]. Different rates of UTI after KT may be due to different time of follow up, various drugs for immunosuppression and UTI prophylaxis, the time remove of ureteral stent and Foley catheters.

In this study, the risk of positive U/C between adult and children was the same in both groups. So, more attention is needed for both adults and children after K.T. The risk of positive U/C in females was more than males in both adult (28% VS 22%) and children (23% VS 6.2%) groups.

Pediatric females had higher risk of UTI after KT [8, 21]. Another study on adult group indicated that, females had higher risk of UTI [5, 19]. Therefore the risk of UTI was more in females in both pediatric and adult groups. The most common microorganism that causes positive U/C was E.coli (52%) and then Entrobacter (26%). E.coli, Klebsiella pneumonia and Entrococcus faecalis were responsible of 60% of UTI in one study [19]. To evaluate the microorganisms responsible of first time UTI, E-Coli was the most common cause of UTI (28.4%) and then pseudomonas Aeruginosa (14.9%) [15].

In other study E.coli (55.7 %) and pseudomonas Aeruginosa (9.7%) were the most common causes of UTI in kidney and kidney- pancreas transplantation [22]. Memikoglu reported E.coli (59.1%) and Klebsiella SPP (16.9%) were the most common cause of UTI [23]. Escherichia Coli (29%), Entrococcus (24%) and then Staphylococcus (12%) were the most common causes of UTI in other study [5].

As mentioned before, E.coli was the most frequently microorganisms which causes the UTI, but it is less frequently bacteria that was reported in general population with UTI (up to 80%) [24]. It may due to underlying immunosuppressive drug and change of bacterial colonization. Kidney transplant patients were on antibiotic prophylaxis or treatment that may change the bacterial colonization.

In conclusion, the risk of UTI in adult and children was the same and female patients had higher risk of UTI. Also, E.coli was the most common cause of UTI.

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