Int J Infect. 2017 April; 4(2):e41696. doi: 10.5812/iji.41696.

Published online 2016 November 13. **Research Article**

Impact of Ureteral Double J Stenting on Kidney Transplant Outcome at Duhok Transplant Center, Iraq

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Received 2016 August 22; **Revised** 2016 August 28; **Accepted** 2016 August 30.

Abstract

Background: Renal transplant is considered the treatment of choice for end stage renal disease. During the transplantation, stents are placed routinely at duhok transplant center (DTC) to protect the ureter-bladder anastomosis and to decrease anastomosis-related complications.

Objectives: The aim of this study was to compare the incidence of urinary tract infection (UTI) and other postoperative complications in patients undergoing renal transplant with or without stent insertion.

Methods: All recipients of kidney transplantation at DTC between January 2012 and December 2013 took part in this study. The patients were followed up at the same center and those who developed post-operative complications were referred back to DTC for management. The study included data of following up the patients for 12 months.

Results: No significant difference was found in GFR between the two groups 12 months after transplant (Mean $\pm$ SD: 74.11 $\pm$ 12.2 for stented group versus 77.4 $\pm$ 14.6 for non-stented group, U test, $P > 0.05$). 29.4% (10/34) of stented patients developed UTI in the first 14 days, while only 7.4% (2/27) of the patients in the non-stented group developed this complication ($P = 0.045$) (OR: 5; CI_{95}: 1-26.3). 44% (15/34) of the stented subjects developed late UTI which was significantly higher than that found in non-stented group where only 20.8% (5/24) of subjects developed UTI ($P = 0.039$) (OR: 3.5; CI_{95}: 1-11.3).

Conclusions: Stents increased the risks of urological infections and might have a detrimental effect on graft survival. It might be inferred that stenting should not be placed routinely; but only used in selective patients with strong indications.

Keywords: Double J, Stent, Kidney, Renal, Transplant, UTI, Iraq

1. Background

Despite the improvements in peritoneal dialysis and hemodialysis, renal transplant is the treatment of choice for the most subjects with end stage renal disease. During the transplant operation, stents may be placed to protect the ureter-bladder anastomosis and to decrease anastomosis-related complications (1). Such a placement may provide continuous decompression of the ureter to avoid anastomosis tension, keep the linear alignment for a better urine flow, and protect from narrowing and obstruction (2). However, stent placement does not eliminate the risk of complication development. In addition, such a placement may increase the risk of other complications such as UTI, hematuria, and exacerbation of long term stricture. Furthermore, stent removal may pose additional risk of infection and trauma by cystoscopy (2).

Renal transplant is associated with urologic complications rate ranging from 20% to 30% (3). After the operation, the urine may leak from renal pelvis, ureter, or ureteroneocystostomy site due to ureteral necrosis caused by vascular insufficiency or increased urinary pressures caused by obstruction. Urine leak is relatively a rare complication and may occur early after the transplant. Urinary obstruction is another post-operative complication with a prevalence of 2%. It usually occurs within the first six months after the operation. Though the obstruction may occur anywhere, most commonly it occurs in the site of ureteric implantation into the urinary bladder. Stenosis may occur years after the operation in particular in patients with multiple operations (4). Reports have shown that more than 80% of renal transplant recipients have at least one attack of infection in the first 12 months after the transplant. Probably, UTI is the most common type of infection and it has been shown to harm the graft function and survival. Also, such an infection may predispose patients to bacteraemia especially with multidrug resistant microorganisms which are common in the region (5-8).

2. Objectives

Duhok transplant center is a relatively newly established center in Kurdistan region, northern Iraq. Annually,

60 - 80 transplant operations are performed at this center. Alongside two other centers in the region, this center offers services to nearly 5 million people. There is a general trend in these centers to use double J stent routinely in every transplant patient. No data are available about the indications of double J stent placement and the associated complications in the region. The aim of this study was to compare the incidence of UTI and other postoperative complications such as acute tubular necrosis (ATN), delayed graft function (DGF), and ureteric stricture and leak in patients undergoing renal transplant with or without stent insertion.

3. Methods

3.1. Patients

All recipients of kidney transplant at Duhok transplant centre, Duhok, kurdistan region, Iraq, between January 2012 and December 2013 included in the study. Patients were followed up at the same center and those who developed post-operative complications were referred back to DTC for the management. The study included data of following up patients for 12 months. Patients were managed according to the local protocol, and the immunosuppressant regimen was composed of Basiliximab 20 mg (intraoperatively and day four post-operation), Cyclosporine (8 - 10mg/kg/day which then titrate to 5 - 6 mg/kg/day), Mycophenolate (2 g/day), and prednisolone (1 mg/kg/day then titrate to maintenance 7.5 mg/day).

During the operation, a 6-French, 12 cm double J stent was placed to establish internal drainage from the ureteropelvic junction to the bladder. Flexible cystoscopy was used to remove the stent under general anaesthetic 6 weeks after the operation. Antibiotics were given as prophylaxis before the removal of the stent and usually following 24 hours ceftriaxone.

The data of this study were collected and analyzed retrospectively. The diagnosis of UTI was made depending upon symptoms and microbiological culture. The requirement of dialysis within the first 7 days of operations was used as a definition for DGF. All donations came from living donors; cadaver donation was not acceptable religiously and socially. Acute tubular necrosis was diagnosed by ultrasound imaging, doppler and histopathology.

Complications were compared between those with a stent and those without stent. Differences between the two groups were tested by the chi square test and U test analysis. A P-value of < 0.05 was adopted as accepted value for statistical significance.

3.2. Ethics Statement

This study was approved by the ethics committee of the University of Duhok.

4. Results

4.1. Characteristics of Patients

A total of 61 renal transplant operations were performed during the period, comprising 40 males and 21 females giving a male to female ratio of 2:1 (Table 1). No significant differences were found between the groups (stented and none-stented) in age, weight, and mean duration of renal failure. BMI was high in 11/34 (32.4%; CI95: 16.67% to 48.13%) stented subjects, while it was high in 8/27 (29.6%; CI95: 12.38% to 46.82%) non-stented subjects.

Table 1. Characteristics of Patients Undergone Renal Transplant[a]

Variables	Stented (N = 34)	Non Stented (N = 27)
	Mean (SD)	Mean (SD)
Age of recipients	35.1 (13.24)	33.5 (11.44)
Age of donors	26.6 (5.73)	25.7 (6.82)
Weight	62.8 (17.71)	68.8 (16.76)
Mean duration of renal failure (in months)	23	21
BMI > 30	11	8

[a] P Value is > 0.05.

4.2. Causes of Renal Failure

The most common causes of renal failure were found to be diabetes mellitus (DM) and hypertension (Table 2). DM caused an established renal failure in 12/34 (35.2%; CI_{95}: 19.15% to 51.25%) patients in the stented group while it was the cause of renal failure in 9/27 (33.3%; CI_{95}: 15.52% to 51.08%) subjects within the non-stented group. Hypertension was the second most common cause of renal failure in our study and it was the cause of renal failure in 6/34 (17.6; CI_{95}: 4.8% to 30.4%) patients in the stented group and 4/27 (14.8%; CI_{95}: 1.41% to 28.19%) subjects in the non-stented group. Neurogenic bladder was the cause of renal failure in 2/34 (5.88%; CI_{95}: - 2.03% to 13.79%) subjects in the stented group. Glomerulonephritis was the cause of renal failure in 3/34 (8.8%; CI_{95}: - 0.72% to 18.32%) and 4/27 (14.8%; CI_{95}: 1.41% to 28.19) patients in the stented and non-stented groups, respectively. In the stented group, 2/34 (5.88%; CI_{95}: -2.03% to 13.79%) patients had renal failure due to interstitial nephritis while the reason for renal failure could not be identified in 9/34 (26.4% CI_{95}: 11.58% to 41.22%) patients. On

the other hand, in the non-stented group, we had one patient with interstitial nephritis and two patients with renal artery stenosis (RAS). The reason for renal failure could not be identified in 7 patients within the non-stented group.

Table 2. Causes of Renal Failure Recorded at Renal Transplant Center

Causes of RF	No. (%)	CI_{95}
DM	21 (34.4)	22.4% - 46.3%
Hypertension	10 (16.4)	7.11% - 25.6%
Neurogenic bladder	2 (3.3)	-1.1% - 7.8%
Glomerulonephritis	7 (11.5)	3.4% - 19.5%
interstitial nephritis	3 (4.9)	- 0.5% - 10.3%
RAS	2 (3.3)	-1.1% - 7.8%
Idiopathic	16 (26.2)	15.1% - 37.2%
Total	61	

4.3. Outcome

We measured the GFR of survived patients 12 months following the operation. No significant difference was found between the two groups (Mean ± SD: 74.11 ± 12.2 for stented group versus 77.4 ± 14.6 for non-stented group, U test, $P > 0.05$). 29.4% (10/34) of stented patients developed UTI in the first 14 days, while only 7.4% (2/27) of the patients in the non-stented group developed this complication ($P = 0.045$) (OR: 5; CI_{95}: 1-26.3). 44% (15/34) of the stented subjects developed late UTI which was significantly higher than that found in non-stented group where only 20.8% (5/24) of the patients developed UTI ($P = 0.039$) (OR: 3.5; CI_{95}: 1-11.3). DGF occurred in 5.8% (2/34) of stented patients while it occurred in 8.3% (2/24) of the non-stented subjects ($P = 0.8$) (Table 3). Death occurred in 3 patients within the stented group and the causes of death were myocardial infarction (MI), acute rejection, and ARDS. On the other hand, two patients died in the non-stented group that was due to acute rejection and MI.

5. Discussion

Ureter-bladder anastomosis can be protected by placing stents after renal transplant (1). Such a placement may help reduce post-operative complications. However, it has been found that stent insertion may increase the risk of infection (3, 5). Ranganathan et al. found a significant proportion of transplant patients with stent suffered from UTI in comparison with those without stent (9). It was also found that stent placement was associated with recurrent UTI even after the removal (9). In another study conducted in the UK, the UTI rate was found to be higher in transplanted kidneys with stent than those without stent (10). Recalling that multidrug resistant microorganisms are common in Iraq, infection poses a deleterious effect on the graft (7, 11-14). In our study, we found that 29.4% of our stented patients versus 7.4% of the non-stented patients developed UTI within the first two weeks after transplant. In addition, 44% of patients with stents developed late UTI which was significantly higher than that found in non-stented group. This was in agreement with previous Cochrane study that found that stenting increased the risk of infection (15). In the same study, it was also found that such an infection can be eliminated or prevented by giving the patient co-trimoxazole 480 mg once daily (15). Further study is needed in the region to determine whether prophylactic antibiotics can be considered for patients with stent placement. It was previously shown that the duration of stenting may increases the risk of complications. It was also shown that stent removal two weeks after the operation would decrease the risk of its complication besides having its benefits (10). In our study, the average duration of stenting was 42 days; therefore, it is recommended that such duration should be shortened to decrease the risk of infection. In the light of our results that stenting increased the risk of infection and hence might be harmful for the graft, it might be inferred that stenting should not be placed routinely and only used in selective patients with strong indications.

Urine leak is a possible complication of renal transplant. In our study, no significant difference was found in the rate of urine leak events between stented and non-stented group. This was in agreement with previous reports showing that stents offered no benefit in preventing ureteral stenosis or leaks (10, 16). Also, in agreement with our study, in a project conducted in the UK on 183 stented and 102 non-stented patients, it was found that the stenting had no significant association with postoperative ureteric stenosis. However, in contrast to our study, some studies have demonstrated lower leak rates in the stented group (2, 17, 18). Probably, other factors may have a role in the development of postoperative leak such as injury to the ureter, ischaemia, injury to the arterial blood supply, and operation technique. Considering these factors, further study with larger sample size is needed to demonstrate the influence of stenting upon urine leaks.

ATN is a common cause of early post-transplant renal function impairment with an incidence varying from 20% to 50% especially with the use of cyclosporine (19) and more common in cadaveric donors than in living related donors. ATN might be caused by donor kidney ischemia during transplant operation due to hypoperfusion and reperfusion injury, harvesting conditions, surgical procedures, and cyclosporine given immediately fol-

Table 3. Post-Transplant Complications in Both Stented and Non-Stented Groups

	Stent	Non Stent	P Value	OR	CI_{95}
Acute tubular necrosis	4	5	0.4600	0.58	0.1411 - 2.4399
Obstruction/stricture	1	0	0.3689	485	0.0 - 0.0
Leak	1	1	0.8681	0.7879	0.0470 - 13.2063
Early UTI	10	2	0.03176	5.2083	1.0325 - 26.2718
Late UTI	15	5	0.03439	3.4737	1.0634 - 11.3470
DGF	2	2	0.81	0.7813	0.1027 - 5.9403
Rejection	3	2	0.8413	1.2097	0.1873 - 7.8111
Death	3	2	0.8681	1.2097	0.1873 - 7.8111

lowing transplant. ATN occurred in 14.7% of our patients and this might be due to the use of cyclosporine. Therefore, it is recommended that the locally used protocols should be revised and newer drugs such as tacrolimus should be used. Fortunately, all the ATN patients recovered without further complications.

Our study has several limitations. First, our study was not large enough. However, this is more likely to hide true-positive associations rather than to produce false-positive results. Therefore, stents increased the risks of urological infections and might have a detrimental effect on early to medium term renal transplant function. In addition, the retrospective methodology of this report may limit the usefulness, and large randomized study is recommended to explore this association of stent with post-operative complications.

To conclude, the most common causes of renal failure were found to be DM and hypertension. Stents were associated with high risks of UTI and might have a detrimental effect on early to medium term renal transplant function. It might be recommended that stenting should not be placed routinely and only used in selective patients with strong indications.

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