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Original Research Article

Renal dysfunction following ileal conduit urinary diversions after radical cystectomy: a five year follow-up study

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ABSTRACT

Background: Ileal conduit (IC) is the most commonly performed urinary diversions (UD) contributing 33-72 % of all types of UD with. Ileal conduits are relatively easy and quick to create, with a low rate of surgical complications. However, there is an incidence of renal deterioration was comparatively high following radical cystectomy, irrespective of the type of UD. To this purpose, we evaluated the post-operative renal function and non-surgical risk factors for loss of renal function in patients who underwent radical cystectomy with ICUD.
Methods: In this retrospective single institutional study, we evaluated risk factors for loss of renal function in 45 patients who had undergone radical cystectomy with ileal conduit as the sole form of urinary diversion. Renal function was calculated based on e-GFR. Analysed risk factors were age, gender, hypertension, diabetes, preoperative renal function, the post-operative occurrence of acute pyelonephritis and chemotherapy.
Results: There were 30 males and 15 female patients; the median follow-up was 36 months (3-90 months). The mean e-GFR before surgery was 74.2 (22.7-143.7) ml/min/1.73 m^2, and it was 58.6 (8.2-140.9) ml/min/1.73 m^2 after surgery, at last, follow up. Five-year renal deterioration free interval was 63.8%. Multivariate analysis showed that post-operative occurrence of acute pyelonephritis (p=0.0003) and treatment with chemotherapy (p <0.000) were significant risk factors for loss of renal function.
Conclusions: In our study, 13/45 (28.8%) patients demonstrated a reduction in renal function during the follow-up period. Postoperative episodes of acute pyelonephritis and treatment with chemotherapy were found to be significant risk factors.

Keywords: Renal function, Ileal conduit urinary diversion, Radical cystectomy

INTRODUCTION

Radical cystectomy (RC) for bladder cancer requires reconstruction of the lower urinary tract. Ileal conduit (IC) is the most commonly performed UD contributing 33-72% of all types of UD with RC.[1] Most urologists are familiar with this technique as it is simple, reproducible and probably the quickest to perform. It is also the procedure of choice for most patients' elderly patients as well as patients with limited dexterity, poor motivation, anatomical restrictions and poor renal function.[2] When compared to ileal neobladder urine function is conserved with IC patients during both short- and long-term follow-up periods whereas other study showed that the types of urinary diversion had no significant impact on renal function decline.[3,4]

Studies have shown a universal decrease in the glomerular filtration rate varying between 10% to 60% after ICUD.[5] Samuel et al. showed that 18% of sources were non-surgical.[6] Studies have shown that risk factors such as age, gender, hypertension, diabetes, preoperative

renal function, the post-operative occurrence of acute pyelonephritis obstruction and chemotherapy, also contributes to such a decline in glomerular filtration rate.[7-10] To this purpose, we evaluated postoperative renal function and risk factors for loss of renal function in patients who had undergone radical cystectomy with ICUD.

METHODS

A total of 60 patients who underwent radical cystectomy with ileal conduit as the sole form of urinary diversion during 2005-2014 at SVIMS Tirupati were enrolled. Fifteen patients were excluded from the study, out of these in two patients due to simultaneous nephrectomy, two due to nephroureterectomy, three requiring immediate dialysis post-operative period and eight due to insufficient data.

After surgery patients were followed up for metastasis and urinary obstruction with routine blood tests, chest x-ray [every three months for first two years then every six months after that, CT abdomen and pelvis [every 3-6 months for first 2 years then every 6-12 months after that]. Bone scanned when symptoms appeared. Postoperative changes in renal function were examined, and MDRD equation was used to calculate eGFR. Renal deterioration was defined by greater than 25% decrease in eGFR compared to pre-operative renal function. Variables analysed were age, gender, hypertension, diabetes, preoperative renal function, the post-operative occurrence of acute pyelonephritis, treatment with chemotherapy. Pyelonephritis defined by flank pain or tenderness with fever and urine culture positive.

Statistical analysis

Continuous data was tabulated as simple arithmetic means and categorical data as simple frequencies. Chi-square and paired t test were used as inferential statistical tools. Multiple logistic regression analysis was used to verify the independence of risk factors for loss of renal function. A two tailed p value less than 0.05 was considered statistically significant.

RESULTS

The median age of patients was 59 yrs (5-87), there were 30 males and 15 female patients in a ratio 2:1; the median follow-up was 36 months (3-90 months). The mean e-GFR before surgery was 74.2 (22.7-143.7) ml/min/1.73 m^2 and it was 58.6 (8.2-140.9) ml/min/1.73 m^2 after surgery, at last, follow up. Five-year renal deterioration free interval was 63.8%. (Figure 1) only 13/45 (28.8%) had >25% reduction in preoperative renal function. Multivariate analysis showed that post-operative occurrence of acute pyelonephritis (p=0.0003) and treatment with chemotherapy (p <0.000) were significant risk factors for loss of renal function (Table 1).

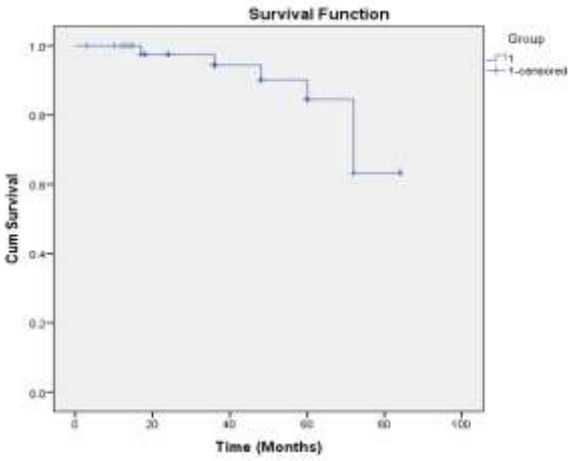

Figure 1: Five year survival rate with our renal dysfunction.

DISCUSSION

Renal function is one of the most important determinants of the decision-making for UD. Substitution by the columnar epithelium of the gastrointestinal (GI) tract for transitional epithelium significantly increases the acid load for the kidneys. The IC is a short segment of the small intestine with minimal contact time with the urine. This advantage of IC is of critical important for elderly patients and those with reduced renal function.[2]

In a study by Madersbacher et al, morphological/functional deterioration developed in 27% of cases, most often in the form of hydronephrosis or shrunken kidney.[5] Renal pathology was present in 40% after five years, increasing to 80% after ten years. The present study showed 28.8% of patients who underwent urinary diversion developed renal deterioration in follow-up, as defined by >25% greater reduction in e GFR. This result is comparable to the previous study in which there was 18-29% of patients revealed worsening of renal function during a median follow-up of 8 years.[6]

Chemotherapy after radical cystectomy was found to be a significant determinant of postoperative renal function. M-VAC is the standard regimen which was used.[9,10] 5/45 patients had chemotherapy, out of which 3 had a significant drop in renal function. Acute pyelonephritis was also another major factor, seen in 10 of 45 patients out of which 6 had a significant decrease in renal function. Male sex had predominance, 30 of 45 patients were men, and out of 13 who had a significant decline in renal function, 12 were men.

Caution has to be executed from our results since; it is a retrospective study, small patient population, single institutional study small follow-up period. Only studies lasting longer than ten years cover the entire morbidity spectrum.

Table 1: Clinical characteristics of all patients who underwent radical cystectomy with an ileal conduit for urinary diversion.

Clinical characteristics	All patients=45	P value	Patients with loss of renal function=13	P value
Age (years)				
<40	3		1	
40-50	9	0.119	4	0.735
51-60	14		3	
61-70	11		3	
>70	8		2	
Gender				
Male	30	0.036*	12	0.0055*
Female	15		1	
Hypertension				
Yes	7	<0.0001*	1	0.0055*
No	38		12	
Diabetes mellitus				
Yes	12	0.0029*	2	0.0265*
No	33		11	
Preoperative creatinine mg/dL				
<1.5	36	0.0001*	12	0.0055*
1.5-3	9		1	
>3	0		0	
Pre-operative e GFR ml/min/1.73 m^2				
<50	6		1	
50-70	14	0.0719	3	0.4415
71-100	17		5	
>100	8		4	
Post-operative creatinine mg/dL				
<1.5	25	0.0003*	3	0.0921
1.5-3	17		8	
>3	3		2	
Postoperative e GFR ml/min/1.73 m^2				
<50	20		10	
50-70	8	0.0054*	0	0.0961
71-100	13		3	
>100	4		0	
Postoperative chemotherapy				
Yes	5	<0.0001*	3	0.0961
No	40		10	
Acute pyelonephritis				
Yes	10	0.0003*	6	1.00
No	35		7	
Ureteral obstruction				
Yes	4	<0.0001*	0	1.00
No	41		13	
Percent change in renal function				
<25%	32	0.0073*	13	1.00
>25%	13		0	

CONCLUSION

13 out of 45 (28.8%) patients demonstrated a reduction in renal function during the follow-up period. Post-operative episodes of acute pyelonephritis and presence of chemotherapy were found to be significant risk factors. Studies lasting longer than ten years are required to cover the entire morbidity spectrum.

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Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Hautmann RE, Abol-Enein H, Hafez K, Haro I, Mansson W, Mills RD. Urinary diversion. Urology. 2007;69(1):17-49.
2. Siddiqui KM, Izawa JI. Ileal conduit: standard urinary diversion for elderly patients undergoing radical cystectomy. World journal of urology. 2016;34(1):19-24.
3. Huang Y, Pan X, Zhou Q, Huang H, Li L, Cui X. Quality-of-life outcomes and unmet needs between ileal conduit and orthotopic ileal neobladder after radical cystectomy in a Chinese population: a 2-to-1 matched-pair analysis. BMC Urology. 2015;15:117.
4. Hatakeyama S, Koie T, Narita T, Hosogoe S, Yamamoto H, Tobisawa Y. Renal function outcomes and risk factors for stage 3B chronic kidney disease after urinary diversion in patients with muscle-invasive bladder cancer. PloS one. 2016;11(2):e0149544.
5. Madersbacher S, Schmidt J, Eberle JM, Thoeny HC, Burkhard F, Hochreiter W. Long-term outcome of ileal conduit diversion. J Urol. 2003;169(3):985-90.
6. Samuel JD, Bhatt RI, Montague RJ, Clarke NW, Ramani VA. The natural history of postoperative renal function in patients undergoing ileal conduit diversion for cancer measured using serial isotopic glomerular filtration rate and 99m technetium-mercapto acetyltriglycine renography. The Journal of urology. 2006;176(6):2518-22.
7. Nishikawa M, Miyake H, Yamashita M, Inoue TA, Fujisawa M. Long-term changes in renal function outcomes following radical cystectomy and urinary diversion. International journal of clinical oncology. 2014;19(6):1105-11.
8. Kristjansson A, Wallin L, Mansson W. Renal function up to 16 years after conduit (refluxing or anti-reflux anastomosis) or continent urinary diversion. Glomerular filtration rate and patency of uretero-intestinal anastomosis. Br J Urol. 1995;76(5):539-45.
9. Sternberg CN, Yagoda A, Scher HI, Watson RC, Geller N, Herr HW. Methotrexate, vinblastine, doxorubicin, and cisplatin for advanced transitional cell carcinoma of the urothelium. Efficacy and patterns of response and relapse. Cancer. 1989;64(12):2448-58.
10. Sternberg CN, Yagoda A, Scher HI, Watson RC, Herr HW, Morse MJ. M-VAC (methotrexate, vinblastine, doxorubicin and cisplatin) for advanced transitional cell carcinoma of the urothelium. J Urol. 1988;139(3):461-9.

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