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Quality of Life and Renal Functional Status In Patients With Cutaneous Ureterostomy and Ileal Conduit Urinary Diversion after Radical Cystectomy

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Abstract

Introduction*: Radical cystoprostetectomy in male patients and anterior pelvic exenteration in female patients coupled with en-block pelvic lymphadenectomy and urinary reconstruction or diversion remains the gold standard surgical approach to muscle invasive bladder cancer in the absence of metastatic disease. In Bangladesh, commonly performed urinary diversions are Cutaneous ureterostomy and Ileal conduit.*

Types of urinary diversion have a great impact on different aspects of quality of life (QoL) as well as post -operative renal function.

Aims and Objectives*: This study was designed to compare the Quality of Life and Renal Function in between Cutaneous ureterostomy and Ileal conduit urinary diversion after radical cystectomy.*

Methodology: *This was a hospital based Quasi Experimental study in which patients were selected by purposive sampling and, conducted from July, 2017 to September, 2018 in the department of Urology Bangabandhu Sheikh Mujib Medical University. This study was performed among the patients with muscle invasive bladder cancer treated by radical cystectomy with cutaneous ureterostomy or Ileal conduit fulfilling the exclusion and inclusion criteria. Total 34 patients were taken for the study, among them 17 for cutaneous ureterostomy and, 17 for Ileal Conduit Group.*

Quality of Life was assessed through EORTC-QLQ-C30 questionnaire both pre and post operatively (3 months after operation). Renal function was assessed before and 1st POD, 7thPOD, one month and three months after operation by measuring eGFR.

Result: *Mean age of the patients was 59.00 ± 8.60 years and 53.35 ± 8.43years in group-A (Cutaneous ureterostomy) and group-B (Ileal conduit) respectively. Three months after operation, overall QoL in all scales were improved in both group but, more improvements were noted in group-B than group-A which were statistically significant ($p<0.05$). The mean pre-operative eGFR was significantly lower in group-A than group-B ($p<0.001$).*

Keywords: Gastro-postatectomy, Pelvic exenteration, Ileal conduit, Cutaneous ureterostomy, EORTC, Quality of life, eGFR

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Three months after operation, statistically significant differences in eGFR, were observed within, and in between two groups ($p<0.05$). Percentage of eGFR changed (renal function deterioration) were significantly more in group-A than group-B ($p=0.001$).

Conclusion: *Quality of life, after radical cystectomy with ileal conduit is better than cutaneous ureterostomy and, post- operative renal function deterioration significantly less in ileal conduit group than cutaneous ureterostomy group. So, ileal conduit is an appropriate option of urinary diversion for the patient those who permit prolong operative procedure.*

Introduction

Bladder cancer is the second most common cancer of the genitourinary tract. Radical cysto-prostetectomy in male patients and anterior pelvic exenteration in female patients coupled with disease. Urinary tract reconstruction following cystectomy is a challenge for the urologist (Afak et al,2009).

Radical cysto-prostetectomy in male patients and anterior pelvic exenteration in female patients coupled with en-block pelvic lymphadenectomy and urinary tract reconstruction or diversion remains the gold standard surgical treatment to muscle invasive bladder cancer in the absence of metastatic disease. There are various methods of urinary diversion, including continent and incontinent diversion. Cutaneous Ureterostomy and Ileal Conduit are commonly performed method of urinary diversion(Mucciardi et al, 2015).Factors that are considered to choose a urinary diversion include patients age, body habits, manual dexterity, physical and mental status, renal function, prognosis of primary disease, existing bowel pathology, prior radiation or chemotherapy, the presence of medical disease, the expectation, preferences, fears of the patients and the experience and preference of surgeon (Afak et al, 2009).

Types of urinary diversion have a great impact on different aspects of quality of life (QoL), including micturition status, physical, sexual, and psychosocial functioning, day life activities and distress related to body image (Gerharz et al,2005).

In addition, the concept of quality of life (QoL) differs significantly between cultures, countries, and races, surgical expertise and available facility. Quality of life (QoL) is more satisfactory in continent urinary diversion than incontinent diversion. But there were limited studies available in QoL and renal function in high risk patients with incontinent diversion (Asgari et al,2013).

In Bangladesh, frequently performed urinary diversions were cutaneous ureterostomy and ileal conduit as because of delayed presentation of patients.

Methodology:

Those patients with evidence of muscle invasive bladder cancer had been treated by Rradical cystectomy with Cutaneous ureterostomy or Ileal conduit urinary diversion, and who were interested to join the research work, were included in this study . Purposive sampling was done. Total 34 patients were included, among them, 17 in Cutaneous ureterostmy Group, and 17 in Ileal conduit Group. All the patients were operated in BSMMU. Total procedures included evaluation of patient; Pre-operative counseling and preparation, pre-operative assessment of Quality of Life (QoL), surgical intervention, post-operative care and follow up. The assessment of the QoL related to health was performed before and 3 months after surgery in every patient using the questionnaire "European Organization for Research and Treatment of Cancer Quality of Life questionnaire-C30" (EORTC QLQ-C30).

The EORTC QLQ-C30 questionnaire is an instrument validated for quality of life assessment in oncological patients. The most recent version, 3.0, was used in this study. Renal function was assessed by measuring eGFR before operation, on 1st and 7th POD, and again 3 months after operation.

Result:

Table I: *Patients characteristics in both group (n=34)*

	Group		p-value
	Group A (cutaneous ureterostom)	Group B (Ileal conduit)	
Sex			
Male	16 (94.1)	15 (88.2)	1.000*
Female	1 (5.9)	2 (11.8)	
Age (years)	59.00 ± 8.60	53.35 ± 8.43	0.062**
	43 – 73	35 - 71	

*Fisher's Exact test and, ** unpaired t test was done to measure the level of significance

Table II: *Pre-operative co-morbidities of the patients in both group (n=34)*

	Group		p-value
	Group A (Cutaneous ureterostomy)	Group B (Ileal conduit)	
DM	3 (17.6%)	1 (5.9%)	0.601
HTN	5 (29.5%)	4 (23.6%)	0.125
COPD	3 (17.6%)	1 (5.9%)	0.601

Fisher's Exact test was done to measure the level of significance

Table III: *Comparison of QoL in the form of functional scale before and 3 months after operation in group A (Cutateous ureteroatomy group) (n=17)*

	Before operation	After operation	p-value
Physical functioning	31.10 ± 10.15	49.41 ± 14.54	<0.001
Role functioning	29.55 ± 10.11	44.12 ± 15.52	<0.001
Emotional functioning	26.47 ± 14.80	37.25 ± 11.07	0.035
Cognitive functioning	29.47 ± 10.31	45.10 ± 12.86	0.002
Social functioning	27.45 ± 11.70	43.14 ± 13.25	0.003
QoL	28.51 ± 8.57	43.63 ± 6.93	<0.001

Table IV: Comparison of QoL in the form of functional scale before and 3 months after operation in group B (Ileal conduit group) (n=17)

	Before operation	After operation	p-value
Physical functioning	34.90 ± 8.34	74.51 ± 11.84	<0.001
Role functioning	33.33 ± 14.43	73.53 ± 15.66	<0.001
Emotional functioning	28.92 ± 8.90	67.16 ± 13.97	<0.001
Cognitive functioning	38.24 ± 11.43	85.29 ± 11.61	<0.001
Social functioning	29.41 ± 9.37	72.55 ± 14.36	<0.001
QoL	32.84 ± 7.49	73.53 ± 19.15	<0.001

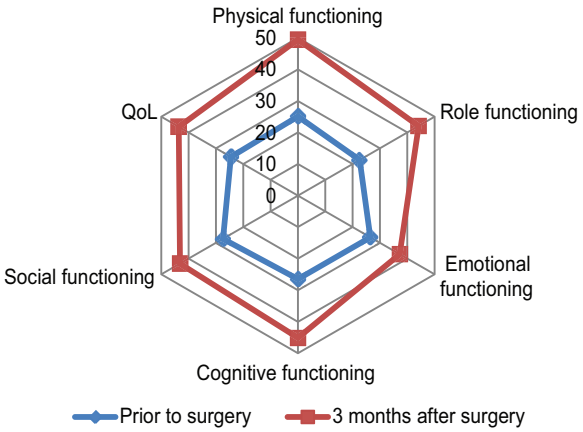

Fig.-1: *(Radar graph): QoL and functional scales before and after surgery in group A (Cutaneous Ureterostomy group)*

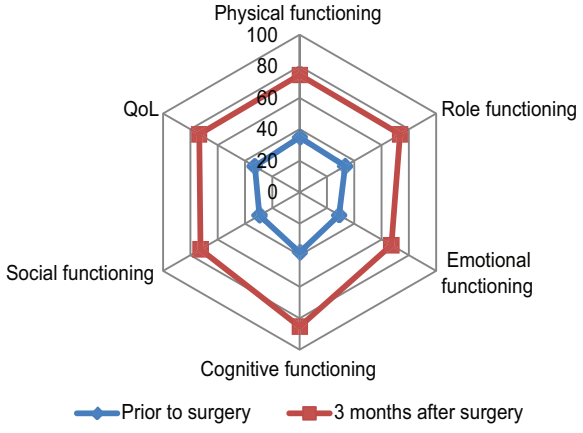

Fig.-2: *(Radar graph): QoL and functional scales before and after surgery in group B (Ileal conduit group).*

Table V: *Comparison of Quality of Life in the form of Functional scale and overall QoL, 3 months after operation between groups (n=34)*

	Group		p-value
	Group A (Cutaneous ureterostomy)	Group B (Ileal conduit)	
Physical functioning	49.41 ± 14.54	74.51 ± 11.84	<0.001
Role functioning	44.12 ± 15.52	73.53 ± 15.66	<0.001
Emotional functioning	37.25 ± 11.07	67.16 ± 13.97	<0.001
Cognitive functioning	45.10 ± 12.86	85.29 ± 11.61	<0.001
Social functioning	43.14 ± 13.25	72.55 ± 14.36	<0.001
QoL	43.63 ± 6.93	73.53 ± 19.15	<0.001

Unpaired t test was done to measure the level of significance

Table VI: *Comparison of QoL in the form of symptom scale before and after operation in group A (Cutaneous ureterostomy group) (n=17)*

	Before operation	After operation	p-value
Fatigue	79.08 ± 11.71	62.75 ± 11.75	<0.001
Nausea and vomiting	85.29 ± 13.02	58.82 ± 11.96	<0.001
Pain	77.45 ± 10.11	53.92 ± 9.37	<0.001
Dyspnea	80.39 ± 16.91	52.94 ± 16.91	<0.001
Insomnia	82.35 ± 20.81	62.75 ± 16.17	0.008
Appetite loss	94.12 ± 13.10	64.71 ± 18.52	<0.001
Constipation	52.94 ± 37.38	49.02 ± 26.66	0.543
Diarrhoea	76.47 ± 28.30	60.78 ± 21.20	0.056
Financial difficulties	60.78 ± 21.20	50.98 ± 20.81	0.264

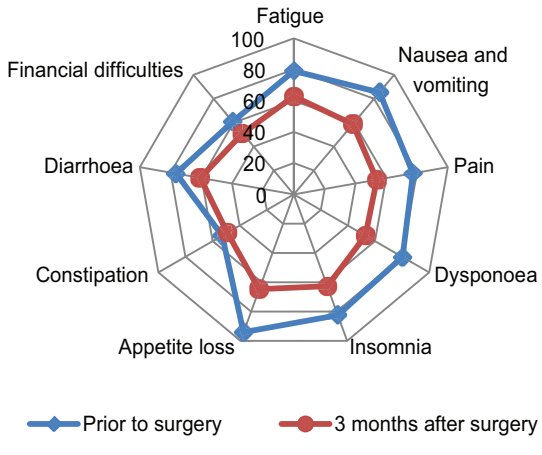

Fig.-3 (Radar graph): *Symptom scales before and after surgery in group A (Cutaneous Ureterostomy group).*

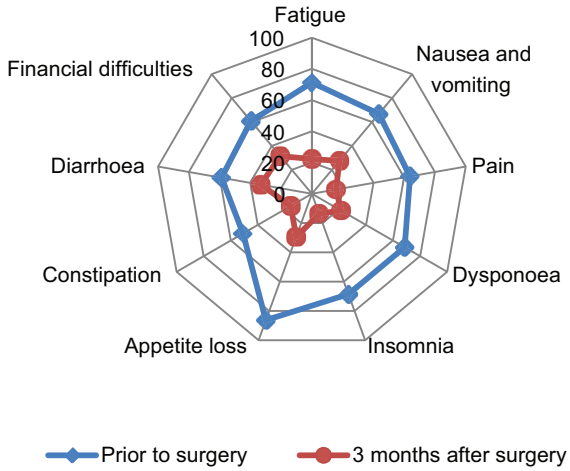

Fig.-4 (Radar graph): *Symptom scales before and after surgery in group B (Ileal conduit Group).*

Table VII: *Comparison of QoL in the form of symptom scale before and after operation in group B (Ileal conduit group) (n=17)*

	Before operation	After operation	p-value
Fatigue	71.24 ± 11.15	22.22 ± 14.16	<0.001
Nausea and vomiting	66.67 ± 13.18	27.45 ± 19.49	<0.001
Pain	63.73 ± 12.13	15.69 ± 13.78	<0.001
Dyspnea	68.63 ± 14.29	21.57 ± 20.21	<0.001
Insomnia	68.63 ± 14.29	13.73 ± 20.61	<0.001
Appetite loss	86.27 ± 16.91	29.41 ± 23.22	<0.001
Constipation	50.98 ± 37.49	15.69 ± 20.81	<0.001
Diarrhoea	58.82 ± 27.71	33.33 ± 23.57	0.014
Financial difficulties	60.78 ± 24.25	31.37 ± 24.92	<0.001

Table VIII: *Comparison of Quality of in the form of symptoms scale 3 months after Operation between groups (n= 34)*

	Group		p-value
	Group A (Cutaneous ureterostomy)	Group B (Ileal conduit)	
Fatigue	62.75 ± 11.75	22.22 ± 14.16	<0.001
Nausea and vomiting	58.82 ± 11.96	27.45 ± 19.49	<0.001
Pain	53.92 ± 9.37	15.69 ± 13.78	<0.001
Dyspnoea	52.94 ± 16.91	21.57 ± 20.21	<0.001
Insomnia	62.75 ± 16.17	13.73 ± 20.61	<0.001
Appetite loss	64.71 ± 18.52	29.41 ± 23.22	<0.001
Constipation	49.02 ± 26.66	15.69 ± 20.81	<0.001
Diarrhoea	60.78 ± 21.20	33.33 ± 23.57	0.001
Financial difficulties	50.98 ± 20.81	31.37 ± 24.92	0.018

Unpaired t test was done to measure the level of significance

Table IX: *eGFR level before and after operation (n=34)*

	Group		p-value
	Group A (Cutaneous ureterostomy)	Group B (Ileal conduit)	
Before operation	54.65 ± 9.19	64.94 ± 5.79	<0.001
After operation			
At 1st POD	52.82 ± 11.70	64.88 ± 5.80	0.001
At 7th POD	53.82 ± 9.70	64.94 ± 5.79	<0.001
After 3 months of POD	53.41 ± 9.59	64.53 ± 5.69	<0.001
% change in eGFR	2.52 ± 2.08	0.62 ± 0.77	0.001
P value (before op vs 3 months after op)	<0.001	0.004	

Unpaired t test was done between groups and paired t test was done within group

Table IX shows the level of eGFR before and after operation in both group of patients. Before operation mean (± SD) eGFR was 54.65 ± 9.19 and 64.94 ± 5.79 in Group-A and Group-B respectively, and there was a statistically significant differences in both groups ($p<0.001$). After operation eGFR was gradually decreases in both groups. 3 months after operation mean (± SD) eGFR was 53.41 ± 9. 59 and 64.53 ± 5.69 in Group-A and Group-B respectively. Percentage (%) change of Mean (± SD) eGFR values within Groups , 3 months after operation were 2.52 ± 2.08 and 0.62 ± 0.77 in Group-A and Group-B respectively. There were statistically significant differences in eGFR status from pre-operative period to 3 months after operation between and within the groups ($p= <0.001, <0.001, <0.004$).

Discussion:

After radical cystectomy urinary diversion is mandatory. The principal goal in selection of urinary diversion method is local cancer control; however, potential for short-term and long-term complications, the best Quality of Life (QoL) and post –operative renal function are also important factors. In Bangladesh usually cutaneous ureterostomy and ileal conduit are performed as a urinary diversion. In this study age of the patients ranged from 43 years to 73 years in Group-A and 35 to 71 years in Group-B. The mean age of Group-A was 59.00 ± 8.60 years and , Group-B was 53.35 ± 8.60 years which was statistically indifferent ($p=0.062$). The mean age of the patients of this study was not comparable with the study done in developed worlds (Mucciardi et al 2015, Huang et al 2015). Mean age of the present study was lower than developed world and, it's may be due to higher life expectancy in the developed world. Saika et al (2007) stated that age is not a factor in the choice of the urinary diversion method, and considered that reconstruction with neobladder after radical cystectomy for bladder cancer is the method of choice even in the elderly patients if the baseline condition of the patients allow it. Siddiqui and Izawa (2015) concluded that ileal conduit poses the least metabolic challenges making it the diversion of choice for many elderly patients and those with reduced renal function.

In this study it was observed that male predominant in both groups, 94.1% in Group-A and 88.2% in Group-B due to male predominance of the disease. Similar studies done by Osawa et al (2013), Mucciardi et al (2015), and Huang et al (2015) showed male predominance of the bladder cancer.

The male predominance in Bangladesh may be due to presence of increased risk factors in male (cigarette smoking, job profession in various chemical industries and exposure to toxin). In this study female patients were less in number because of less hospital bed number in female ward in Bangabandhu Sheikh Mujib Medical University.

In this study frequent co-morbidities were HTN, DM and COPD. Apparently more co-morbidities were observed in Group-A patients (DM-17.6%, HTN-29.5%, COPD-17.6%) than Group-B patients (DM-5.9%, HTN-23.6%, COPD-5.9%), but there were no statistically significant differences in both groups.

In this study, Quality of Life (QoL) in the form of functional scale, symptoms scale and overall QoL were assessed before and 3 months after operation in both groups and, result showed that a statistically significant improvement in almost all the parameters observed 3 months after surgery within and between the Groups. More improvement (increased functional scores and decreased symptoms scores) was observed in Group-B (Ileal conduit group) than Group-A (Cutaneous ureterostomy group), which was statistically significant ($p<0.001$). Mucciardi et al (2015) observed similar result 6 months after operation in their study. Siddiqui and Izawa (2015) observed clinically significant improvement in QoL after radical cystectomy with Ileal conduit.

Anderson et al (2012) used a condition specific health –related quality of life (HRQOL) survey known as Functional Assessment of cancer therapy –Vanderbilt Cystectomy index (FACT-VCI) to assess QoL after radical cystectomy. This study reported a clinically significant improvement in QoL after Ileal Conduit.

Some authors state that considerations about the current quality of life are of great importance to assess the results of a surgical intervention and that they are one of the main reasons at the time of choosing the urinary diversion after a radical cystectomy (Lee et al, 2014).

Despite the fact that urinary problems and sexual dysfunction are common to all methods of urinary diversion (Saika et al 2007), the QoL related to health seems to be relatively good in elderly patients after radical cystectomy for bladder cancer , regardless of the urinary diversion method chosen.

One major problem in comparing the results of different studies is a lack of universal standard

questionnaire for the purpose of addressing different domains of QoL in cystectomized patients. The problems include lack of standard definition of QoL, and cultural differences in judgment and expression of both physical and emotional health. In addition, sample size, study design and characteristics of the population analyzed are also confounding factors. The potential effects of sociocultural settings on the concept of QoL have also been raised. The cultural pattern of the studied population can affect the study results. Patients education, describing the pros and cons of the different urinary diversion methods, and active participation of the patient in selecting treatment methods (shared decision making) appear to be some of the key points to post-operative QoL and satisfaction.

One of the major limitations of this study was lack of addressing the sexual life of the patients, which is an important item of QoL. Asgari et al (2013) stated that erectile dysfunction occurred irrespective of type of urinary diversion and there were no statistically significant differences in different type of diversions. They also concluded that the rate of satisfaction from sexual life in different type of diversions did not reach in statistically significant differences.

In this study , in pre-operative period , mean eGFR was less in Group-A (54.65 ml /min) than Group-B (64.94 ml /min) and It's may be due to more comorbidities (DM, HTN, pre-operative HDUN) in Group-A and, the difference in both groups was statistically significant ($p< 0.001$). Osawa et al (2012) observed comparable result of pre-operative eGFR in their study ($p=0.01$).

The time dependent changes of mean eGFR status at 1^{st} POD, 7^{th} POD and, after 3 months of operation were statistically significant between two groups ($p<0.05$). Percentage of eGFR changes (reduction) 3 months after operation from base line were 2.52% in Group-A and 0.62% in Group-B and, the changes (reduction) were statistically significant within the groups, and in between two groups. Although significant but comparatively less deterioration of eGFR was observed in Group-B (Ileal conduit group) than Group-A (Cutaneous ureterostomy group).

Current result differ from, the study by Osawa et al (2013) in which, they showed that there was no significant difference in renal deterioration among the different types of diversions. Hatakeyama et al (2016) concluded that types of urinary diversion had no significant effect on renal function decline. It was also different from the current study.

In the present study, in Group-B (Ileal Conduit) mean eGFR reduction (0.41ml/min/1.73m2) was less than the define value (>1ml/min/1.73 m2), but in Group-A (Cutaneous Ureterostomy) mean eGFR reduction (1.24ml/min/1.73m^2) was more than the define value of deterioration and, the difference was statistically significant ,although study period was short.

At the end of the discussion, the present study suggested that post- operative Quality of life and renal function were better in ileal conduit group (Group-B) than cutaneous ureterostomy group (Group-A) following radical cystectomy for muscle invasive bladder cancer.

Conclusion:

Quality of life, after Radical Cystectomy with Ileal conduit is superior in all aspect than Cutaneous ureterostomy and, post-operative Renal function reduction rate is less in Ileal conduit Group than Cutaneous ureterostomy Group, Ileal conduit is an appropriate option of urinary diversion for the patients who have base line physiological parameters that permit prolong operative procedure.

Ethical issues: The protocol was submitted to Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University for their approval, and their permission was taken prior to the Research work.

Informed written consent was taken from each of the patient after proper counseling.

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