



COMPLICATIONS OF RADICAL CYSTECTOMY : A SINGLE CENTRE EXPERIENCE

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ABSTRACT

Anemia was the most common hematological complication. Minor wound infection represented 55.5% of the infectious complications. GI complications mostly consisted of ileus or small bowel obstruction (61%), with re-exploration required in 2 patients (9.5%) of the patients. Eight patients required interventions under general or local anaesthesia for the management of high-grade (≥III) complications. 2 patients underwent percutaneous nephrostomy for ureteroileal or vesicourethral anastomotic leak. Re-exploration for intestinal obstruction was needed for 2 patients. Three patients, one of ONB group and two of IC group required reexploration for burst abdomen.

KEYWORD

Muscle invasive , Radical cystectomy, Clavien Dindo complication, bladder tumor.

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INTRODUCTION:

RC is the most widely treatment modality for muscle invasive bladder cancer in the absence of metastatic disease.^{1,2} Over the past decade a shift in the patients' population characteristics is evidently seen with more and more older patients with comorbidities are being treated with RC.

Mortality and morbidity associated with this radical procedure ranges between 30-70% and 0.3 – 5.8% as per the literature in various centres. There are many audits and reports addressing the complications after RC but they lack scientific basis and are subjective. Very few reports have considered patients comorbidities before reporting the complications.

An accepted standard for reporting complications did not exist in the urological literature until 2007.³

In this audit we have used modified Clvien Dindo classification for reporting the complications in the first 90 days in the post op period.^{4,5}

Preoperative risk factors and type of urinary diversion was also looked at.

Material and Methods :

Data on RC performed between January 2012 and Feb 2017 were collected from medical record department and hospital information system. Of the 58 patients who underwent RC over this period,

orthotopic neobladder (ONB) was done in 25 patients, ileal conduit (IC) in 33. The indications for surgery were muscle invasive urothelial carcinoma, high-grade nonmuscle invasive BC, and Bacillus Calmette-Guerin-resistant nonmuscle invasive BCs. Data on age, sex, comorbidities, smoking history, body mass index (BMI), American Society of Anaesthesiologists (ASA) score, and details of urinary diversion were recorded. Pre- and post-operative

haematological investigations and serum chemistries were also recorded. Clinical and pathological stages were evaluated for all the patients according to the tumour node metastasis 2010 staging system.⁶

The Charlson Comorbidity Index contains 19 categories of comorbidity and predicts the ten-year mortality for a patient who may have a range of co-morbid conditions. Each condition is assigned with a score of 1,2,3 or 6 depending on the risk of dying associated with this condition.

The CCI index were recorded to have an insight into the high vulnerability of the patient for complications.⁷

Attribute	ONB	IC
Number	25	33
Age(years) mean	62.4	59.4
Gender : Male	25	24
Female	0	9
Smoker	9	20
DM	5	6
HTN	8	15
CAD	1	3
BMI	26.4	25.6
Preop Hb	10.2	9.8
ASA>3	9	16
CCI >3	8	17
HDN	6	12
Tumour size (mean in cms.)	3.8	4.6
Mean Operative time (minutes)	380	320
Intraoperative blood loss (ml)	1150	1000

Combined Nephroureterectomy	0	3
Length of stay(days)	19	16

Table 1: Baseline characteristics of patient group

Polyethylene glycol solution was routinely administered a day before the surgery for bowel preparation. However this practice was done away in the last 15 cases as it was perceived to be associated with prolonged paralytic ileus. Deep vein thrombosis prophylaxis as elastic compressive stocking was used in all the patients, but low molecular weight heparin was administered in selected patients only. All RCs were done with open approach, and standard steps of surgery were followed. Lymphadenectomy was done up to the bifurcation of the aorta. Ileal ONB was made according to the Studer technique.[8,9,10]

All uretero-intestinal anastomosis were stented regardless of the form of urinary diversion for at least 7 days.

Patients were followed up after surgery at 1 month, then 3 monthly for 2 years, and 6 monthly thereafter. All early complications within 90 days of surgery were recorded and classified into five grades according to the modified Clavien-Dindo classification system.[7]

Statistical analysis was performed using the SPSS 16.0 software (Chicago, USA). For continuous data, normality was tested using Anderson Darling test. Fisher's exact test and Chi-square-test were used to test the difference in proportions, as appropriate, and P < 0.05 was considered statistically significant. ANOVA test was used to compare the means among independent groups.

RESULTS

Table 2 : Complications of radical cystectomy classified according to the modified Clavien-Dindo system

GRADE	COMPLICATIONS	NUMBER	ONB	IC	
GRADE 1	Paralytic Ileus	17	7	10	
	Superficial wound infection	10	4	6	
	Transient elevation of S.Creatinine	2	1	1	
	Lymphorrea	1	1	0	
	Urinary Leak	1	1	0	
	Diarrhoea	2	1	1	
	Dyspnoea	2	1	1	
GRADE 2	Blood transfusion for anaemia	29	12	17	
	Wound Infection	8	3	5	
	UTI	3	2	1	
	Metabolic derangement	4	3	1	
	Ileus requiring treatment	3	1	2	
	DVT	1	0	1	
	Pneumonia	2	1	1	
	Delirium	1	0	1	
GRADE 3 A	Urine leak require PCN	3	2	1	
	Lymphocele	1	1	0	
	Small bowel obstruction	2	1	1	

	HDN	2	1	1
	Int. iliac artery aneurysm	1	1	0
	Slipped out PUC catheter	2	2	0
GRADE 3 B				
	Reexploration for bowel obstruction	2	1	1
	Burst abdomen	3	1	2
	Rectal Injury	2	0	2
GRADE 4				
	Myocardial Infarction	1	0	1
	ARDS	1	1	0
	Renal failure	3	1	2
	Sepsis	3	1	2
	Pulmonary artery thrombus	1	1	0
	External artery thrombus	1	1	0
GRADE 5	Death	4	2	2

A total of 58 patients underwent RC and urinary diversion with a mean age of 58.15 ± 10.82 years. Majority of the patients were male (49/58). Diabetes mellitus, hypertension, and coronary artery disease were the major comorbidities in 11,23, and 4 patients, respectively [Table 1]. The mean BMI was 26.4 kg/m2 (24.2–28.6) in the ONB group and 25.6 (23.8-26.4) in the IC group.

Patients with ASA ≥3 and CCI > were was 36.0%.and 48.5% in ONB group and 48.5% and 51.5 % in the IC group respectively.

RC with ONB was done in 25 patients and that with IC was done in 33 patients depending upon the stage , renal parameters , patient's desire and compliance to surveillance related issues.

Intraoperative blood loss was 1150ml (770–1500 ml).in the ONB group and 1000 ml(750- 1250 ml) in the IC group.

ONB required a significantly (P < 0.05) longer operative time (mean - 380 min.) as compared to Ileal conduit (mean -320 min).

The overall length of hospital stay (LOS) was 19 days (17-24 days) (range: 12–35 days).

Mean tumour size was 5.3 ± 1.4 cm. Mean number of lymph nodes removed was 9.92 ± 7.13. Majority of the tumours were T2 stage (28/58). Overall, 12 patients (20.68%) had pathologicalN+ disease.

Patients with ONB were more likely to have a lower tumour stage (T2 or less) (76.00 %) as compared to IC (45.45%). In three patients, nephroureterectomy (right side –2, left side – 1 was done in addition to RC. In all the three patients, there was extension of bladder growth into the terminal ureter with proximal gross hydronephrosis and thinning of the renal parenchyma. The mean split function of the hydronephrotic kidneys was 7.6% ± 1.4%.

TABLE 3 : Characteristics of patients having higher grade of complications

ATTRIBUTE	ONB (CDC) n= 9			IC (CDC) n=12		
	Gr 3	Gr 4	Gr 5	Gr 3	Gr 4	Gr 5
T Stage > 2	2	4	1	4	3	2

BMI > 30	1	4	2	4	3	3
ASA >3	2	4	1	2	3	3
CCI > 3	2	3	2	3	4	2
Age > 70	1	2	2	2	4	3

A total of 115 complications were recorded in 42/58 (72.0%) patients. 91 complications (79.3%) occurred in the first 30 days, with the remaining 24 complications (20.7 %) occurring between 31 and 90 days postoperatively.

The majority of complications (86/115, 74.78%) were classified as low-grade with 30.4% in Grade I and 44.34 % in Grade II.

High-grade (Clavien-Dindo Grade III-V) complications were seen in 16/58 (27.58%) patients. Grade IIIa, IIIb, IV and V complications comprised 6.9%, 6.1%, 8.7% and 3.5% respectively of the total [Table 2].

The overall mortality rate within the first 90 days after surgery was 6.8% (4/58). When comparing the two types of urinary diversion for complication rates, the result was statistically insignificant (ONB and IC (P = 0.344)). The mean preoperative haemoglobin was 11.2 g/dL while the mean postoperative haemoglobin was 8.9 g/dL. The mean preoperative serum creatinine was 1.4 mg/dL.

Of the 58 patients, 10(17.24%) had preoperative serum creatinine >1.5 mg/dL. Of them, 5/58 patients (8.6%) presented with gross hematuria and acute renal injury. All these were managed with urgent bilateral percutaneous nephrostomies, following which there was post obstructive diuresis.

The mean preoperative albumin for the entire study group was 3.2 g/dL. Among the 42 out of 58 patients who developed complications, the mean preoperative albumin was 2.8 g/dL while for those without complications (n = 16), the mean albumin was 3.9 g/dL.

Hematologic complications (29/115 or 25.21%) were the most common followed by infectious complications (18/115 or 15.6 %),gastrointestinal (GI) complications (21/115 or 18.26%), genitourinary complications (12/115 or 10.43%), and pulmonary complications (07/115 or 6.1%).

Anemia was the most common hematological complication. Minor wound infection represented 55.5% of the infectious complications.

GI complications mostly consisted of ileus or small bowel obstruction (61%), with re-exploration required in 2 patients (9.5%) of the patients. Eight patients required interventions under general or local anaesthesia for the management of high-grade (≥III) complications. 2 patients underwent percutaneous nephrostomy for ureteroileal or vesicourethral anastomotic leak. Re-exploration for intestinal obstruction was needed for 2 patients.

Three patients , one of ONB group and two of IC group required reexploration for burst abdomen.

3 patients which required concomitant Nephroureterectomy had a prolonged intraoperative time by about 70 minutes over the mean and all had one or more high grade complications.

On pt. needed exploration for peritonitis due to incidental jejunal tear which got unnoticed during the primary surgery and later required jejunal resection and anastomosis.

2 patients of ONB had a slipped out PUC during mobilisation in the 4 th and 6 th post op day respectively , flexible

urethroscopy and PUC insertion was done over a guide wire under local anaesthesia.

One patient of ONB developed internal iliac artery aneurysm after 30 days of primary surgery and presented with gross hematuria .Pt. was readmitted and angioembolisation was done successfully to treat the condition.

Another pt. of neobladder developed lt .external iliac artery embolus on post op day 2 manifested by enema and painful movement of the limb. Pt. was taken for emergent thrombectomy and started on anticoagulant therapy in the post op period.

2 patient one of IC and one of ONB developed pulmonary embolism and were successfully managed by medical therapy.

DISCUSSION:

In this study, an attempt is made to classify the complications arising post Radical Cystectomy which is considered one of the most challenging Urological procedure using modified Clavien Dindo Classification.

There exists a big void with regard to the quality of reporting complications due to lack of universally accepted grading system.

To improve the quality of reporting surgical complications, Martin et al. proposed 10 criteria to enhance the accuracy and comparability of the surgical literature.¹² These criteria included, for example, methods of acquiring data, inclusion of outpatient data, definition of complications, inclusion of risk factors and the use of a grading system.

The demographical attributes of patients presenting in our institute are significantly different from that of western world. Most of our patients are of advanced stage of the disease , relatively younger ,had a low mean BMI and are nutritionally compromised.

Complication rates were more in our audit with respect to contemporary literature^{13,14,15,16,17,19}

We had a total of complications CDC (1-5) occurring in 42 (72.4%) of 58 patients.

Shabsigh¹³ reported a 90-day overall complication rate of 64%, whereas Novara¹⁶ and Schiavina¹⁷ recorded a rate of 49% and 52% in their cohorts, respectively.

In our study most of the complications were low grade (74.78%) ,grouped under CDC(1,2) and were managed conservatively.

The more important high grade complications (CDC 4,5) comprised 25.22% i.e. 29 of the total 115 complications and included 4 pts. (6.8%) mortality in the 90 day postoperative period.

Studies by Shabsigh¹³ Novara¹⁶ and Schiavina¹⁷ have shown high-grade complication/mortality rate of 13.9 and 3%,⁸ 13 and 2.7%,¹² and 17.3 and 4.5%,¹³ respectively.

Our high grade complications rates and mortality is significantly higher than the contemporary western series owing to the higher stage at presentation and more contribution of orthotopic neobladder subgroup to the total pool which is technically more challenging and associated with more genitourinary complications.

Grade IIIa complications in the present study were comparable to De Nunzio et al.[15] (8.16%), but their Grade

IIIb complications (4.71%) were lower than that reported in the present series 7.14%. The reasons could be two-fold. First, we have reported intraoperative rectal injury in 2 cases and graded them as Grade IIIb. Intraoperative injuries were not reported in previous studies as CDC complications; however in the original description by Clavien it was mentioned that intraop event can be mentioned a complication by adding a suffix 'I' 18

All fascial wound dehiscence repairs were undertaken under anesthesia which increased the CDC grade. Thus management policies could have a bearing on final values. In our study, mortality was 6.85% (4/58) which was significantly higher than other contemporary studies.

One pt. had a florid sepsis developing into a multiorgan dysfunction and subsequent cardiac failure and death. Two patients had pneumonia and acute respiratory distress syndrome leading to respiratory arrest and death. 1 patients developed electrolyte imbalance in the immediate post op period and subsequent myocardial infarction and death.

.It was observed that hematologic complications (25.2%) was most common, primarily due to the low preop Hb (mean 10gm%) of the patient population and normal expected blood loss associated with the procedure.

Other complications by order of magnitude being infectious (18.3%), Gastrointestinal (15.6%), Genitourinary (10.4%) and Pulmonary (6.1%).

Ileus was most common GI complication and 2 patients required re-exploration for suspected bowel obstruction.

Overall patients in ONB group were younger than that in IC group and were likely to have more genitourinary and infective complications.

This is supported by study by Srimson et al. 19

Rates of blood transfusion were equal in both groups and as the T stage rose so did the frequency and severity of complications.

More complications were seen with T3 and T4 disease patients.

Higher grades of complications are also consistently associated with ASA > 3, CCI > 3, BMI > 30 and age > 70 years.¹⁹

Our study showed the median LOS as 19 days for the ONB group and 16 days for the IC group and it was significantly higher in pts. with higher grade of complications.

This effort may help in realizing the magnitude of the complications associated with this surgical procedure, the importance of proper optimization of patients in the preop period and counseling of the patients and relatives as well set a benchmark for other to decrease the complications.

There are few limitations to this study: foremost it being a retrospective study inherent risk of missing some vital information is always as the data was retrieved from medical record section and hospital information system.

Conclusion

Radical cystectomy is associated with complications in about 70% of the patients but fortunately most are low grade and easily manageable.

About one fourth of complications are high grade as per Clavien-Dindo classification which are strongly associated with patients' characteristics such as higher disease stage and

preexisting comorbidities.

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