Perioperative complications of orthotopic neobladder after radical cystectomy for carcinoma of urinary bladder: A Retrospective Study

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Abstract

Background: The gold standard treatment for muscle-invasive bladder cancer is radical cystectomy (RC) with urinary diversion. Urinary diversion is performed in either as continent or incontinent forms. Orthotopic neobladder has the benefits of continent reservoir with voiding from the urethra. The mortality and morbidity rates ranged from 0 to 9.0% and 30 to 70%, respectively in various reports. For surgical outcome assessment, Clavien-Dindo classification is widely accepted for classification of complications of most of the surgical procedures. This study will be helpful to identify the potential complications and possibly minimize the morbidity and mortality of this surgery in the future.

Materials and Methods: Data of 20 consecutively enrolled patients who underwent radical cystectomy and orthotopic neobladder form January 2023 to July 2024 at Urology unit of B.P. Koirala Memorial Cancer Hospital were taken for study from hospital medical records. The various demographic data and perioperative parameters were recorded. The early complications were defined as the complications during the period of hospitalization and up to 30 days of surgery, they were enlisted and then classified according to Clavein-Dindo Classification and the continence was reviewed at 1 month of surgery after catheter removal and after 3 months of surgery. Data was entered in SPSS 27 software and analyzed.

Results: Complications were seen in 18 (90%) patients out of which 1 (5%) patients had Grade I complication, 12 (60%) patients had Grade II, 3 (15%) patients had grade IVA and 2(10%) had died. 5 (25%) patients developed high grade(≥ Grade III) complications. Mortality rate was 5%.

Conclusion: Radical cystectomy with any forms of diversion is associated with high rate of morbidity and mortality. In order to identify and minimize the complications of this surgery in future, Clavein-Dindo classification is the standardized way of reporting the complications

Keywords: Radical Cystectomy, Orthotopic Neobladder, Postoperative complication

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Introduction:

Bladder cancer is the second most common urological malignancy, with transitional cell carcinoma making up nearly 90% of all primary bladder tumors.[1] The major risk factors for bladder cancer are environmental, tobacco smoking, exposure to toxic industrial chemicals and gases, bladder inflammation due to microbial and parasitic infections, as well as some adverse side-effects of medications.[2] Bladder cancer has been divided into Non muscle invasive (NMIBC) and Muscle invasive bladder cancer (MIBC) accounting for 75% and 25% of the bladder cancer as an initial presentation. [3]

Regional therapy involves maximal transurethral resection of bladder tumor (TURBT) followed by treatments such as intravesical chemotherapy, intravesical immunotherapy, extirpative surgery, or chemoradiation. Pathologic staging and risk stratification are used to help guide further therapy.[4] Radical cystectomy with pelvic lymph node dissection is by far considered the gold standard treatment for muscle invasive bladder cancer.[5] The Indications of radical cystectomy are MIBC, and among NMIBC; very high risk category, BCG refractory, relapsing, unresponsive and intolerant, some variant histology. [6]

Radical cystectomy has evolved from open radical cystectomy to laparoscopic to robot assisted radical cystectomy with comparable oncological outcomes as well as perioperative complications. [7] Technical advances and the ability to use smaller incisions may ease recovery, limit complications, and decrease in-hospital recovery time. A more limited in-hospital length of stay (LOS) potentially may offset the additional equipment-related costs. [8]

Radical cystectomy represents routine surgery in patients who suffer from invasive bladder cancer. Even though cystectomy is a major procedure with a significant complication rate, our results demonstrate that radical cystectomy can be safely performed with acceptable morbidity and mortality in properly selected patients. It seems that improvements in surgical and anesthesia techniques, and increased team vigilance in perioperative care have resulted in reduced morbidity and shorter hospital stay. [9] The complications of radical cystectomy and orthotopic neobladder are blood loos requiring transfusion, post operative fever, postoperative bowel ileus, mechanical bowel obstruction, urinary tract infection, ureteral catheter blockage, anastomosis leaks of intestines or ureters, urinoma formation, complications of urethra-neobladder anastomosis, incontinence of urine, retention of urine, pyelonephritis, pulmonary embolism, ureteral catheter issues and metabolic complications. The complications can be graded as per Clavien Dindo classifications. [10]

Among various classifications of complications, the Clavien–Dindo classification (CDC) is applicable to most procedures for comprehensive surgical outcome assessment.[11] Clavien developed classification system for surgical complications in 1992 which was modified by Dindo et al. in year 2004. [12,13]

Materials and methods

Patient selection

Data of 20 consecutively enrolled patients who underwent radical cystectomy and orthotopic neobladder form January 2023 to July 2024 at Urology unit of B. P. Koirala Memorial Cancer Hospital were taken for study from hospital medical records. A proforma sheet was created to enumerate the information on clinical examination, laboratory data, Operative procedure, post operative complications and the follow up data of 2 months. The information of contrast enhanced CT scans of chest, abdomen and pelvis were done in all patients were reviewed in details and recorded. Previous biopsy report/ variants were recorded.

The patients underwent pre-defined radical cystectomy and with standard pelvic lymph node dissection along with Ileal neo bladder of studers type under general anaesthesia. The operative time, intra-operative blood loss and length of abdominal incision were also recorded. The duration of ICU stay, requirements of antibiotics and its duration of use, use of analgesics and its type, proton pump inhibitors, prokinetics and diuretic agents were reviewed. Low molecular weight heparin and potassium in IV fluids were started on first post operative day or as per need. The daily drain and urine out puts and the post-operative day of drain removal, stent removal were recorded. All the complications that were observed during the period of recovery were recorded. Duration of hospital stay was noted. The complications related to neobladder like: unability to void after catheter removal, leakages were also recorded. The final histopathology report was reviewed and compared to previous histopathology reports of TURBT if available. Also noted the site, size, margin status, tumor grade, extension and lymph nodes status along with lympho-vascular and perineural extension were noted. All the patients were advised to do pelvic floor muscle training exercise by contracting and relaxing the pelvic floor muscles and anal sphincter in early post-operative days. The time/ days of foleys catheter removal was noted. The day time and night time incontinence episodes were reviewed at 1 month and 3 months follow ups. The postoperative complications are enlisted and then classified according to Clavein-Dindo Classification. Univariate analysis was done, using student's independent t-test for continuous variables and chi-square test for categorical variables.

Data Analysis: Data are analyzed using SPSS 27 software.

Definition of Early Complication

Postoperative morbidity and mortality was defined as complications and death from any cause occurring during hospitalization or within 30 days of surgery.[12] Postoperative complications during the hospital stay are recorded and classified according to Clavein-Dindo classification. [13]

Table 1: CD classification

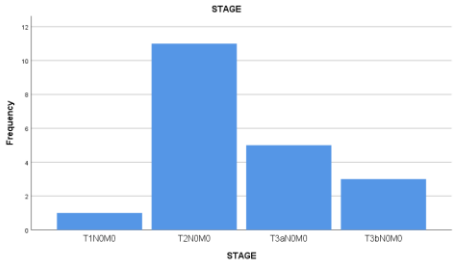
Grade	Definition
I	Any deviation from the normal postoperative course without the need for pharmacological treatment, or surgical, endoscopic, and radiological interventions. Allowed therapeutic regimens are: drugs as antiemetics, antipyretics, analgesics, diuretics and electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside
II	Requiring pharmacological treatment with drugs other than such allowed for grade I complications, or requiring blood transfusion or total parenteral nutrition
III	Requiring surgical, endoscopic, or radiological intervention
IIIa	Intervention not under general anesthesia
IIIb	Intervention under general anesthesia
IV	Life-threatening complication (including central nervous system complications) requiring intensive care unit (ICU) management
IVa	Single organ dysfunction (including dialysis)
IVb	Multiorgan dysfunction
V	Death of a patient

Surgical site infection which did not require any intervention were classified as Grade I. Patients with postoperative pneumonia, paralytic ileus, pyelonephritis and those requiring total parenteral nutrition (TPN) and Blood transfusion were classified as Grade II. Patients with bowel obstruction or peritonitis, wound dehiscence who needed surgery under general anesthesia were classified as Grade IIIB while those who did not require general anesthesia taken as Grade IIIA. Patient with single organ dysfunction or septic shock who needed inotropic support were classified as IVA while those with multiorgan dysfunction as Grade IVB. Death of the patient was taken as Grade V.

Results

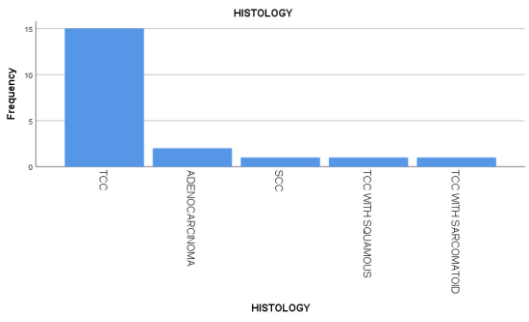
In this study of 20 patients out of which 17(85%) were male and 3(15%) were female. The mean age was 53 ± 10 years with a range of 34-72 years. The mean duration of hematuria on presentation to hospital was 3.15 ± 1.0 months (range 2-6 months). Eleven (55%) patients were smokers while 9 (45%) were non-smokers. Three (15%) patients had history of alcohol intake. The preoperative ASA grade was 1 in 15 (75%) patients and 2 in 5 (25%) patients. The performance status of patients ECOG 0 in 16 patients (80%) patients and ECOG 1 in 4 (20%) patients. Three (15%) patients were hypertensive. Two (10%) patients received neoadjuvant chemotherapy. Hydroureteronephrosis was seen in 5 (25%) patients. Preoperative Blood transfusion was done in 4 (20%) patients. Intraoperatively, intravesical disease was seen in 16 (80%) patients. Transitional cell carcinoma was seen in 15 (75%) patients, adenocarcinoma in 2(10%), squamous cell carcinoma in 1(5%), TCC with squamous differentiation in 1(5%) and TCC with sarcomatoid differentiation in 1(5%) patients.

Mean duration of operation was 327.5 ± 52.72 minutes with range of 245 to 495 minutes. Mean Operative Blood Loss was 889.5 ± 340.79 ml with range of 370 to 1750 ml.



Postoperative blood transfusion was necessary in 16 (80%) patients. Postoperatively, the mean duration of ICU stay was 3.55 ± 2.66 days with range of 2-10 days. Inotropic support was required in 5 (25%) patients.

Table 2: Basic parameters	
Parameter	Values (X±SD)
Age in Years	53±10
Symptoms in Months	3.1±1
Hemoglobin % (gm)	12.3±1
Cr	0.9±0.1
Albumin	3.5±0.4
Duration of Surgery	327±52
Blood Loss	889±340
ICU Days	3.5±2
Mean Length of Hospital Stay	19±5



Complications were classified according to Clavien-Dindo classification and complications were seen in 18 (90%) patients out of which 1 (5%) patients had Grade I complication, 11 (55%) patients had Grade II, 4 (20%) patients had grade IVA and 1(5%) mortality occurred in postoperative period due to MODS. 5 (25%) patients developed high grade (≥ Grade III) complications.

Mean length of hospital stay was 19.1 ± 5.78 days with range of 14-35 days. After catheter removal after about 2 weeks, almost 90% patient had increased frequency. 2 patients went into retention after catheter removal due to mucus and were re-catheterized again which was removed 5 days later. At 1st month 50% patients were daytime continent and but were incontinent in night. At 3 months 75% of patients were daytime continent and 50% were night time continent.

Overall events of postoperative complications

Table 3: Complications in CD classification		
CD	Parameter	#
GI Complications		
II	Paralytic Ileus	5
IIIB	Mechanical Bowel Obstruction	1
IIIB	Anastomosis Leak	2
IIIB	Rectal Leak	1
IIIB	Pouch Leak	1
Infectious		
II	Pyelonephritis	2
II	Pneumonia	1
IVA	Septic Shock	5
Wound Related		
I	SSI	3
IIIB	Dehiscence	1
Blood Transfusion		
II		16
TPN		
II		3
Mortality		
V		1

Discussion

Radical Cystectomy in Urology is a surgical procedure associated with

relatively high morbidity and mortality. In our study, we observed an overall complication rate of 90 %, with approximately 25 % of patient experienced high grade complications which is higher than those reported in other studies (11.2 %–14.2 %).[21,21,22] Notably, paralytic ileus and blood transfusion requirement were frequently noticed complications in our study. Perioperative mortality at 30 days varies from 1.2% to 3.2%, based on large series data which is 5% in our study.[16,17] Maibom et al. concluded in his systematic review (2021) that during first 30 days of radical cystectomy, 1 out of 3 patient developed complications and 1 out of 5 patient develop major complications.[15] In our study, we found GI complications (41.7%), infections related (21.7%), Wound related (11.7%). Nitesh et al. (2016), concluded in his study that hematologic complications accounted for 28.42% of all complications along with infectious complications (18.49%), GI complications (18.15%), genitourinary difficulties (15.41%), and pulmonary complications (7.5%).[10] Hirobe et al. (2018) concluded in his study that 149 patients (80.5%) had 328 postoperative problems noted out of which 46 patients (24.9%) experienced high grade (≥ Grade III) episodes, of which 73 (22.2%) were.[17] Aziz et al. (2014) in their prospective study found that mortality rate of 9% within 90 days of radical cystectomy.[18] It is due to the fact that our study takes account of 30 days as cut off for early postoperative complication.

Yao-Guang Zhang et al. (2017) concluded in his study that the daytime incidence of continence at the 6th, 12th, 24th, 36th, and 48th months can reach 63%, 70%, 76%, 88%, and 92%, respectively. We observed in our study 50% patients were daytime continent and none were night time continent at 1st month after ONB and 75% patients were daytime continent and 50% were nighttime continent at 3rd month. The status of continence should be evaluated at 12 and 24 months after ONB before proceeding with any type of surgical intervention.[26] The same group has observed and learned less complications in due course of learning curve and with stringent selection criteria.[27]

Conclusion:

Radical cystectomy is a procedure with some higher rate of morbidity in urological surgical field. The majority of the complications are minor. However, morbidity and mortality can probably be decreased with careful patient selection, surgery performed by skilled surgeons, treatment at high volume canters and the application of an Enhanced Recovery After Surgery (ERAS) protocol. Clavein-Dindo classification is the standardized way of reporting complications of radical cystectomy with orthotopic neobladder in bladder cancer. The idea behind this study is to identify the potential complications and possibly minimize the morbidity and mortality of this surgery in the future.

Conflict of interest

None

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