Postoperative Complications of Radical Cystectomy and Urinary Diversion using Clavein-Dindo Classification in Tertiary Care Hospital

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Abstract

Background: The gold standard treatment for muscle-invasive transitional cell carcinoma of the bladder is radical cystectomy (RC) with urine diversion. The mortality and morbidity rates ranged from 0 to 9.0% and 30 to 70%, respectively in various reports. Among various classifications of complications, the Clavien–Dindo classification (CDC) is applicable to most procedures for comprehensive surgical outcome assessment. The study will be helpful to identify the potential early postoperative complications and possibly minimize the morbidity and mortality of this surgery in the future.

Materials and Methods: Prospective study of 60 patients with Bladder Cancer fulfilling the inclusion criteria who underwent radical cystectomy with urinary diversion was collected from January 2023 to June 2024 at B.P. Koirala Memorial Cancer Hospital. The various demographic data and perioperative parameters were recorded. The early complications defined as the complications during hospitalization or within 30 days of surgery were enlisted and then classified according to Clavein-Dindo Classification. Data were analyzed using SPSS 25 software.

Results: Many patients, 56 (93.33%) patients had some form of postoperative complications of radical cystectomy with urinary diversion. Of these, GI complications were (41.7%), infections related (21.7%), Wound related (11.7%) and others. 23 (38.33%) patients had high grade (≥ Grade III) complications. The

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mortality rate was 6.7%.

Conclusion: Radical cystectomy is complicated surgery involving at least 2 systems in the body *ie* genitourinary and Gastrointestinal systems. So it is associated with higher rate of morbidity.

Keywords: Cystectomy · Comorbidity · Postoperative complication · Urinary bladder cancer

Introduction:

Bladder cancer accounts for 3% of global cancer.[1] Muscle invasive Bladder Cancer accounts for 75% of bladder cancer.[2] The gold standard treatment for muscle-invasive transitional cell carcinoma of the bladder is radical cystectomy (RC) with bilateral pelvic lymph node dissection and urine diversion.[3] Radical cystectomy can also be offered to patients with non-Muscle invasive bladder cancer with BCG-unresponsiveness, BCG-Relapse, BCG-recurrence and very-high risk or high risk tumors.[4] Bladder cancer incidence rises sharply with age, with the disease striking most people when they reach the age of 70.[5] Studies using typical follow-up, typical criteria of complications, and retrospectively gathered data are increasingly in demand.[6] The mortality and morbidity rates ranged from 0 to 9.0% and 30 to 70%, respectively in various reports.[7] Treatment-related morbidity and mortality rates have declined in the last two decades as surgical procedures and perioperative care have improved.[8] Among various classifications of complications, the Clavien–Dindo classification (CDC) is applicable to most procedures for comprehensive surgical outcome assessment.[9] Clavien developed classification system for surgical complications in 1992[10] which was modified by Dindo et al. in 2004.[11] In this study, we will discuss early assess the incidence of early postoperative (in-hospital) complications of Radical Cystectomy and Urinary diversion for Urinary Bladder Carcinoma using Clavein-Dindo Classification system.

The study will be helpful to identify the potential early postoperative complications of radical cystectomy with urinary diversion and possibly minimize the morbidity and mortality of this surgery in the future.

Materials and methods:

Patient selection and assessment of data:

From January 2023 to June 2024, 60 patients who underwent radical cystectomy with urinary diversion for carcinoma urinary bladder at B.P. Koirala Memorial Cancer Hospital, Chitwan were selected in consecutive enrollment as per admission and surgery. Patients included in the study are those with Carcinoma urinary bladder who are planned for Radical Cystectomy with urinary diversion. Patients with Muscle Invasive Bladder Cancer (MIBC), Non-responders to conservative therapy, Recurrence after bladder conserving therapy, BCG-refractory, BCG-unresponsive, BCG-relapse or Recurrent High Grade tumors were included in the study. Patients with metastatic bladder cancer and those who undergo palliative cystectomy are not included in the study. The patients with suspected symptoms of cancer of urinary bladder are evaluated in OPD with Ultrasound abdomen and pelvis, cross sectional imaging with CT or MRI. All patients who fulfill the inclusion criteria are subjected to radical cystectomy with urinary diversion after consent.

Patient after giving consent are taken for the study and surgery after explaining the procedure. The data like Age, Gender, Smoking History, History of Alcohol Intake, Duration of symptoms, Co-morbid conditions, American Society of Anesthesiologists' (ASA) score, Eastern Cooperative Oncology Group (ECOG) performance status, Histological Subtype, preoperative hydronephrosis, Pre-operative Hemoglobin, Preoperative Transfusion, and use of pre-operative chemotherapy or radiotherapy. Intraoperative parameters like duration of surgery, Blood transfusion, type of anastomosis or diversion, estimated blood loss and Operative findings are recorded. Postoperative parameters like Intensive Care Unit (ICU) stay, Use of Inotropes, length of Stay are recorded. The early postoperative complications of Radical cystectomy are enlisted and then classified according to Clavein-Dindo Classification.

Operative Procedure:

All patients underwent radical Cystectomy with standard bilateral pelvic lymphadenectomy with urinary diversion. The urinary diversion types included orthotopic neobladder and ileal conduits. The selection of type of urinary diversion depends upon the disease status, discussion with the patient and surgeon’s preference as well.

Definition of Early Complication:

Postoperative mortality was defined as 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 I: Clavein Dindo 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 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 inotrope support were classified as IVA while those with

multiorgan dysfunction as Grade IVB. Death of the patient was taken as Grade V.

Statistical Analysis:

All data are expressed as mean, standard deviation or frequency and percentages. Univariate analysis was done using chi-square test for categorical variables. For all statistical tests, p-value < 0.05 was considered statistically significant

Data Analysis: Data are analyzed using SPSS 25 software.

Results:

In this study of 60 patients, there was a male preponderance. Fourty Six (76.7%) male and 14 (23.3%) female. The mean age was 62.5 ± 11.7 (range 34-84). The mean duration of hematuria on presentation to hospital was 3.32 ± 1.2 months. 34 (56.7%) patients were smokers while 26 (43.3%) were non-smokers. 19 (31.7%) patients consumed alcohol while 41 (68.3). The ASA grade was one in 29 (48.3%) patients, two in 29 (48.3%) patients, three in one (1.17%) patient and four in one (1.17%) patient. The ECOG performance status was 0 in 30 (50%) patients, one in 29 (48.3%) patients and two in Only one (1.17%) patient. 46 (76.7%) patients had no comorbidities while 14 (23.3%) patients had comorbidities. Only two patients were subjected to preoperative chemotherapy. ECOG score was 0 in 30 (50%) patients, one in 29 (48.3%) patients, two in one (1.17) patient. Hydroureteronephrosis was seen in 26 (43.3%) patients. Preoperative Blood transfusion was done in 13 (21.7%) patients only while 47 (78.3%) did not require it. Intraoperatively, 36 (60%) had intravesical disease while 24 (40%) had extravesical disease. Ileal conduit was adopted as most common form of urinary diversion in 40 (66.7%) patients, whereas Orthotopic diversion was performed in 19 (31.7%) patients and Appendiceal conduit in only one (1.7%) patient due to inflamed bowel loops. Transitional Cell Carcinoma was seen in 58 (96.67%) patients while adenocarcinoma was seen in only two (3.33%) patients on histopathology of specimen.

Mean duration of Surgery was 296.25 ± 56.842 minutes. Mean Operative Blood Loss was 815.83 ± 403.80 ml. Postoperative blood transfusion was necessary in 50 (83.33%) patients. Postoperatively, the mean duration of ICU stay was 3.72 ± 2.44 days. Inotropes were needed in 18 (30%) patients. Major complications were

56 (93.33%) patients developed complications. Three (Five %) patients had Grade I complications. 30 (50%) patients had Grade II complications. Twelve (20%) patients had grade IIIB complications. 6 (10%) patients had Grade IVA complications. One (1.7%) had Grade IVB complications. Four (6.7%) patient had died. 23 (38.33%) patients developed high grade (≥ Grade III) complications. The high grade complications were observed in all forms of urinary diversion after radical cystectomy which were not statistically significant (p value=0.233) Mean length of hospital stay was 19.13 ± 5.59 days.

Table II: Overall Events of Postoperative Complications:

Gastrointestinal (41.7%)	no. of patients	Clavein-Dindo Grade
Paralytic Ileus	14	II
Mechanical Bowel obstruction	4	IIIB
Anastomotic bowel leak	7	IIIB
Infectious (21.7%)		
Pyelonephritis	2	II
Pneumonia	4	II
Septic shock	7	IVA
Wound (11.7%)		
Surgical Site Infection(SSI)	5	I
Wound Dehiscence	2	IIIB
Renal (1.7%)		
Renal Shutdown (dialysis)	1	IVA
Respiratory (1.7%)		
Respiratory Distress (Intubation)	1	IVA
Blood Transfusion (21.7%)	13	II
Total Parenteral Nutrition (11.7%)	7	II
Mortality (6.7%)	4	V

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 93.33 %, with approximately 38.33 % of patient experienced high grade complications which is higher than those reported in other studies (11.2 %–14.2 %).[12, 14, 15] 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 6.7% in our study.[16, 17] A systematic review

conducted by Maibom et al. (2021), concluded that during first 30 days of radical cystectomy, one out of three patient develop complications and one out of five patient develop major complications.[18] In our study, we found GI complications (41.7%), infections related (21.7%), Wound related (11.7%). Nitesh et al. (2016), found that hematologic complications accounted for 28.42% of all complications. They also observed Infectious complications (18.49%), GI complications (18.15%), genitourinary difficulties (15.41%), and pulmonary complications (7.5%) were the next most common types of complications.[9] Hirobe et al. (2018) in their study found that 149 patients (80.5%) had 328 postoperative problems noted. Of them, 46 patients (24.9%) experienced high grade (≥ Grade III) episodes, of which 73 (22.2%) were[7]. Aziz et al. (2014) in their prospective study study found that mortality rate of 9% within 90 days of radical cystectomy which is slightly higher than our study.[19] It is due to the fact that our study takes account of 30 days as cut off for early postoperative complication.

Conclusion:

Radical cystectomy is associated with higher rate of morbidity and mortality. Majority of the complications are minor. However, morbidity and mortality can probably be decreased with careful patient selection, skilled surgeons, treatment at high volume canters and the application of an Enhanced Recovery After Surgery (ERAS) procedure. Clavein-Dindo classification is the standardized way of reporting complications of radical cystectomy with urinary diversion 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.

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