Reporting Complications in Radical Cystoprostatectomy and Orthotopic Neobladder in Male Patients Using a Standard Reporting Methodology

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INTRODUCTION

The gold standard treatments for patients with muscle-invasive bladder cancer or high-grade noninvasive transitional cell carcinoma is radical cystectomy (RC), including extended pelvic lymph node dissection, and urinary diversion.[1] RC, including pelvic lymph node dissection, provides excellent local cancer control with up to 50–70% cancer-specific survival.[2]

Even surgical technique and postoperative care improve RC is still associated with high perioperative mortality and complication rates varying between 20% and 57%[3–10] and 0.3% and 5.7%, respectively.[4,7–10] A formal complication system was not used in most of the studies that reported on complication and morbidity, thus, making it difficult to compare different studies and to create a definition of morbidity for the procedure.[6] Martin et al.[11] established 10 factors for reporting surgical complications to provide an objective and more accurate reporting method of complications. The criteria comprised risk factor analysis, follow-up duration, data accrual methods, complication definitions, outpatient information, mortality and morbidity rates, procedure-specific complication, severity grading and hospital stay. Further, Shabsigh et al.[12] used these 10 critical reporting elements to define the type, incidence,
and severity of early postoperative morbidities following RC.

There is a shift toward continent diversion during the last years. However, it is reported that orthotopic neobladder is associated with a complication rate of about 50% even at referral centres.\footnote{12}

The type of urinary diversion reporting complications is not stratified in most of the studies. In the recent study, we report the 90-day complication rates of male patients who underwent RC and orthotopic neobladder using a standard method reporting complications.

**MATERIALS AND METHODS**

We retrospectively reviewed the data of 209 RC male patients operated by the same surgical team between March 2008 and December 2017 in our institution. A written waiver was provided from each patient. Ethical approval was obtained from the Ethical Committee of our institution (Medicana International Hospital No 430-2020). The Martin criteria were used for collecting the data of early postoperative complications.\footnote{13} Patients (Nn=10) who received neoadjuvant chemotherapy were excluded from the study.

The pathological parameters and patients characteristics, including age, ASA score (2≤ vs. >2), estimated blood loss (EBL), operative time (OT), pathological stage, radiological interventions, readmissions, transfusion rate (TR), hospital stay (HS) and clinical outcome, were retrospectively collected from the hospital medical record. Indications for an orthotopic neobladder were normal kidney function (creatinine clearance >40 ml per minute or creatinine less than 2 ng/dl), absent disease at the level of the bladder neck and prostatic urethra, and patient request for orthotopic neobladder substitution. The 2012 TNM system was used for reporting pathological stage.

Low-molecular-weight heparin was started on the evening before surgery and was maintained until the 30th postoperative day. Third-generation cephalosporin was used as prophylaxis for infection, and elastic compressive stockings were used for preventing thromboembolic events, respectively, in all patients. Patients received two high enemas the night before and in the morning before surgery.

Open RC and pelvic lymphadenectomy were performed in the standard fashion. The neobladder was performed using a modified Studer technique, while ureteral anastomosis was performed using the Wallace and Bricker technique. A 45-cm ileal part was isolated for the neobladder reconstruction 20-cm proximal to the ileocecal valve. All patients spent one night in the intermediate care unit according to our institutional protocol. A nasogastric tube was left in place until recovery of bowel activity after surgery, usually until postoperative day 3 or 4. A cystogram was performed when elevated creatinine levels of the drainage fluid were determined and routinely before removal of the catheter, usually postoperative tenth day.

Daily clinical examinations and laboratory monitoring were performed in a standard fashion. All patients underwent a physical examination, blood tests, urine culture and abdominopelvic computed tomography during the third-month visits. A modified version of the original Clavien-Dindo grading system was used for reporting complications within 90 days.\footnote{14} Major complications were defined as grade 3 to 5 and minor or no complications as grade 0, 1, and 2. Complications that developed after discharge were collected by reviewing the medical records at our outpatient clinic.

Statistical analyses were performed using the Statistical Package for the Social Sciences 22.0 (SPSS, Chicago, IL, USA). Continuous variables were reported as the mean ± SD. Categorical variables were reported as numbers and percentages.

**RESULTS**

Table 1 presents the clinical characteristics, perioperative and postoperative outcomes and pathological evaluations. All the patients were male. The 90-day postoperative mortality rate was 2% (n=4).

**Operative characteristics**

The mean operation time was $412.6±99.3$ minutes. Mean EBL was $1107±617.3$ ml (400–3600). Perioperative transfusion rate was given in 78.8% of the patients (n=156). No major intraoperative complications occurred. Four patients (4%) were admitted to the intensive care unit for a median of two days. The median time for the removal of the indwelling catheter was 13 days (range 12–21).

Reoperation due to the surgical complication was required in three patients (1.5%). Six (3%) patients required interventional radiology procedures. Overall mean hospitalization time was 19.2±7.3 days (7–30).

Overall, 239 complications developed in 143 of the 198 patients (72.2%). Most of these were gastrointestinal complications. Thirty-nine (19.7%) of these complications occurred after thirty days postoperatively. Infection was the most commonly occurring complication after thirty days (n=75, 37.9%).

Major complications (Clavien 3–5) were observed in 41 (20.7%) patients. In 31 (15.7%) patients, grade 3 complications were observed (such as urinary leakage, reoperation for fascial dehiscence, bleeding, evisceration, urinoma). Six patients (3%) had grade 4 complications, and four (2%) died within three months of surgery (grade 5). All four patients died of cardiopulmonary events (myocardial infarction or pulmonary embolism). One (0.5%) of these patients died between the 30 days to 90-day postoperative period. Of the patients, 102 (51.5%) had grade 1-2 complications. The most common complication categories were gastrointestinal (n=56, 28.28%) and wound-related (n=45, 22.72%). Ileus was the most common individual complication, occurring in 21.2% of patients. Wound infections...
and urinary infections (11.61%, n=23) were other common individual complications. Wound dehiscence managed with local wound care occurred in 12 (6.04%) of patients, fascial dehiscence requiring reoperation occurred in three (1.51%) of patients. The most common complication of the genitourinary system was acute renal failure occurring in seven patients (3.50%), whereas urinary leakage was determined in three (1.51%) patients. Arrhythmia was the most common cardiac morbidity observed in 10 (5.05%) patients. Myocardial infarction was observed in three (1.51%) of the patients. The most common complications were gastrointestinal (GIS) and genitourinary system. The most common complications were gastroenteritis (1.51%, n=1), followed by wound infection (22.7%, n=45), gastroenteritis (7.6%, n=15), bleeding (15.6%, n=31), pulmonary (7.6%, n=15), myocardial infarction (3%, n=3), and neurological (1.5%, n=3). The most common complications of the genitourinary system were acute renal failure (3.50%, n=7), urinary leakage (1.51%, n=3), and neobladder bleeding (2%, n=2). The most common complications of the gastrointestinal system were ileus (28.8%, n=42), constipation (5%), and diarrhea (4%). The most common complications of the pulmonary system were pneumonia (6%), respiratory distress (5%), pleural effusion (2%), and atelectasis (2%). The most common complications of the cardiovascular system were arrhythmia (11.1%, n=10), myocardial infarction (3%), and hypertension (3%). The most common complications of the neurological system were encephalitis (1%), loss of consciousness (1%), and delirium/ agitation (1%).

### Table 1. Clinical characteristics, perioperative and postoperative outcomes and the pathological evaluations

| Variable | Value |
|----------|-------|
| Patient number | 198 |
| Age, year, mean±SD (range) | 61.1±10.68 (28–81) |
| BMI, mean±SD (range) | 25.8±2.80 (19.47–36.21) |
| ASA score, n (%) | 1 (52.3), 2 (40.4), 3 (27.3), 4 (6.1) |
| Operating time, minutes, mean±SD (range) | 412.6±99.3 (300–485) |
| Hospitalization time, day, mean±SD (range) | 19.2±5.4 (7–30) |
| Estimated blood loss, ml, mean±SD (range) | 1102 ±617.3 (400–3600) |
| Perioperative transfusion, n (%) | 156 (78.8) |
| Pathological stage, n (%) | pTa 4 (2.0), pTis 3 (1.5), pT1 8 (4.0), pT2 98 (49.5), pT3 81 (40.9), pT4 4 (2.0) |
| Pathological lymph node, n (%) status | N0 137 (69.1), N+ 61 (30.8) |
| Organ confined disease | 102 (51.5) |
| Concomitant Cis, status | 10 (6.3) |
| Clavien-Dindo classification, n (%) | Major 3 41 (20.2), Minor 1–2 102 (51.5) |

BMI: Body mass index; ASA: American Society of Anesthesiologists (classification); SD: Standard deviation; §Grade 0: No complications; Grade 1: Complications needing only oral medications or bedside intervention; Grade 2: Complications needing only intravenous medications, total parenteral nutrition, or blood transfusion; Grade 3: Complications needing interventional radiology, therapeutic endoscopy, intubation, angiography or surgery; Grade 4: Complications causing residual and lasting disability requiring major rehabilitation or organ resection; Grade 5: Complications causing death.

### Table 2. Incidences of early complications (first 90 postoperative days)

| Early complications (first 90 postop. days) | No. total (%) |
|---------------------------------------------|---------------|
| Gastrointestinal (GIS) | 56 (28.8%) |
| Ileus | 42 |
| Constipation | 5 |
| Diarrhoea | 4 |
| Intestinal bleeding | 2 |
| Emesis | 2 |
| Pancreatitis | 1 |
| Infection | 39 (19.7%) |
| Urinary tract infection | 23 |
| Fever unknown origin | 11 |
| Urosepsis | 2 |
| Pyelonephritis | 2 |
| Gastroenteritis | 1 |
| Wound | 45 (22.7%) |
| Wound infection | 24 |
| Wound dehiscence | 12 |
| Wound seroma | 9 |
| Fascial dehiscence/evisceration | 2 |
| Genitourinary | 14 (7.1%) |
| Renal failure | 7 |
| Urinary leak | 3 |
| Urinary retention | 2 |
| Neobladder bleeding | 2 |
| Cardiac | 22 (11.1%) |
| Arrhythmia | 10 |
| Myocardial infarction | 3 |
| Hypertension | 3 |
| Angina | 4 |
| Syncope/hypotension | 2 |
| Pulmonary | 15 (7.6%) |
| Pneumonia | 6 |
| Respiratory distress | 5 |
| Pleural effusion | 2 |
| Atelectasis | 2 |
| Bleeding | 31 (15.6%) |
| Anaemia requiring transfusion | 27 |
| Draine side bleeding | 1 |
| Perioperative vascular bleeding | 3 |
| Thromboembolic | 10 (5%) |
| Deep venous thrombosis | 6 |
| Pulmonary embolism | 4 |
| Neurological | 3 (1.5%) |
| Encephalitis | 1 |
| Loss of consciousness | 1 |
| Delirium/agitation | 1 |
| Miscellaneous | 7 (3.5%) |
| Dermatitis | 2 |
| Acidosis | 2 |
| Lymphocele | 2 |
| Decubitus ulcer | 1 |
mon pulmonary comorbidity was pneumonia, affecting six (3.03%) of the patients. Deep venous thrombosis and pulmonary embolism developed in six (3.03%) and four (2.02%) patients, respectively. Emergency room visits were required in 24 (12.12%) patients, of whom, 13 (6.56%) were readmitted. The majority of readmissions were due to gastrointestinal and infectious complications (n=10, 5.05%). Further information about complications is listed in Table 2.

DISCUSSION

RC reduces the risk of death from bladder cancer after controlling for disease grade and stage. The orthotopic neobladder should be the primary procedure for urinary diversion following RC because of the possibility of maintaining anatomy and function close to the natural preoperative status. In our patients, the Studer orthotopic neobladder is offered to those who are eligible for RC and who do not have contraindications.

Many studies regarding complications have been published, but most of them did not use accurate grading systems or a standard methodology. We attempted to fulfill the Martin criteria for reporting complications after surgery. Donat et al. reported that the disparity in reporting surgical complications in urologic oncology makes it difficult to compare the morbidity associated with surgical outcomes and surgical techniques among different institutions and surgeons. Afterwards, studies were published using standardized methodologies to report the outcomes and complications in RC.

The overall 90-day postoperative complication rate in our study was 72.2%. This result is comparable with that of recent studies using systemic classification criteria, including minor complications. In the study by Lowrance et al., the rate of the 30-day postoperative complications was 41%. The 30-day complication rate in our study was 52.2%. Another study reported a 90-day postoperative complication rate of 64% and noted the difference in complication rates between postoperative 30 days and 90 days. They stated that an important part of complications occurred after postoperative 30 days. The results of our study support this argument, as 19.7% of the complications occurred after 30 days. These complications would have been missed if the Martin criteria were not be applied. The complication rates noted in the studies using classification systems are higher than reported in previous studies that did not. Complications in these previous studies, without the standardization of reporting complications and/or clear definitions of complications, ranged between 28.4 and 39%.

Certainly, surgeon experience, technique, and institutional differences may explain the dissimilarities in complication rates. The reporting of 90-day complications with the inclusion of outpatient complications, might be another reason for the higher complication rates in our study. As Shabsigh et al. reported, 21% of complications in their study would have been missed if only inpatient complications were reported instead of 90-day findings. Other reasons for the higher complication rates in our study group may stem from the longer HS (19.2 days). This allowed a more precise assessment and recording of complications. The results of our data revealed higher grade 3–5 complication rates as opposed to findings in previous studies, although the median patient age and ASA scores were similar. The EBL rate was higher in our study compared to other studies, and this may be another reason for the higher major complication rates. Because our study included only patients with orthotopic neobladder, substitution could be another explanation for the higher complication rates. It should be mentioned that some complications are disposed to occur after Foley catheter and drains were removed in orthotopic neobladder. The most frequent complications in our study were related to the gastrointestinal tract (21.2%), ileus, and wound infection (12.1%). Ileus rates were similar to that in a previous study where ileus was similarly defined (23%).

The postoperative mortality rate was 2% in the present study. Three of the patients died in the first 30 days, whereas one patient died between the 30 to 90 day time period in our study. One patient would have been missed if a 90-day period of complications had not been reported. Previous studies reported mortality rates in the perioperative period or 30-day mortality rates, and this period might not include all surgery-related deaths that might have occurred after 30-days postoperatively. Shabsigh et al. expanded the definition of perioperative mortality to a 90-day period, which may yield higher mortality rates.

The limitations of our study include the retrospective collection of data. Another limitation is the relatively low sample size. A bigger patient cohort may help to identify other factors that are predictive of complications. Moreover, our study population included only male patients with an orthotopic neobladder. Patients with ileal conduit or female patients were excluded.

CONCLUSION

Our results support the consideration of a longer follow-up period to define the morbidity of RC. The standardization of the reporting criteria for complications will allow direct comparisons between studies. The complication rates after utilizing a standard reporting methodology were higher compared to studies that do not employ such methodologies. The accurate reporting of complications and assessment of factors that affect the perioperative course and complications should allow for improved preoperative risk stratification and counselling.

Ethics Committee Approval

Approved by the local ethics committee (Medicana International Hospital No 430-2020).

Informed Consent

Retrospective study.
Internally peer-reviewed.

Authorship Contributions
Concept: O.Ö.; Design: M.B.; Supervision: T.K.; Materials: O.Ö.; Data: O.M.I.; Analysis: O.Ö.; Literature search: C.S.; Writing: O.Ö.; Critical revision: A.Ç.

Conflict of Interest
None declared.

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