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Complications of radical cystectomy: A Prospective Study

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Abstract

Radical cystectomy is associated with significant morbidity and mortality despite advancements in minimally invasive techniques and robotic technology. This review discusses early and late complications, along with efforts aimed at reducing morbidity and mortality, including enhanced recovery after surgery (ERAS), which has shortened hospital stays and minimized complications. Early complications arise directly from the surgical procedure, while late complications, which can manifest even 10 years post-operatively, are often linked to urinary diversion. For patients without contraindications, a neobladder represents the ideal form of urinary diversion.

Keywords: Bladder; Cystectomy; Cancer; Urothelial carcinoma

1. Introduction

Radical cystectomy remains the gold standard for treatment of patients with muscle invasive bladder cancer, or recurrent high grade non-muscle invasive bladder cancer. Despite the advent of minimally invasive and robotic technology, radical cystectomy has a significant mortality and morbidity. Ninety-day mortality rates from population studies range from 5.1% to 8.1%, [1] which are high for surgery with curative intent. Morbidity is also significant, with 90-day complication rate between 28%–64%, even in high volume centers [2]. The high rates of morbidity and mortality reflect the fact that the majority of patients undergoing this procedure are elderly patients with multiple comorbidities. This study aims to describe the complications associated with radical cystectomy and to identify risk factors for their occurrence in the Urology Department.

2. Materials and Methods

This prospective study spans a three-year period. The medical records of patients treated at the Urology Department of Mohammed VI University Hospital were reviewed.

3. Results

A total of 40 patients underwent radical cystectomy. Of these, 93% were male, and 83% were younger than 70 years. Smoking was prevalent in 89% of patients, and all presented with hematuria. Urothelial carcinoma was the most common histological type (92%). Resumption of oral intake occurred, on average, by the third post-operative day. Overall, 30% of patients experienced either early or late complications. Late complications accounted for 59% of all complications, with the most frequent being uretero-ileal stenosis (20% of all cystectomy patients), representing 47% of all complications. Post-operative ileus and wound infections were reported in 17% of cases, while pyelonephritis accounted for 11% of complications.

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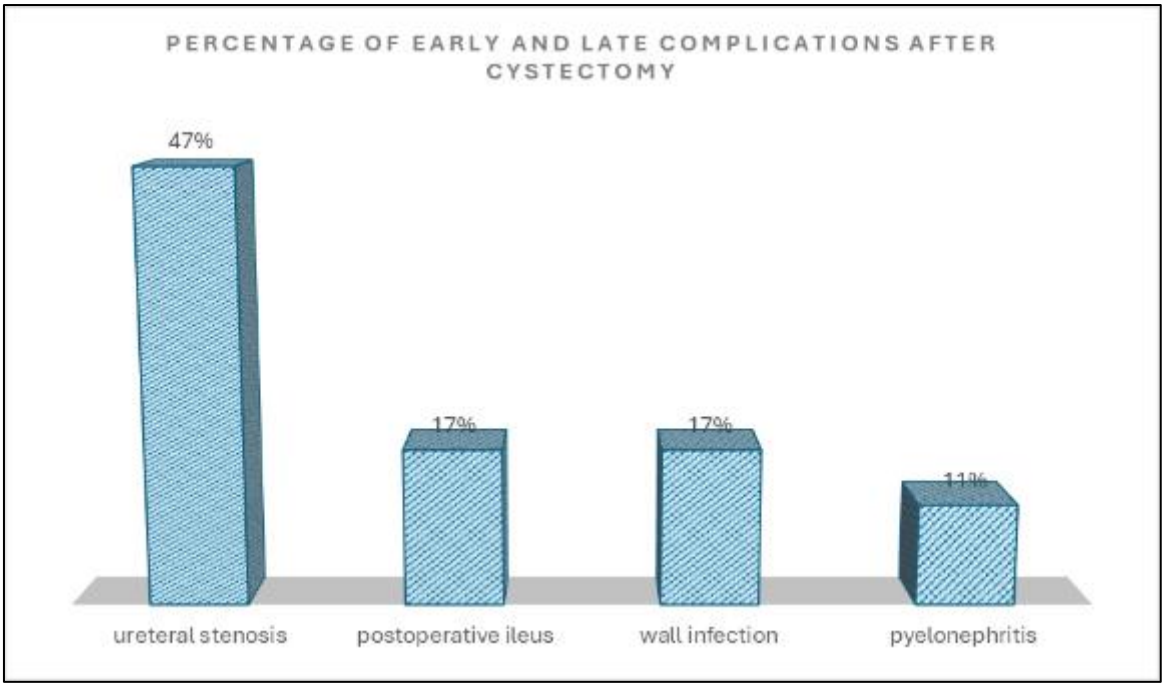

Figure 1 Percentage of early and late complications after cystectomy

4. Discussion

Once regarded as a complex and high-risk procedure in the 1980s [1], radical cystectomy has become a standardized routine intervention. However, it is not devoid of complications, despite significant advancements in surgical and anesthetic techniques. Mortality rates have decreased from 20% to 2% over the past two decades, and morbidity has also been significantly reduced, making the procedure more acceptable to patients. In our series, the early post-operative mortality rate was 16%, with only one reported case of death, which aligns with current literature [1]. Mortality rates have notably decreased over the years, from over 12% in the 1970s to under 3% in most recent series. This reduction is attributed to improved patient selection, surgical techniques, and advancements in anesthesia and intensive care. In a series of 1,054 patients, [2] Stein et al. reported a morbidity rate of 28% [3]. Oosterlink [3] and Canion estimated the rate at 30%, while the University of California, in a study of 889 patients, reported 27% [5] . In our study, the overall complication rate was 30%, consistent with these findings. Variability in complication rates across studies is influenced by differences in data collection techniques and definitions used. Early removal of the nasogastric tube, early resumption of oral intake, and early mobilization have been shown to reduce the duration of post-cystectomy ileus and hospital stay [5]. In our study, post-operative ileus was the second most frequent complication (17%), with multifactorial etiology. Uretero-ileal anastomotic strictures were the most common cause of renal function deterioration following urinary diversion. These strictures, typically unilateral, most commonly affect the transposed ureter, particularly the left, as transposition compromises its distal blood supply and exposes it to compression between the root of the mesosigmoid and the prevertebral vessels [6].

4.1. Enhanced Recovery

Enhanced recovery after surgery (ERAS) protocols have been shown to reduce adverse events and hospital stay duration [7]. In some high-volume centers, ERAS has reduced the median hospital stay from 8 to 4 days [8]. Preoperative carbohydrate loading is recommended to minimize insulin resistance and prevent protein and fat catabolism, which are induced by the physiological stress response to surgery [9]. Other features of enhanced recovery for radical cystectomy patients include avoiding bowel preparation. Post-operative ileus, the most frequent reason for prolonged hospital stays [10], was the second most common complication in our study. To mitigate this risk, prokinetic agents such as metoclopramide should be used post-operatively. Additionally, a randomized controlled trial demonstrated that Alvimopan significantly reduces the time to first bowel movement in patients undergoing radical cystectomy [11] ... Systematic reviews and meta-analyses have also highlighted the benefits of chewing sugarless gum in reducing ileus [12].

4.2. Early Complications

The majority of early complications include gastrointestinal issues (29%), infections (25%), and wound-related complications (15%) [13]. Multivariate analysis identified age, surgical history, ASA score > 2, and blood loss as independent predictors of high-grade complications [13]. Infection is the second most common complication, and prophylactic short-term treatment with broad-spectrum antibiotics, such as second- or third-generation cephalosporins, is routinely prescribed [14]. Adequate pain management and early mobilization are recommended. Thromboprophylaxis should be continued for up to four weeks post-cystectomy [14].

4.3. Late Complications

Late complications include urinary tract infections, renal function deterioration, stone formation, metabolic disorders, and cancer recurrence.

4.3.1. Urinary Tract Infections

Leukocytes and bacteria are commonly found in urine cultures of patients with neobladders. Approximately 58% of patients with asymptomatic bacteriuria will develop urinary tract infections, and 18% may develop urosepsis over a five-year period [15]. It is currently recommended that patients with asymptomatic bacteriuria not be treated with antibiotics unless symptomatic.

4.3.2. Renal Function Deterioration

Two primary factors contribute to renal function deterioration:

- Hydronephrosis secondary to uretero-ileal strictures
- High-pressure reflux of infected urine

4.3.3. Metabolic Complications

Metabolic complications depend on the type, location, and length of intestine used, particularly in neobladder patients, due to prolonged contact of urine with the intestinal mucosa. The primary factor in metabolic acidosis is the absorption of ammonia (NH4-) from urine [16]. Severe cases may result in fatigue, nausea, and vomiting. Patients with symptomatic acidosis typically require treatment with sodium bicarbonate for at least six weeks post-catheter removal.

4.3.4. Long-Term Follow-Up

Follow-up should be tailored, particularly for patients at high risk of recurrence, such as those with positive lymph nodes, positive surgical margins, multifocal tumors, or urethral involvement [17]. Early follow-up (within 4 months) is essential for detecting uretero-ileal strictures. Between 4- and 60-months post-surgery, oncological surveillance is the main concern. Most recurrences occur within two years of surgery [18] , and many early recurrences are asymptomatic. Long-term follow-up (over five years) is necessary. Urethral recurrence was observed in 56% of cystectomy patients during a median follow-up of 13,3 months [19].

5. Conclusion

Radical cystectomy remains a complex surgical procedure, but advances in surgical techniques, anesthesia, intensive care, and medical follow-up have significantly reduced peri- and postoperative mortality and morbidity. Robotic assisted radical cystectomy is gaining popularity, and although technically challenging intracorporeal OBS reconstruction is routinely performed in select centers. All patients with OBS reconstruction should have regular long-term follow-up for oncological surveillance and to identify complications should they arise.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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