



Nursing Care in Robotic Radical Cystectomy and Intracorporeal Orthotopic Urinary Diversion Surgeries

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Abstract

In this article, the management of nursing care in robotic cystectomy and urinary diversion surgeries, which are performed for treating bladder cancer, is explained considering the current literature. Bladder cancer is a type of cancer that is highly prevalent worldwide, and it is seen more frequently in men than in women. Radical cystectomy with pelvic lymphadenectomy are the reference treatment for muscle-invasive bladder cancer, and they play a key role in managing high-risk non-muscle-invasive cancer and saving the patient following radiotherapy. While radical cystectomy involves the removal of the bladder, urethra, uterus, Fallopian tubes, ovaries, and anterior vagina in women, it involves the removal of the bladder, urethra, prostate, and seminal glands in men. Urinary diversion performed following robotic cystectomy is a curative surgical method associated with functional and metabolic changes that could affect the patient as well as the quality of life of the patient. Urinary diversions performed following removal of the cancerous bladder aim to divert the urinary flow toward its normal path or form a new path for urine to be released directly or by accumulation. In robotic cystectomy and urinary diversion surgeries, the role of the nurse in the management of the preoperative, perioperative, and postoperative stages is highly important. The optimal management of nursing care and nurse training programs, especially for the postoperative period, aims to increase the quality of life of the patient by preventing complications, shortening their hospital stay, and organizing their activities of daily living.

Keywords: Bladder cancer, urinary diversion, radical cystectomy, nursing care

Introduction

Bladder cancer is a type of cancer that is highly prevalent worldwide, and it is seen more frequently in men (3:1) than in women (1,2). The International Agency for Research on Cancer is an institution of the World Health Organization, and it published the latest Global Cancer Statistics on the global burden of cancer on 5 December 2020. According to the 2020 database of GLOBOCAN, which is the online platform of the Global Cancer Observatory, in men of all ages worldwide, bladder cancer is the sixth most frequently encountered cancer with an incidence of 9.5% (3,4).

In Turkey, according to the 2017 data of Türkiye Unified Database, in the percentage distribution of the most prevalent cancers in men in all age groups, bladder cancer ranks fourth with a prevalence of 7.7% (5).

Radical cystectomy with pelvic lymphadenectomy are the reference treatment for muscle-invasive bladder cancer, and they play a key role in managing high-risk non-muscle-invasive

cancer and saving the patient following radiotherapy. While radical cystectomy involves the removal of the bladder, urethra, uterus, fallopian tubes, ovaries, and anterior vagina in women, it involves the removal of the bladder, urethra, prostate, and seminal glands in men.

Radical cystectomy is a comprehensive and major surgery associated with or accompanied by comorbid/chronic diseases, and today, open radical cystectomy is being replaced by robot-assisted radical cystectomy (6,7).

The first robotic radical cystectomy surgery was reported in 2003 by Menon et al. (8), whereas various studies have revealed that robotic cystectomy provides advantages in terms of parameters such as complications, bleeding control, blood transfusion requirement, early mobilization, and the hospital stay duration of the patient (8,9,10,11).

Urinary diversion performed following robotic cystectomy is a curative surgical method associated with functional and metabolic changes that could affect the patient as well as the

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quality of life of the patient. Urinary diversions performed following removal of the cancerous bladder aim to divert the urinary flow toward its normal path or form a new path for the urine to be released directly or by accumulation (1,12,13,14).

The most frequently performed urinary diversions today are conduits, continent cutaneous diversions, and orthotopic neobladders anastomosed to the urethra (15).

This study presents the characteristics of nursing care for the clinically observed intracorporeal orthotopic bladder in the framework of the Enhanced Recovery after Surgery (ERAS) protocol.

The ERAS protocol includes evidence-based practices developed by the ERAS Society that can be described as ERAS or Fast Track Surgery (FTS). The ERAS protocol reduces the rates of complications by 30-50% by recommending evidence-based practices regarding the process of the patient that starts in the pre-operative period and ends at the home of the patient after their discharge, and it shortens the hospital stay of patients by 2 to 3 days (16).

In robotic cystectomy and urinary diversion surgeries, the role of the nurse in the management of the preoperative, perioperative, and postoperative stages is highly important. The optimal management of nursing care and nurse training programs, especially for the postoperative period, aims to increase the quality of life of the patient by preventing complications, shortening their hospital stay, and organizing their activities of daily living. According to Paula Francis, the roles and responsibilities of the nurse in robotic surgeries are examined at three stages: preoperative, perioperative, and postoperative (11,12,17,18). In this review, nursing care is discussed under four categories: preoperative care, perioperative care, postoperative care, and patient education and discharge.

Preoperative Patient Preparation and Nursing Care

Robotic radical cystectomy and urinary diversion surgeries play a significant role in the health and quality of life of individuals. Planning nursing care and education for the patient admitted to the inpatient clinic for robotic surgery in a holistic, humane, and personalized manner is an effective method for the self-care management of the patient, the management of their chronic diseases, and the management of the intraoperative process (1,12,19). Therefore, patient admission, education, and discharge are interrelated processes and should be considered as a whole. The preoperative period starts with the decision of surgery and covers the period until the patient is admitted for surgery (20).

Patient Information

Initiating and maintaining a professional relationship with the patient who is admitted to the urology inpatient clinic for robotic surgery by identification check is highly important for managing the care process with the patient and achieving cooperation. The patient who will undergo this surgery for the first time is probably anxious and concerned. For this reason, at the first encounter, the patient needs to be informed in detail

about what they will experience throughout their stay in the hospital in verbal and written form.

It is important to check the informed consent form of each patient who is admitted to the inpatient clinic.

The nursing interventions to be carried out in the patient admission process start with determining the patient's room with suitable characteristics for their surgery, introducing the room and items in the room to the patient, taking the patient's history, checking their vital signs, physical examinations, and planning the necessary screening and diagnostic tests.

Considering a model or theory like the Roper-Logan-Tierney Model for nursing based on activities of daily living, the patient should be systematically followed up, and their needs should be identified. The Roper-Logan-Tierney Model for nursing is based on life expectancy, activities of daily living, factors affecting activities of daily living, the cycle of dependency-independence, and measurable and observable phenomena regarding the fields of nursing care and education. It is also an individual-centered model with its humane and holistic approach (21).

Based on this model, information about the patient's safe spaces, diet, respiration, voiding, communication, personal hygiene and dressing, body temperature, mobility, working and entertainment, sexual expression, sleep, and death at the end of life should be collected. In addition to these items, one should consider their substance and alcohol use, regular medication use, psychosocial factors, and spiritual and religious beliefs. Care should be taken in the collection of data regarding complications that are considered possible to occur in the perioperative period.

In robotic cystectomy and urinary diversion operations that are carried out after the diagnosis of bladder cancer, which is known to emerge especially in elderly male patients, age-specific characteristics, chronic diseases, mental state, and needs changing in relation to reduced functions in areas such as coordination and dexterity should be considered (20).

Before surgery, all test results brought by the patient are received and assessed by all relevant healthcare professionals (e.g., physician, nurse, dietician, physiotherapist) in a multidisciplinary manner.

Generally required tests may include chest radiography, electrocardiogram testing, complete blood count and biochemistry (e.g., Glucose, aspartate aminotransferase, alanine aminotransferase, gamma-glutamyl transferase, urea, creatinine, sodium, potassium, chloride) tests, coagulation and blood type tests, complete urine analysis, tests on infectious parameters such as HbsAg, anti-hepatitis C virus, and Venereal Disease Research Laboratory, cystoscopy images, respiratory function tests, and bone scan. A copy of the pathology report if the patient underwent a biopsy and CDs and reports of radiological imaging procedures such as BT/MR/IVP must be added to the patient file.

Following the examination of test results, the anesthesiologist who will take part in the surgery of the patient should be informed, and anesthesia consultation should be ensured. Here, nurses are in a key position in the facilitation of communication and interaction among the members of the healthcare team (12,22).

Before the surgical intervention, the patient should be given education about breathing and coughing exercises, a spirometer should be arranged for them, instructions should be provided, and its use should be started. Using a spirometer allows the alveoli to be filled with air by strengthening the weakened respiratory muscles. In this way, it is ensured that the development of diseases such as pneumonia and atelectasis is prevented (20).

Preoperative Bowel Preparation

The bowel preparation before colon surgeries has been a practice for many years. However, recent randomized controlled studies and meta-analyses have reported that mechanical bowel preparation in colorectal surgery does not provide an additional clinical benefit, increases the risk of anastomotic leaks, and causes fluid and electrolyte imbalances, especially in elderly patients. In this context, bowel preparation is contraindicated in major surgeries other than intraoperative colonoscopy and colon surgery.

In the study conducted in 2010 by Tuna (23) on radical cystectomy surgeries, patients in whom preoperative bowel preparation was practiced and those who did not undergo preoperative bowel preparation were compared, and it was reported that there was no significant difference between these groups in terms of patient recovery or complications such as infection.

Therefore, it has been concluded that bowel preparation does not provide the any advantage in radical cystectomy and urinary diversion surgeries (20,22,23).

Antimicrobial Prophylaxis

Based on studies in the literature, while oral antibiotic usage is not recommended before surgery, it has been reported that administering intravenous antibiotics exactly one hour before the incision provides the maximum effect. Thus, the IV antibiotic ordered by the physician should be administered by the nurse after the confirmation of the time of the surgery by communicating with operating room nurses (24,25).

Assessment of Dietary Status and Provision of Nutritional Support If Needed

Malnourishment is a significant risk factor in surgical operations due to the complications it creates in infection and wound healing. It has also been reported to be associated with perioperative survival and mortality. Therefore, to shorten hospital stays and increase the quality of care in radical cystectomy and urinary diversion operations, it is important to manage nutrition (26). In nutrition management, first, nurses should measure the weight and height of the patient who has been admitted to the inpatient clinic and calculate their body mass index. Additionally, serum albumin levels are accepted as a nutritional indicator, and multidisciplinary care should be provided to the inpatient (20). Especially for elderly patients, if malnutrition and protein deficiency are present, total parenteral feeding support should be planned, and appropriate nursing interventions should be included in the care plan (20,22,23).

A few days before surgery, the outpatient clinic nurse should explain the foods that can be consumed by the patient and have the patient repeat back what they say to confirm their comprehension and prevent misunderstandings. It was reported that according to the ERAS protocol, before the operation, the patient admitted to the clinic should fast for 6 h after their intake of solid foods, and they should stop having anything 2 h after their intake of clear fluids (e.g., unsweetened tea, water, juices, soups), whereas consuming 800 mL of fluids containing carbohydrates the night before the operation and 400 mL of fluids containing carbohydrates 2-3 hours before the operation reduces the insulin resistance of the patient, lowers nitrogen loss and loss of muscle strength, and speeds up recovery by reducing postoperative metabolic stress (16,23,27).

Surgical Site Preparation

The night before surgery, the patient should have a shower with a sponge and disinfectant. This is done to minimize bacterial presence without damaging the patient skin (20).

Thromboembolism Prophylaxis

The use of especially anticoagulant and antithrombotic drugs (Aspirin, Coraspin, Ecopirin, Plavix, Coumadin, Dispril) by the patient and when they quit using these drugs should be questioned. If quitting these drugs will be a threat to the patient is, the replacement drug ordered by the physician should be started. In such cases, drugs in the low-molecular-weight heparin class (e.g., clexane-heparin) are usually preferred. For the continuation of the treatment and the reduction of the risk of intraoperative bleeding, nurses should be careful about medication use, follow-up, and changes. Moreover, other factors that are known to affect coagulation should also be kept in mind, and alternative thromboprophylaxis methods such as antiembolic stocking use should be implemented (16,27).

Geriatric Issues

The care requirements of elderly patients are different. Reduced functions with advancing age increase the care needs of the patient. Therefore, nurses should allow patients to have acceptable levels of independence and closely monitor the needs of elderly patients. Fall cases in hospitals are mostly seen in elderly patients. Nurses should accurately assess the fall risk of elderly patients, implement effective fall prevention activities, and inform patient relatives/attendants. The main purpose of care provided to elderly patients is to allow and support their most efficient use of their capacity (28).

Medication Before Anesthesia

- Because opioids prolong hospital stays due to their side effects, unnecessary premedication practices should be avoided. Instead, short-acting anxiolytics can be preferred.
- Preoperative records: Pre-operative preparations should be checked on the surgical safety checklist. The items that are checked in this list are the surgical marking procedure of the patient, their laboratory findings, dental prostheses, appropriate storage of valuables, cleaning nails, removing nail

polish, checking the presence of makeup, checking gowns and antiembolic stockings, directing the family members to waiting and information areas, confirming the preparation of blood products, premedication administration, checking voiding needs, and skin preparation.

- Transfer of the patient to the operating room: The inpatient clinic is called by the operating room staff and informed that the patient will be transferred to the operating room. The operating room staff arrives at the floor with the "patient operating room order chart" and transfers the patient to the unit with the inpatient clinic nurse. Fall prevention measures should be taken if premedication is to be administered (20).

Perioperative Nursing Care

- The perioperative process starts with the arrival of the patient in the operating room and ends with the reanimation of the patient/transfer of the patient to the intensive care unit.

- The patient is received at the operating room by checking their identity, and the surgical safety procedure continues. The surgical consent information of the patient is re-checked at admission, and all information about patient safety is provided by the inpatient clinic nurse.

- All tools and equipment that will be used and are/can be required in robotic surgery are prepared, it is confirmed that they are in working order, and the expiration dates of all consumables and kits are checked.

- The patient is given a position suitable for surgical intervention.

- To prevent the development of pressure injuries, care should be taken to place patient-supporting gel pads appropriately.

- Throughout the entire surgical process, the surgeon and nurse should be in active communication with each other and support each other, and the entire process should be recorded in the patient safety checklist.

- Before the patient is surgically closed, a final count of all equipment and materials is made on the basis of the counting protocol.

- After the surgery is completed and the covers are removed, the patient should be checked thoroughly and transferred safely to the reanimation room (11,29,30).

Postoperative Nursing Care

The postoperative period starts with the transfer of the patient to the reanimation or intensive care unit and ends with their discharge from the hospital (20). It has been reported that with effective nursing care that is planned and implemented well after a surgical intervention, postoperative complications are prevented to a substantial extent. After surgery, based on the Model for Nursing, postoperative nursing care involves the provision and maintenance of the safety of the patient and their environment and regulations of their diet, respiration, voiding, communication, personal hygiene and dressing, body temperature, mobility, working and entertainment, sexual expression, and sleep activity humanely and holistically (31,32).

In addition to basic care principles, nursing care following robotic radical cystectomy and urinary diversion operations

should involve information and interventions in a way that includes care practices specific to the preferred type of diversion. Simultaneously provided nursing care and patient education should cover discharge preparation, at-home care, and the support and education of family members.

- When the patient is brought back to their room after they are received from the operating room in verbal and written form with their file, their entire bodily integrity should be checked, their nasogastric tube, Foley catheter, abdominal drains, catheters, and urostomy bag should be emptied by observing and recording the fluids that come out in terms of quantity, color, and consistency.

- As in all surgical interventions, vital signs should be checked throughout 24 h, every 15 min in the first hour and every 30 min in the second hour, followed by 2- and 4-h checks. Based on the institutions policy, nursing care instructions and procedures should be followed. In the follow-up of vital signs, monitoring and alarm systems provide convenience in practice for nurses.

- Skin integrity should be checked and temperature and moisture information should be monitored. Pressure points should be checked for pressure injuries, the pressure injury risk assessment scale preferred by the institution should be applied again, and the results should be recorded. The patient should be given a suitable position, and this position should be changed at appropriate intervals.

- Based on the physician is, oxygen support can be provided to the patient according to their respiratory activity. At the appropriate time, Triflow use with breathing and coughing exercises should be started.

- The fall risk of a patient who has undergone surgical intervention must be assessed again, and preventive nursing measures should be taken (16,20).

Postoperative Analgesia

In each vital sign monitoring step, the pain of the patient should also be assessed, and to the use of analgesics, nurses should also use suitable positioning and relaxation techniques in the management of pain. With pain management, the patient can be mobilized comfortably, and their complication development risk decreases. If pain is not taken under control after the operation, it can lead to limitation in activities, respiratory/circulatory complications, gastrointestinal system problems, and delayed patient recovery (20).

The Stimulation of Gastrointestinal Motility and Postoperative Diet

One of the main purposes of ERAS protocols is to prevent postoperative ileus following abdominal surgery. excess fluids given during and after the operation negatively affect the gastrointestinal system, and thus, these practices should be avoided. Moreover, the use of agents that positively affect motility should be preferred (16).

In the timing of postoperative eating, the main issue is starting oral food intake to an extent tolerable by the patient after the assessment of their gastrointestinal functions. Patients should be encouraged to take fluids orally after the second hour the

following surgery and consume solid foods after the fourth hour. Support can be provided with nutritional solutions until sufficient nutrition is provided. According to recent randomized controlled studies, prolonging the fasting duration of patients after elective gastrointestinal resection does not have any advantage, but in contrast, it leads to several problems. It has been proven that early enteral feeding reduces the risk of infection and the duration of hospital stays, and does not increase the risk of anastomotic leaks or separation. Moreover, by early feeding, appropriate nitrogen compound balance metabolism is preserved and insulin resistance is minimized. However, it has been stated that in patients who start consuming food early, especially in those using opiates, the risk of nausea and vomiting increases, and a set of problems arise, including bloating, pulmonary dysfunction, and delay in mobilization (16,27).

As a nursing intervention, to ensure the oral hygiene of the patient, oral care should be planned for the patient and implemented. Furthermore, IV fluid and electrolyte treatment should be provided, and their fluid intake-output and weight should be monitored to prevent dehydration. When the oral food intake of the patient starts, their sufficient food intake should be monitored.

Monitoring should be performed in terms of nausea, vomiting, and diarrhea that can be seen in patients after surgery (16).

Urinary and Drainage Catheters

To create the neobladder, an approximately 40-45 cm section is taken from small intestinal segments, and the ends of the remaining intestine are sutured together robotically (27).

In robotic radical cystectomy and orthotopic urinary diversion, where a neobladder is created from small intestinal segments, patients usually have three drainage catheters. Two of these catheters are small stents with a diameter of 1 mm each placed into the right and left kidneys that come out of the abdominal wall through the urinary canal and the neobladder. The stents are usually removed on the seventh day of the postoperative period, and the patient is planned to complete their recovery period with only the Foley catheter.

The urine output of the patient should be checked every hour in the first 24 h in terms of color, amount, and consistency, and monitoring should continue at least at 4 h intervals on the following days. The amounts of urine collected from the right-left drainage catheters or Foley catheter should be monitored separately. Increased or decreased urine output as well as changes in urine color should be recorded in the observation chart of the nurse, and the physician should be informed.

The daily laboratory tests of the patient ordered by the physician should be carried out, their results should be followed up, and they should be shared with the members of the healthcare team.

Wound healing: The surgical incision site of the patient should be monitored and appropriate care should be provided. Aseptic techniques should be followed in the monitoring/emptying of drains and wound dressings, and appropriate solutions and methods should be used.

Early Mobilization

With the development of new surgical techniques and technological advancements today, conventional patient care approaches are being replaced by current multifaceted approaches. In one of these multifaceted approaches, called "fast track surgery", early mobilization has great significance.

The most frequently included practices in nursing interventions about problems of patients in the early postoperative period such as pain, nausea, vomiting, coughing, swallowing difficulties, and constipation include the early mobilization of the patient, giving the patient a suitable position, and administering medication ordered by the physician. Early mobilization speeds up the recovery process and reduces the risk of complications. On the other hand, delayed mobilization or prolonged bed rest may increase insulin resistance, muscle weakening, and muscle atrophy. Increasing mobility in the early period after surgery raises the circulation, prevents venous stasis, and supports optimum respiratory activity. In addition to its physiological effects, early mobilization has significant contributions to the solution of psychosocial problems (20,32,33,34).

Complications and Nursing Interventions for Preventing Complications

After major surgical interventions, the most frequently observed complications are infectious factors such as fever and pyelonephritis, hemorrhage, urinary extravasation, and ileus. These complications are followed by complications such as atelectasises, myocardial infarction, urinary fistulae, and urethral stricture related to the urinary diversion. While postoperative ileus is seen at rates between 2% and 32% in different patient groups, fever and pyelonephritis have been reported in 5% to 40% of patients (35,36,37).

After radical cystectomy and urinary diversion, some electrolyte anomalies arise when intestinal segments are included in the urinary system. These are hypokalemia, hypocalcemia, and hypomagnesemia (38,39).

In the prevention of such complications, the main approach involves the arrangement of sufficient and balanced fluid treatment for the patient, monitoring their fluid intake-output and weight, managing their diet for resolving constipation, and providing laxative treatment when needed (36,38,40).

Geriatric Issues

It is known that with advanced age, neurological symptoms such as delirium and disorientation are seen more frequently in patients. However, studies examining complications following radical cystectomy and urinary diversion have not focused specifically on this issue. These complications after surgery prolong the hospital stay of the patient and substantially increase the costs for the patient and the institution. Large et al. (41) found the postoperative delirium rate in 49 radical cystectomy patients older than 65 as 29%. This rate is similar in cardiovascular surgery and major orthopedic cases (35,41).

Patient Education and Discharge

Patient education starts with the admission of the patient to the institution. Nurses share examination results, examination and diagnosis procedures, routine hospital procedures, and hospital departments with the patient. When the patient is admitted to the inpatient clinic, the nurse introduces himself, the clinic, and the patient's room, informs the patient that different nurses work in different shifts, and provides the working schedule of nurses. The formal education plan should start after the patient has been examined. The education given to the patient should be personalized and focus on the diagnosis/needs of the patient, the treatment their condition requires, and their use of personal care tools and equipment. In cases where the patient is not able to decide/comprehend, their family members should be informed.

The patient and their family should be informed about self-care needs throughout their hospital stay and for discharge, how to meet these needs, pain status and management, the importance of the regular and correct use of medication, perineum care, urine monitoring and its importance, urinary catheter care, drainage monitoring, diabetes and diet, sexual activity, infection signs and symptoms, and cases where the patient would need to contact the physician urgently (15).

In the postoperative period, after the removal of the stents, the patient can shower. There is no problem regarding the exposure of the 5 robotic incision sites on the abdomen and Foley catheter to water. The important point here is drying the incision site after showering and the care of the Foley catheter. In male patients, the penis, the tip of the penis, and the area around the penis should also be cleaned based on the recommendations of the physician.

After cystectomy and subsequent diversions, movements such as cross-legged sitting or crouching, which put excessive tension on the floor muscles, should be avoided. These movements should also be avoided in the presence of catheters and for 2-3 weeks after catheter removal. If the catheter gets detached for various reasons, the physician must be contacted, and the catheter should not be reinserted at different institutions. Depending on the characteristics of the surgery and the patient, catheters are usually removed on the 14th or 21st day in the postoperative period. European-style toilets must be used. The patient should be instructed to urinate every 2 h in the daytime and every 3 h at night. The patient should be informed that they may experience urinary incontinence at first, and this situation will be resolved in time.

Some exercises recommended after catheter removal are as follows:

1. The hands are placed on the abdomen while lying down or sitting.
2. The abdominal muscles should not be contracted but controlled by the hand. Only the area around the rectum and buttock muscles are contracted, and this contraction is held for 4-5 seconds.
3. These muscles are relaxed, followed by a 4-5 s rest.

4. These movements should be followed in three sessions: morning, afternoon, and evening sessions, and each session should include 30 repetitions of contraction and relaxation.

To prevent urinary incontinence, the patient has to perform these exercises while coughing, making sudden movements, and getting up from bed or in a sitting position.

Follow-up and Examination of Results

Blood creatinine and urine culture tests should be conducted 4-5 weeks after the date of surgery. Because culture results cannot be obtained on the same day, the date on which the results will come out should be learned from the laboratory, and follow-up appointments should be planned accordingly.

Based on the pathology results after the operation, routine tests and examination follow-ups are conducted every 3 months for 2 years. Pathology results may affect the times of treatment and follow-up, and the patient should be constantly in contact with the physician. On average, radiological follow-up is performed by CT every 6 months

The checks continue with annual, lifelong follow-ups after the 5th year (27).

Conclusion

With all these nursing care and education processes, it is aimed to meet the self-care requirements of patients regarding their health problems and maximize their quality of life. Moreover, it is aimed for nurses to have increased awareness about robotic radical cystectomy and urinary diversion surgeries, more knowledge about the issue, and more positive outcomes in the success of the treatment with the nursing care they provide.

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