Journal of Positive School Psychology http://journalppw.com
2022, Vol. 6, No. 4, 11218–11222

COMPARISON OF 30-DAY COMPLICATIONS BETWEEN ILEAL CONDUIT AND NEO BLADDER SURGICAL METHODS AFTER RADICAL CYSTECTOMY, A COHORT STUDY IN IRAN

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Abstract

Objective: This study aimed to evaluate and compare 30-day postoperative complications between the ileal conduit and neo bladder methods after radical cystectomy.

Methods: The data of 94 patients with bladder cancer, undergoing radical cystectomy withtwo surgical methods of ileal conduit (n=32) and neo bladder (n=62) by the same surgeon, were collected. Thirty-day postoperative complications were collected, and the severity of complications in these two different methods was evaluated and compared according to the Clavien-Dindo standard system.

Results: According to the results of the current study, the chance of major complications in patients undergoing IC surgery is 1.81 times higher than those receiving the NB intervention. Therefore, the NB surgical approach is associated with fewer major complications than IC (27.5% vs. 40.6%, p-value=0.0196). The incidence of urinary tract infections (UTI) was slightly higher in NB than IC (6.4% vs. 6.2% p-value = 0.053). Besides, IC had a higher incidence of wound complications at the superficial surgical site (12% vs. 7%, p-value = 0.0327). The incidence of ileus was higher in NB compared to the IC group (38% vs. 28%, p-value = 0.510).

Conclusion: According to the observations of this study, the incidence of 30-day postoperative major complications was lower in the NB surgical approach compared to IC. Also, the incidence of surgical site infection was higher in the IC method.

Keywords: Radical Cystectomy, Ileal Conduit, NeoBladder, Postoperative Complications.

1. INTRODUCTION

Bladder cancer is the 11th most common cancer in terms of incidence and 14th cancer leading to death worldwide [1,2, 3]. More than 12 million new cases of bladder cancer are diagnosed across the world each year, with approximately 145000 annual mortalities [4, 5]. Research has also shown that the global burden of bladder cancer will have an increasing trend in the future [6]. The gold standard of treatment for high-grade bladder cancer includes radical cystectomy (RC) surgery, extensive lymphadenectomy, and urinary diversion, among which ileal conduit and orthotopic neo bladder can be mentioned [6-8]. The procedure used for urinary diversion depends on several factors, including the patients' clinical conditions and the patient and the surgeon's desire for a particular method to find an appropriate surgical procedure with the least disturbance in patients' quality of life regarding postoperative complications [8]. Neo bladder surgery has recently become a common technique for urinary diversion in radical cystectomy. Yet, the ileal conduit is considered a standard method for urinary diversion [9]. No studies have so far compared the early (30-day) complications after radical cystectomy [9, 10]. also so far as our knowledge, there are a few studies in this field which all patients had underwent surgery by one surgeon.

This study aimed to evaluate and compare 30-day complications of the IC and NB procedures after

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radical cystectomy by one surgeon and to evaluate the strengths and weaknesses of each method.

2. Materials and Methods

The medical records of 94 patients with muscle invasive bladder cancer were reviewed in this retrospective study from January 2016 to April 2019 after ethical baord approval to review the patients' records. All patients received radical cystectomy, pelvic lymphadenectomy, and urinary diversion in three medical centers of Labbafinezhad , Erfan Saadat Abad, and Ghiassi in Tehran, Iran. Neobladder and ileal conduit approaches were applied on 62 and 32 patients, respectively. Information on the patients' clinical characteristics and diseases, pre- and post-operative outcomes, and complications within 30 days after surgery was collected to compare the two surgical techniques. The 30-day postoperative period is generally the standard for assessing early postoperative complications [11]. Then, the postoperative complications experienced by all patients in the IC and NB groups were classified into 5 grades and evaluated according to the Clavien-Dindo standard classification (**Table 2**). As shown in **Table 2**, grades 1 and 2 represented minor, and grades 3-5 reflected major surgical complications [10-12].

2.1. Statistical Methods

As shown in **Table 1**, study variables included age (continuous), sex (male, female), weight (continuous), body mass index (continuous), duration of disease (<1 year, 1-3 years, >3 years), type of invasive cancer and its stage, history of comorbidity (yes, no) and smoking (yes, no), pre- and post-operative hemoglobin (continuous), duration of surgery (continuous), length of postoperative hospitalization (continuous), duration of Foley catheter application (continuous), and the drain (continuous). Variables related to postoperative complications were also listed in **Table 2** according to the Clavien-Dindo standard classification system to compare the two groups. **Table 3** shows the frequency of complications for the two study groups. SPSS 22 software was used to perform the calculations of all the collected data. Descriptive statistical tests including Chie square, Independent T-Test, and related nonparametric tests were used for analyses. Correlation tests were also used to evaluate quantitative variables. P-values <0.05 were considered significant.

3. Results

3.1. Patients' characteristics

Table 1 summarizes the patients' characteristics according to the type of urinary diversion performed. Males made up 83% and 81% of patients in the NB and IC groups, respectively (P-value <0.1). The body mass index of 31.3% of patients undergoing IC was in the range of overweight and obese, while only 24.2% of patients in the NB group were in this range (P-Value <0.383). Overall, 28% and 22.5% of patients who suffered from their disease for more than three years underwent IC and NB, respectively (P-value<0.492). The mean duration of surgery was 191 minutes in the IC group and 232 minutes in the NB group (P-value <0.001). The mean length of hospitalization in the IC and NB groups was 6 and 7 days, respectively (P-value <0.03). The mean preoperative hemoglobin of patients was 12.2 in both IC and NB groups, reaching 9 and 9.3 ml in the IC and NB groups, respectively, after surgery (P-values <0.320 postoperative, respectively).

3.2. Postoperative Complications

Table 2 shows the most common 30-day postoperative complication in patients according to the Clavien-Dindo classification. At least one complication was observed in all patients in both groups. Therefore, there was no difference in the occurrence of overall complications in both groups. Grade 1 complications, including all complications that did not require therapeutic intervention, were observed in 12.5% of patients in the IC group (4/62), and 16.6% of patients in the NB group (10/62). Grade 2 complications, including complications that needed therapeutic interventions with drugs, were observed in 46.9% of patients in the IC group (15/32) and 53.1% of patients in the NB group (34/62). Overall, minor complications were more common in the NB procedure (72.5% vs. 59.4%, p-value= 0.0029).

In contrast, major complications (grades 3-5) were observed in 40.6% and 27.5% of patients in the IC and NB groups, respectively (p-value = 0.0196). Grade 3 complications, which required reoperation or any surgical or radiological interventions, were observed in 31% of patients in the IC group (10/32) and 22.5% of patients in the NB group (14/62). Grade 4 complications, which were life-threatening complications, were observed in 2 patients in the IC group (6.25%) and

4 patients in the NB group (6.15%). There was only one death in the IC group due to cardiac arrest during postoperative hospitalization, regarded as grade 5. There were no deaths observed in the NB group.

3.3. Frequency of any Complication Related to Clavien -Dindo Classification:

Table 3 summarizes the complications associated with each Clavien-Dindo classification grade. In both groups, gastrointestinal complications such as ileus, infections, surgical wound-related complications, and anemia were the most recurrent complications [6, 10, 15, 16]. There were more wound infections requiring treatment in the patients of the IC group (25% vs. 16%, p-value=0.0430 respectively). The need for blood transfusion due to anemia was also higher in the patients undergoing IC surgery than those in the NB group (32% vs. 21% p-value=0.0319). Hernia requiring reoperation was observed in 6% of IC patients and only 1% of NB patients. As mentioned, unfortunately, there was one death in the IC group due to cardiac arrest.

In contrast, 38% and 28% of patients in the NB and IC groups experienced gastrointestinal complications such as ileus, respectively (p-value = 0.510). Urinary tract infection was reported in 6.4% of NB and 6.2% of IC patients (p-value = 0.053). One patient from the NB group suffered sepsis.

4. Discussion

Recently, Abe et al. studied and compared 90-day postoperative complications of the IC and NB approaches using the Clavien-Dindo classification system at the Memorial-Sloan Kettering Cancer Center. Using this classification system in the cohort performed in the present study, there were no significant differences in the incidence of overall postoperative complications between the IC and NB groups compared to the study, as well as other studies [9, 11, 17]. It seems that the present study is the only research in which all patients underwent surgery by one surgeon who also performed all postoperative follow-ups. Therefore, the likelihood of bias in examining and comparing the complications of the two approaches minimizes, while it is also possible to obtain more reliable results. In the present study, the NB surgical method showed fewer major complications (grades 3-5) in multivariate analyses (p-value = 0.0196). Unfortunately, there was one death during the 30-day study of postoperative complications in the IC group. There were no deaths recorded in the NB group. According to the results of logistic regression, the chance of major complications in patients undergoing IC surgery was 1.81 times higher than those receiving the NB intervention. Therefore, it seems that if proper preoperative care, good surgical conditions, and skilled surgeons are available, Neo bladder surgical approach leads to fewer comorbidities in comparison with ileal conduit.

According to the comparison of each complication in the two groups, patients undergoing IC surgery experienced a higher incidence of wound complications at the superficial surgical site (12% vs. 7%, p-value = 0.0327). Also, more complications of the major surgical site, which generally require treatment, were observed in the IC compared to the NB group (25% vs. 16% p-value = 0.0430) [10][18]. In general, the incidence of urinary tract infections (UTI) was slightly higher in the NB and IC approaches (6.4% vs. 6.2% p-value = 0.053), However, there was sufficient information available on the number of patients having pre-operative bacteriuria (**Table 1**) and prophylactic treatments were performed for patients in the first postoperative days to reduce the incidence of UTI in both groups. The incidence of ileus was higher in the NB compared to the IC group (38% vs. 28%, p-value = 0.510). The duration of surgery was longer in NB than the IC method (3.7 ± 0.8 hrs vs. 3.09 ± 0.7 hrs, P-value <00.1). The length of hospitalization was also slightly higher in NB than the IC group (7.0 ± 2.4 days vs. 6.1 ± 2.1 days, P-value= 0.030), which is obviously due to the longer duration of NB surgery compared to IC. As previously mentioned, the incidence of major complications was lower in the NB approach (27.5% vs. 40.6%, p-value = 0.0196) in the present study. However, this group had a higher incidence of minor complications (72.5% vs. 59.0%), which is similar to the results obtained by Abe et al. [9] Also, the incidence of postoperative wound infection was higher in patients undergoing IC surgery compared to the NB method. Abe et al. and Erber et al. also reported similar results [9, 10]. The incidence of postoperative ileus was higher in NB than the IC approach. Erber et al. and Nieuwnhuijzen et al. also reported similar results. The incidence of ileus in patients of the NB group may be

particularly due to the possibility of urine leakage from the unfilled Neobladder in the early postoperative hours [18]. According to the results of logistic regression, there was a significant relationship between the patients' BMI and the incidence of surgical site infection. According to these assessments, the chance of surgical site infections in patients with a BMI at the level of overweight is 1.99 times higher than those with a normal BMI (p-value = 0.006). Therefore, BMI can be an independent risk factor for surgical wound infections [19-22].

This cohort study had several limitations. First, it could not report some minor postoperative complications due to limitations in reviewing the patients' records in retrospective studies, along with the lack of access to complications in all patients. Also, this study did not investigate various factors such as the type of NB surgery and the anastomosis technique that affect the postoperative recovery process and the severity of complications because of insufficient information. Future studies can explore these issues. However, this study reflects the incidence of 30-day postoperative complications and the recovery process in patients with bladder cancer in Iran.

5. Conclusion

According to the results of this study on 94 patients with bladder cancer in three medical centers, there was no significant difference between the IC and NB approaches regarding the overall postoperative complications after radical cystectomy. Moreover, the NB surgical approach had fewer major complications than IC.

Acknowledgments

The authors declare that they have no known competing for financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Conflict of interest

Financial support

Ethics statement.

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