

Incidence of The Bowel, Bladder, and Sexual Dysfunction Following Surgery for Colorectal Malignancy

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ABSTRACT

Background: Colorectal malignancy is a very common disease of the gastrointestinal tract. Surgery following neoadjuvant chemoradiotherapy has been found to improve the survival of the patients with colorectal carcinoma. Research on bowel, bladder and sexual dysfunction following colorectal surgery remains limited in Nepal. The aim of this study is to evaluate the incidence of the bowel, bladder, and sexual dysfunction after colorectal surgery.

Methods: It is a cross-sectional study carried out at National Academy of Medical Science, Bir hospital. Patients who underwent low anterior resection and abdominoperineal resection with curative intention post neoadjuvant chemoradiotherapy were included in the study.

Results: A total of 26 patients [20 (76.9%) males and 6 (23.1%) females] who underwent surgery for the colorectal malignant disease were included. 24 (92.30%) underwent low anterior resection and 2(7.6%) patient underwent abdominoperineal resection respectively after neoadjuvant chemo radiotherapy. 19(79.16%) of the patients developed bowel dysfunction with mean low anterior resections score of 22.88 ± 4.394 . And 5(20.83%) had normal bowel function. Bladder dysfunction was seen in 3 (11.5%) patients. And rest of the 23 (88.5%) patient had normal bladder function. In males, Sexual Dysfunction was observed in 11 (42.3%) and no sexual dysfunction was observed in 15(57.69%). While in females, 38.46% had no sexual desire and 50% had dyspareunia due to vaginal dryness.

Conclusions: This study clearly demonstrated a higher incidence of bowel and sexual dysfunction compared to bladder dysfunction following low anterior resection and abdominoperineal resection for colorectal malignant diseases.

Keywords: Bowel; bladder; sexual dysfunction; low anterior resection; abdominoperineal resection.

INTRODUCTION

Colorectal cancer is the second most common cancer by the site in Europe and the third most common cancer in the USA with high morbidity and mortality.^{1,2} Survival after the treatment has improved over the past few decades as a result of early diagnosis, radiotherapy and advances in surgical techniques such as abdominoperineal resection (APR), low anterior resection (LAR), and total mesorectal excision (TME).³⁻⁵ These innovative surgeries are the current standard treatment for the mid and the low rectal cancers which avoids the permanent colostomy. It is very difficult to find out the incidence of the bowel, bladder and sexual dysfunction of patients either because they are embarrassed or because they do not relate their symptoms to rectal cancer treatment. This article reports the incidence of the bowel, bladder and sexual dysfunction following surgery for rectal

cancer from the NAMS, Bir Hospital, a tertiary level hospital.

METHODS

It was a cross-sectional study at Bir Hospital and the duration of the study was from December 2014 to December 2017. Here, all the patients who underwent LAR and APR following neoadjuvant chemoradiotherapy were included. And, all the patients with recurrence after surgery, lost to follow up, benign disease, who did not undergo neoadjuvant chemoradiotherapy, and who underwent trans-anal excision were excluded from the study (Table 1). In our study, the independent variable will be the type of surgery done for the colorectal malignant disease. And the dependent variables will be the post-operative complications in the form of immediate and delayed complications. Immediate

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could be infectious or non-infectious complications and delayed (long term) complication could be bowel, bladder, and sexual dysfunction respectively.

Table 1. Patient demography.

Parameter	Value
Number of enrolled patients	26
Sex	
Male	20(76.9%)
Female	6(23.1%)
Age at surgery in years	43.577(26-75)
Body Mass Index(kg/m ²)	20.78
Operation Type	
LAR	24(92.30%)
APR	2(7.6%) [6 patients belonged in exclusion group]
Stage	
DUKES A	-
DUKES B	3(11.5%)
DUKES C	23(88.5%)
DUKES D	-

Data collection was done using structured Performa that included all the demographic parameters, examination findings which included the data regarding neoadjuvant chemoradiotherapy and type of surgery (LAR and APR) were included. The laboratory parameters were also included. All the operative and post-operative details were included regarding bowel, bladder, and sexual dysfunction. And validated tools were used to calculate and analyze data.

The aim of this questionnaire was to assess the bowel function using a validated questionnaire.⁶ The LARS consists of five questions and can be used to generate an overall score that translates into no LARS (score 0-20), minor LARS (21-29), and major LARS (30-42) respectively.⁷

Assessment of bladder dysfunction was assessed by the validated questionnaire of International Prostatic Symptoms Score (IPSS) for bladder dysfunction.⁸ For the evaluation of preoperative and postoperative bladder function, a urologic history and residual urine volume measurements by ultrasound were done.

In the early period after surgery sexual function was measured using the validated questionnaire the international index of female sexual function (IFSF) for females and the International Index of Erectile Function (IIEF) for males.^{9,10} reliable, self-administered measure of erectile function that is cross-culturally valid and psychometrically sound, with the sensitivity and specificity for detecting treatment-related changes in patients with erectile dysfunction. METHODS Relevant domains of sexual function across various cultures were identified via a literature search of existing questionnaires and interviews of male patients with erectile dysfunction and of their partners. An initial questionnaire was administered to patients with erectile dysfunction, with results reviewed by an international panel of experts. Following linguistic validation in 10 languages, the final 15-item questionnaire, the international index of Erectile Function (IIEF These tools helped to assess the impact of a specific treatment modality by evaluating different sexual function domains.⁹ Our study group was small, so we did not classify the groups into mild, moderate, and severe dysfunction groups. We did the overall long term assessment of the patients who came for the follow-up. These specific questionnaires were asked and the assessment was done for the overall dysfunctions.

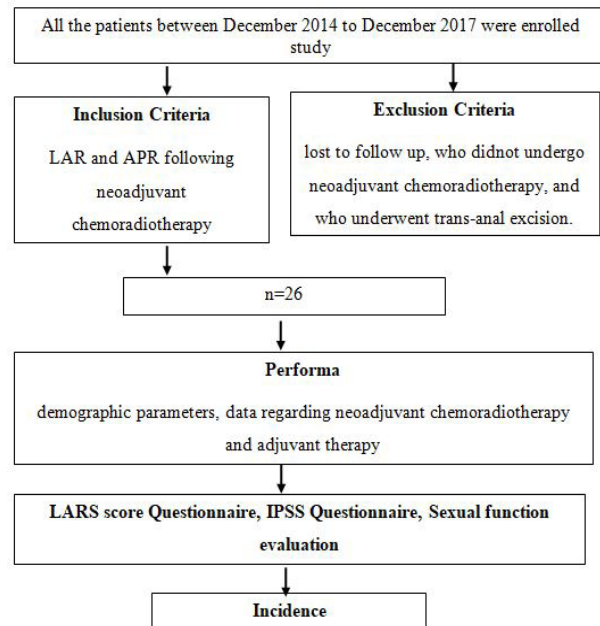


Figure. 1. Flow Chart demonstrates the course of study.

The study was approved by the institutional ethical committee- “IRB of NAMS, Bir Hospital” and written

consent was obtained from all of the patients.

All the data were entered in SPSS version 16 and then statistical analysis was done. Type of surgery, the status of neoadjuvant chemoradiotherapy, and the postoperative outcomes were studied respectively. Correlation and logistic regression statistic tools were used. A comprehensive literature search published in English was done till 2019 using Hinari, PubMed, and Cochrane Library.

RESULTS

Out of 38 patients included for surgery 12 were excluded due to poor follow up and those patients who underwent upfront surgery respectively. Only 26 patients were included in the study. There were 20 (76.9%) males and 6 (23.1%) females respectively. The mean age of the patient was 43.577yrs (26-75) and mean BMI was 20.78. The number of patients that underwent LAR were 24 (92.30%) and those who underwent APR were 2 (7.6%) after neoadjuvant chemoradiotherapy respectively. Out of all, 3 (11.5%) patients were staged as Dukes B and 23 (88.5%) was classified as Dukes C (Table 2).

It was seen in 19 (79.16%) of the patients, whereas no dysfunction was seen in 5 (20.83%) of the patients. Mean LARS score in the patients with dysfunction was 22.88±4.394. When we followed up the patients for 12 to 36 months. The urgency was seen in 42.10% patients, fecal incontinence (either flatus or stool) was seen in 78.94% of the patients and difficulty in the evacuation was seen in 15.78% (Table 2).

Table 2. Incidence of bowel, bladder dysfunction, and sexualin present.

SYMPTOMS, n=26	YES	NO	Scores
Bowel Dysfunction (-2 APR)	19 (79.16%)	5 (20.84%)	LARS (mean±SD) 22.88±4.394
Bladder Dysfunction	3 (11.5%)	23 (88.5%)	IPSS (8-19)
Sexual Dysfunction	11 (42.3%)	15 (57.69%)	IIEF(8-11) males IFS(16-25) females

It was seen in 3 (11.5%) and rest of the patient 23 (88.5%) did not have bladder dysfunction. The IPSS was 8-19 in those patients with bladder dysfunction. Weak urinary stream 2 (7.6%), stress incontinence 1 (3.8%), difficulty in postponing urination 2 (7.6%) and dysuria in 1 (3.8%)

patient (Table 2).

It was seen in 11 (42.3%) and no sexual dysfunction was seen in 15 (57.69%). Most of the males had moderate SD with IIEF score (8-11) and female had moderate dysfunction with IFSF score (16-25). When considering individual symptoms most of the males, 42.30% had no sexual desire, 38.46% were unable to attain erection, and 34.61% were unable to ejaculate respectively. While in females, 38.46% had no sexual desire and 50% had dyspareunia due to vaginal dryness (Table 2).

DISCUSSION

The total number of included patients was 26. The rate of bowel dysfunction was 79.16% (19 out of 26). Which was found to be improved with long term follow up and the LARS scores showed only minor dysfunction (LARS 21-29). A study from Denmark by Bregendahl et al.¹¹ including the recently validated low anterior resection syndrome score (LARS score; range 0-42, showed 41% of major LARS in the patients with TME after RT. And in a recent systemic review, major LARS was seen in 38-62%, minor LARS in 22-28% and no LARS in 10-38% of the patients respectively.¹² termed 'low anterior resection syndrome' (LARS Similar results were seen in a study by Kupsch et al.¹³, 55.2% of patients exhibited LARS scores >20 (minor 19.5% and major 35.6% respectively). There was a positive correlation in the type of procedure, young age, and preoperative chemoradiotherapy with LARS scores in this study. However, only young age was a factor related to the LARS score in further analysis, as the disease was aggressive in younger age in our study. Whereas our study, on logistic regression analysis, did not show any correlation with the type of procedure, preoperative chemoradiotherapy, and young age respectively. This could be due to small sample size in our study, as most of them were LAR and few of them were APR. Other studies with a large patient cohort (n =796), 71.5% suffered from LARS out of which 52% suffered from major LARS. The overall incidence of LARS was similar to our study.⁷

With regard to urinary function 3 (11.5%) out of 26 patients had urinary dysfunction with the IPSS scores between (8-19), but rest (88.5%) of the patient had a normal urinary function, the scores ranging from (0-7). In a recent prospective study, 78% F and 88.9% M had a urinary dysfunction following TME.¹⁴ Which was slightly higher than preoperative urinary dysfunction (75% F and 80.1% M) in the same study. Similarly, in another study by Langeet al.,¹⁵ 73.8% reported moderate and 26.2% reported severe incontinence, whereas, 88% reported

moderate and 12% reported severe bladder dysfunction respectively 5 years after TME. In their study, preoperative incontinence and difficulty in bladder emptying, female sex, perioperative blood loss, and autonomic nerve damage were found to be independent risk factors.¹⁵

In a study by Adam et. al.,⁸ the baseline urinary function of the overall population (men and women) assessed by the IPSS score was normal in 78% of patients. At 12 months, the IPSS score was normal in 83% of patients, with a moderate dysfunction in 15% and with a severe dysfunction in 2%, without any difference compared with the baseline urinary function ($p = 0.21$) (Table 3). But in a study by Doeksen A et. al.¹⁶ urinary and bowel function and quality of life in both short-term and long-term. METHODS Eighty-three patients who underwent RR were compared to 53 patients who underwent a colonic resection leaving the rectum in situ (RIS, long term follow up (median interval of 8.5 years), no significant impact of colorectal surgery on overall urinary and sexual functioning was demonstrated. And during TME, identification and preservation of the pelvic autonomic nerves were associated with low bladder dysfunction rates (4.5 vs. 38.5 percent; $p < 0.001$).¹⁷

It was seen in 11(42.3%) out of 26 patients. The SD score in males ranged from (8-11) and (16-25) in females respectively. Most of the patients experienced SD at 12 months after surgery.⁸ Sexual activity in women declined from 59% before treatment to 36%. In men, sexual activity (82% vs 57%), erectile function (71% vs 24%), and ejaculatory function (78% vs 32%).⁸ In a study by Hendren et. al.,¹⁸ including the Female Sexual Function Index (FSFI mean (SD), FSFI and IIEF scores were found to be 17.5 (11.9) and 29.3 (22.8) respectively. Also, in another study by Bruheim et al.,¹⁹ the prevalence of moderate-severe ED was 86% in the RT+ and 55% in RT- patients which was statistically significant $p < 0.001$.¹⁹ SD was found to be more common after APR (87%) than after LAR or HAR (50 %) with $p = 0.01$.²⁰ But contrary to

the previous study, post-operative SD in this study was not associated with preoperative RT. In another study results of higher SD in female (94%) was seen compared to male (63.9%).¹⁴ In a recent study by Attaallah et. al.,²¹ laparoscopic surgery was found to have better results than open surgery in terms of SD. The authors found significantly higher rates of moderate-to-severe SD in female patients compared to male (38% vs. 52%) following rectal surgery with curative intent.

The results of this study are better than most of the previous studies. It could be due to small sample size. All of the patients in our study received neoadjuvant chemoradiotherapy and had moderate SD in females (16-25) whereas the males (8-11) had moderate to severe sexual dysfunction. The strength of this study is the use of well-validated instruments for the analysis of bowel, bladder, and sexual dysfunction. Nevertheless, the limitation of this study is that preoperative bowel, bladder, and SD were not registered. Furthermore, large number of sexually inactive patients (preoperative and postoperative) could have affected the questions regarding sexual function.

A Novel technique like laparoscopic surgery is found to be an acceptable alternative with better results. This method reduced the intraoperative blood loss and the transfusion requirement, earlier resumption of oral intake, and better short term results.²² Similarly, a recent meta-analysis on robot-assisted rectal surgery showed better urogenital function than after laparoscopic rectal surgery.²³ Embase and the Cochrane Library were systematically searched in February 2014. All studies investigating urogenital function after robot-assisted rectal cancer surgery were identified. The inclusion criteria for meta-analysis studies required comparison of robot-assisted with laparoscopic surgery and the evaluation of urological and sexual function by validated questionnaire. The outcome was evaluated using the International Prostate Symptom Score (IPSS) and RCT with high ligation vs low ligation of IMA following

Table 3. Comparison of Bowel, Bladder and Sexual dysfunction with different published literature.

Authors	Year	Patients	Dysfunction(%)		
			Bowel	Urinary	Sexual
Junginger et al. ¹²	2003	150	-	Up to 38.5%	-
Desnoo et al. ¹⁵	2006	-	Up to 90%	-	-
Bregendahl et al. ²³	2013	938	41%	-	-
Juul T et al. ¹¹	2014	796	71.5%	-	-
Kupsch et al. ²⁵	2018	331	55.2%	-	-
Present study	2017	26	79.16%	11.5%	42.3%

anterior resection did not show any effect on defecatory function.²⁴ Similar results were seen in a Swedish study, the level high tie did not show any effect on bowel, bladder, and sexual functions respectively.²⁵ In a study by Chen TY al.²⁶ known as low anterior resection syndrome (LARS, rectal cancer specialists were found to underestimate the bowel dysfunction symptoms that truly mattered to the patient and affected their QoL. Surgical nerve damage is the main factor in the etiology of pelvic organ dysfunction after rectal cancer treatment. Therefore, nerve preservation during rectal cancer surgery needs to be more emphasized in the daily practice.²⁷ Novel techniques like robotic surgery with the comprehensive surgical technique with an intact mesorectal fascia²⁸ and intra-operative nerve stimulation²⁹ during dissection helps in the nerve preservation. Robotic surgery requires skilled manpower and advanced setup which is not feasible in our context. So, we still rely either on laparoscopic or open surgery. Other than these, preoperative neoadjuvant and postoperative adjuvant therapy also affects the postoperative outcome. The detail discussion is out of the scope of this article, interested readers can find them here.³⁰

There are certain limitations in our study. First, it is a single center study with small sample size. Additionally, several patients were lost to follow-up. Hereafter, results should be cautiously interpreted with regard to the representing patients. Second, postoperative changes in bowel, bladder and sexual function require longer observation period than ours to understand the long-term effects of the procedure.

CONCLUSIONS

High rates of incidence of bowel and sexual dysfunction were clearly demonstrated by the present study following surgery for rectal cancer after neoadjuvant chemoradiotherapy. Further research is warranted in order to improve the surgical outcome of patients undergoing surgery for the colorectal malignancies.

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