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Major and Minor Complications of Laparoscopic Surgery following Colorectal Cancer Treatment

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Abstract

Background: Laparoscopic surgery has become a preferred minimally invasive option for colorectal cancer treatment due to its numerous advantages over traditional open surgery. This study aimed to evaluate the short-term outcomes of laparoscopic surgery for colorectal cancer at the National Institute for Cancer Research and Hospital (NICR&H) in Dhaka, Bangladesh. **Material & Methods:** This was a prospective observational study conducted from September 2018 to October 2019 in the Department of Surgical Oncology at NICR&H. The study included 39 patients diagnosed with colorectal cancer who underwent laparoscopic surgery. Data were collected prospectively from medical records, including demographic information, clinical characteristics, surgical details, and short-term postoperative outcomes. Statistical analysis was performed using SPSS for Windows, with categorical data expressed as numbers and percentages and continuous data as means and standard deviations. **Results:** The study comprised 23 males (58.97%) and 16 females (41.03%). Most participants had primary education (51.28%) and were housewives (41.03%). A family history of cancer was reported by 25.64% of participants. The most common chief complaint was per-rectal bleeding (48.72%). Colonoscopy findings included ulcer proliferative lesions in 64.10% of patients. The most frequent minor complication was urinary tract infection (30.77%), while surgery conversion (12.82%) was the most common major complication. Other major complications included hemorrhage, respiratory distress, internal hemorrhage, intra-abdominal abscess, acute renal failure, and postoperative mortality, each occurring in 2.56% of patients. **Conclusions:** Laparoscopic surgery for colorectal cancer in Bangladesh demonstrates significant benefits, including reduced postoperative pain and quicker recovery times, despite certain minor and major complications. These findings support the broader adoption of laparoscopic techniques in similar healthcare settings to improve patient outcomes.

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Keywords:- Colorectal cancer, Laparoscopic surgery, Postoperative complications.

INTRODUCTION

Colorectal cancer (CRC) remains one of the most significant malignancies worldwide, posing substantial health burdens due to its high incidence and mortality rates. Globally, colorectal cancer ranks third in terms of incidence and second in terms of cancer-related deaths.[1] In Bangladesh, the situation mirrors this global trend, with a rising incidence that reflects changes in lifestyle and increasing life expectancy. The socio-demographic profile of colorectal cancer patients in Bangladesh often includes late-stage presentation and varied histopathological types, emphasizing the need for timely and effective treatment modalities.[2] Surgical intervention is a cornerstone in the management of CRC, with several approaches available depending on the stage and location of the tumor. Traditional open surgery has long been the standard treatment but is associated with significant postoperative pain, longer hospital stays, and extended recovery periods. In recent years, laparoscopic surgery has emerged as a minimally invasive alternative, offering numerous benefits over open surgery. Laparoscopic approaches are associated with reduced postoperative pain, shorter hospital stays, and quicker recovery times, which can significantly improve patient outcomes and quality of life.[3] The evolution of laparoscopic techniques has been marked by increased adoption in both developed and developing countries, including Bangladesh, although challenges remain in terms of resource availability and the need for specialized training.[4] Despite the advantages, laparoscopic colorectal surgery is not without complications. Major complications such as anastomotic leakage, intraoperative bleeding, and infections can significantly impact patient recovery and outcomes. Anastomotic leakage, a particularly severe complication, occurs in 0% to 20% of cases depending on the anatomical site and is associated with high morbidity and mortality rates.[5,6] Intraoperative and postoperative bleeding, while less frequent, present risks that can necessitate reoperation or blood transfusion, with incidence rates reported between 1% and 4%.[7] Infections, including surgical site infections (SSIs) and intra-abdominal infections, also pose significant risks, occurring in 2% to 15% of cases.[8] Minor complications, though less severe, are also of concern in laparoscopic colorectal surgery. Postoperative ileus, characterized by delayed bowel function recovery, can prolong hospital stays and delay patient recovery. Studies have shown that postoperative ileus can occur in up to 20% of patients undergoing laparoscopic colorectal procedures.[9] Urinary retention, another minor complication, affects around 10% of patients and often requires temporary catheterization to manage.[10] Port-site hernias, while less common, still present a notable risk, with incidence rates ranging from 0.5% to 2%.[11,12] These complications highlight the need for meticulous surgical technique and careful postoperative monitoring to minimize their occurrence. The growing adoption of laparoscopic surgery in Bangladesh is promising, yet it is accompanied by several challenges. The limited availability of trained surgeons and specialized equipment, along with the variability in healthcare infrastructure, poses significant barriers to widespread

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implementation. Efforts to enhance surgical training and improve healthcare resources are crucial for maximizing the benefits of laparoscopic techniques in this context.[13] Given the rising incidence of CRC in Bangladesh and the significant advantages of laparoscopic surgery, this study aims to comprehensively assess the major and minor complications associated with laparoscopic colorectal surgery in the Bangladeshi context. By providing detailed observational data and statistical analyses, this research seeks to inform clinical practices and guide strategies for improving patient outcomes. The ultimate goal is to reduce the incidence of complications and enhance the overall effectiveness of laparoscopic colorectal surgery in treating CRC in Bangladesh.

MATERIAL AND METHODS

This was a prospective observational study conducted among patients suffering from colorectal cancer at the National Institute for Cancer Research and Hospital (NICR&H) in Mohakhali, Dhaka. The study was carried out from September 2018 to October 2019, focusing on evaluating the short-term outcomes of laparoscopic surgery in the treatment of colorectal cancer. The study was conducted in the Department of Surgical Oncology at NICR&H, a leading cancer treatment and research institution in Bangladesh, equipped with advanced surgical technologies and staffed by experienced oncologists and surgeons, providing a comprehensive setting for the study. The study population consisted of 39 patients diagnosed with colorectal cancer who underwent laparoscopic surgery at NICR&H during the study period. These patients were selected based on specific inclusion criteria: they had confirmed colorectal cancer and were deemed suitable candidates for laparoscopic surgery by their treating physicians. Patients with other comorbidities that contraindicated laparoscopic surgery or those who required emergency surgery were excluded from the study. Data were collected prospectively from the patients' medical records and included demographic information, clinical characteristics, surgical details, and short-term postoperative outcomes. Key variables collected included age, gender, tumor location, tumor stage, type of laparoscopic procedure performed, operative time, blood loss, length of hospital stay, postoperative pain levels, and complications within 30 days post-surgery. After cleaning and editing, all relevant data were compiled into a master chart for analysis. Statistical analysis of the results was performed using SPSS for Windows (IBM SPSS Statistics for Windows, version 22.0, Armonk, NY, IBM Corp.). Categorical data were expressed as numbers and percentages, while continuous data were presented as means and standard deviations (SD).

RESULTS

The study included 39 patients: 23 males (58.97%) and 16 females (41.03%). Most participants had primary education (51.28%), followed by secondary education (33.33%), higher secondary education and above (10.26%), and a small portion were illiterate (5.13%). Regarding occupation, 41.03% were housewives, 20.51% were in business, 17.95% were farmers, 12.82% were in private service, and 7.69% had other occupations. Monthly income varied with 25.64% earning less than 5000 BDT, 23.08% earning 5000-10000 BDT,

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12.82% earning 10000-15000 BDT, 15.38% earning 15000-20000 BDT, and 23.08% earning more than 20000 BDT. A family history of cancer was reported by 25.64% of participants, while 74.36% had no family history of cancer. [Table 1]

The most common complaint was per-rectal bleeding, reported by 19 patients (48.72%). This was followed by abdominal pain in 7 patients (17.95%), rectal pain in 6 patients (15.38%), and abdominal lump in 4 patients (10.26%). Other less frequent complaints included constipation (2.56%), itching and burning sensation (2.56%), and alteration of bowel habits (2.56%). [Table 2]

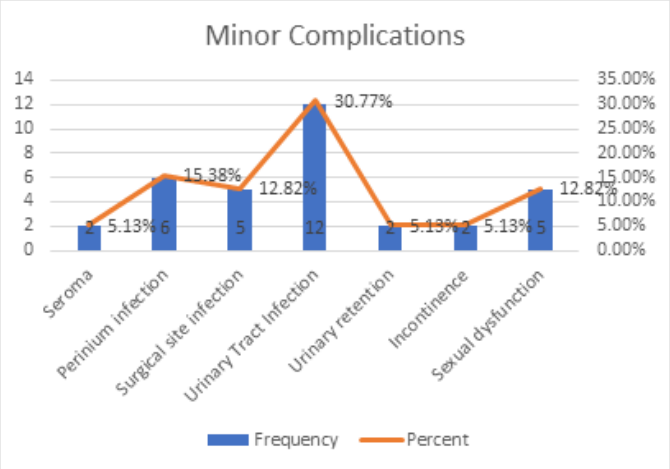

Figure 1: Distribution of minor complications among participants

The most common finding was ulcer proliferative lesions, observed in 25 patients (64.10%). Annular growth and polypoid lesions were each found in 5 patients (12.82%). Cauliflower-like lesions were noted in 1 patient (2.56%), and nodular growths were seen in 2 patients (5.13%). Additionally, a mass in the colon on ultrasound was detected in 11 patients (28.21%). [Table 3]

The minor complications observed are depicted in [Figure 1]. Urinary tract infection was the most common, occurring in 12 patients (30.77%). Perineum infection and surgical site infection were reported in 6 patients (15.38%) and 5 patients (12.82%), respectively. Other minor complications included urinary retention (5.13%), incontinence (5.13%), seroma (5.13%), and sexual dysfunction (12.82%).

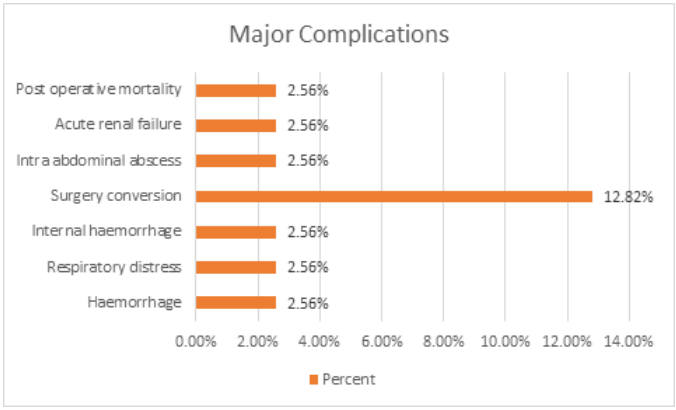

Figure 2: Distribution of major complications among participants (N=39)

The major complications observed are depicted in [Figure 2]. Surgery conversion was the most frequent major complication, occurring in 5 patients (12.82%). Other major complications included hemorrhage (2.56%), respiratory distress (2.56%), internal hemorrhage (2.56%), intra-abdominal abscess (2.56%), acute renal failure (2.56%), and postoperative mortality (2.56%).

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Table 1: Distribution of baseline characteristics among the participants (n=39)

Demographic variables	**Frequency**	**Percent**
Gender		
Male	23	58.97%
Female	16	41.03%
Educational status		
Primary	20	51.28%
Secondary	13	33.33%
Higher secondary & above	4	10.26%
Illiterate	2	5.13%
Occupation		
Housewife	16	41.03%
Business	8	20.51%
Farmer	7	17.95%
Private service	5	12.82%
Others	3	7.69%
Monthly income		
<5000	10	25.64%
5000-10000	9	23.08%
10000-15000	5	12.82%
15000-20000	6	15.38%
>20,000	9	23.08%
Family history of Cancer		
Yes	10	25.64%
No	29	74.36%

Table 2: Distribution of patients by present complaints (n=39)

Chief Complaints	**Frequency**	**Percent**
Per-rectal bleeding	19	48.72%
Abdominal Pain	7	17.95%
Rectal Pain	6	15.38%
Abdominal Lump	4	10.26%
Constipation	1	2.56%
Itching &burning sensation	1	2.56%
Alteration of bowel habit	1	2.56%

Table 3: Distribution of patients by colonoscopy findings (n=39)

Colonoscopy	**Frequency**	**Percentage**
Ulcer proliferative lesion	25	64.10%
Annular growth	5	12.82%
Cauliflower like lesion	1	2.56%

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Polypoid	5	12.82%
Nodular growth	2	5.13%
Mass in Colon on USG	11	28.21%

DISCUSSION

The present study evaluated the short-term outcomes of laparoscopic surgery in the treatment of colorectal cancer at the National Institute for Cancer Research and Hospital in Dhaka, Bangladesh. Our findings reveal critical insights into the demographic characteristics, clinical presentations, and complications associated with laparoscopic colorectal surgery, offering a comparative perspective with existing literature. The gender distribution in our study showed a higher prevalence of male patients (58.97%), aligning with global patterns indicating a slightly higher incidence of colorectal cancer in males.[14,15] Educational status varied, with most participants having primary education (51.28%), a factor that could influence health-seeking behavior and awareness about cancer screening and treatment options. This is consistent with findings from previous studies that link educational levels with colorectal cancer risk and management outcomes.[16,17] Occupational status in our cohort highlighted a significant portion of housewives (41.03%), reflecting the socio-economic context of Bangladesh. This distribution emphasizes the need for targeted educational and preventive measures in different occupational groups, as observed in other studies.[18] Monthly income distribution showed a considerable portion earning less than 5000 BDT, which may impact access to healthcare and post-treatment follow-up. This economic disparity is a critical consideration for implementing cost-effective and accessible healthcare solutions in developing countries.[19] Family history of cancer was reported by 25.64% of participants, indicating a significant hereditary component in colorectal cancer risk, corroborating findings from studies that emphasize the importance of family history in colorectal cancer screening and preventive strategies.[20,21] The chief complaints in our study, primarily per-rectal bleeding (48.72%), abdominal pain (17.95%), and rectal pain (15.38%), align with common clinical presentations of colorectal cancer reported in other populations.[22] These symptoms underscore the importance of early detection and timely intervention to improve patient outcomes. Colonoscopy findings in our study revealed ulcer proliferative lesions in 64.10% of patients, with other notable lesions including annular growth (12.82%) and polypoid lesions (12.82%). These findings are consistent with the typical endoscopic presentations of colorectal cancer as reported in previous studies, emphasizing the role of colonoscopy in accurate diagnosis and staging of colorectal cancer.[23] Regarding complications, urinary tract infection was the most common minor complication (30.77%), followed by perineum infection (15.38%) and surgical site infection (12.82%). These rates are comparable to those reported in other studies, highlighting the ongoing challenge of infection control in postoperative care.[24] Major complications included surgery conversion (12.82%), hemorrhage (2.56%), and intra-abdominal abscess (2.56%). The rate of conversion to open surgery is within the range reported in the literature, which underscores

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the complexity and technical demands of laparoscopic colorectal surgery.[25,26] The incidence of postoperative mortality (2.56%) aligns with other studies that highlight the risks associated with major colorectal surgeries.[27] Comparative analyses reveal that laparoscopic surgery for colorectal cancer, while associated with specific challenges such as higher rates of minor complications, offers significant benefits including reduced postoperative pain, shorter hospital stays, and quicker recovery times. Studies have shown that laparoscopic surgery results in lower overall morbidity and faster return to normal activities compared to open surgery.[28,29] The lower incidence of major complications such as intraoperative blood loss and postoperative mortality in laparoscopic surgery, as observed in our study, supports its growing adoption in colorectal cancer treatment.[30] In conclusion, our study underscores the efficacy and safety of laparoscopic surgery for colorectal cancer in Bangladesh, highlighting both its advantages and the need for continued efforts to minimize complications. The findings suggest that with appropriate surgical expertise and postoperative care, laparoscopic surgery can significantly improve patient outcomes in colorectal cancer treatment. Future studies should focus on long-term outcomes and strategies to further reduce postoperative complications, ensuring optimal patient care.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSIONS

In conclusion, this prospective observational study underscores the efficacy and safety of laparoscopic surgery for colorectal cancer in a Bangladeshi cohort. The findings highlight the benefits of laparoscopic surgery, including reduced postoperative pain, shorter hospital stays, and quicker recovery times, despite the presence of specific minor and major complications. The demographic and clinical profiles of the patients, as well as the complication rates, align with global trends, emphasizing the relevance and applicability of laparoscopic techniques in diverse healthcare settings. Continued efforts to enhance surgical expertise and postoperative care are essential to further minimize complications and improve patient outcomes. These results support the broader adoption of laparoscopic surgery for colorectal cancer treatment in Bangladesh and similar settings.

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