

Postoperative Outcome and Complications Among Peritoneal Carcinomatosis Patients

Girin Chandra Biswas*¹, Tanvir Hasan Shoaib²,
Lt Col Shahajadi Shanjida Parveen³, Mahnaz Tabassum Prova⁴,
Md Ekramul Haque⁵, Kaselia Fatema⁶, Sonia Rahman⁷, Md. Nahid Hossen⁸
Shubhankar Da⁹

¹Assistant Professor, Department of Surgical Oncology, Sher-E-Bangla Medical College, Barishal, Bangladesh

²Assistant Professor, Department of Surgical Oncology, National Institute of Cancer Research & Hospital, Dhaka, Bangladesh

³Commanding Officer, 61 Field Ambulance, Dhaka, Bangladesh

⁴Assistant Professor, Department of Surgical Oncology, Sylhet MAG Osmani Medical College, Sylhet, Bangladesh

⁵Medical Officer, Department of Uro-Oncology, National Institute Of Cancer Research & Hospital, Dhaka, Bangladesh

⁶Resident, Department of Obstetrics & Gynaecology, Mymensingh Medical College Hospital, Mymensingh, Bangladesh

⁷Junior Consultant, Department of Surgery, Rupganj Upazila Health Complex, Narayanganj, Bangladesh

⁸Assistant Surgeon, Department of Medical Oncology, Sheikh Hasina National Institute Of Burn And Plastic Surgery, Dhaka, Bangladesh

⁹Registrar, Department of Surgery, Sir Salimullah Medical College & Mitford Hospital, Dhaka, Bangladesh

Abstract

Introduction: Peritoneal carcinomatosis is a recurrence pattern in gastric cancer, commonly complicating the postoperative course, especially in high-risk individuals. These complications adversely affect quality of life, increase mortality, and have immediate postoperative clinical implications. Surgery is the best treatment for early-stage tumors, despite its associated risks, including mortality.

Aim: To evaluate the impact of postoperative complications on the clinical outcomes of patients undergoing peritoneal cancer surgery.

Methods: This cross-sectional observational study was conducted at the National Institute of Cancer Research and Hospital, Dhaka, Bangladesh, over twenty-one months from July 2017 to March 2019. Forty-two patients were selected based on inclusion and exclusion criteria and diagnosed clinically, radiologically, and histopathologically. Data were collected using a structured case record form and analyzed using SPSS-22.

Results: The mean age of participants was 66.19 ± 10.38 years, with 33.3% aged 56-65 years. The cohort included 64.3% males and 35.7% females, with 52.4%, 40.5%, and 7.1% having a BMI of 18.5-24.9 kg/m², 25-30 kg/m², and >30 kg/m², respectively. Smoking and betel leaf use were common (61.9% and 83.3%, respectively), with 69% from the middle class. Tumors primarily involved the proximal and distal stomach, with a mean size of 6.20 ± 1.86 cm, predominantly Type 3 and Type 4, and stages T4a and N2. No metastasis was observed. Total and lower radical gastrectomies were performed, with complications occurring in 9.5% (chest infection) and 14.3% (wound infection), while 76.2% had no complications.

Conclusion: Complications can serve as indicators of postoperative clinical outcomes. The findings highlight the need for systemic changes in healthcare to reduce postoperative morbidity and mortality, thereby decreasing hospital stays.

Keywords: Gastric carcinoma, Peritoneal cytology, Staging.

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I. Introduction

Globally, the prevalence of cancer is rising and is quickly becoming a serious public health issue. In many nations, cancer is the primary cause of mortality.^{1,2} Cancers of the gastrointestinal tract and lungs are quite common worldwide and have significant fatality rates.³ In terms of mortality from cancer worldwide, stomach cancer comes in third. An advanced stage of the illness at the time of diagnosis is linked to a bad prognosis. The peritoneum is one of the most common sites where stomach cancer patients have metastases. What causes peritoneal dispersion is yet unknown. Nevertheless, the presence of peritoneal-free cancer cells appears to be one of the main factors fostering its expansion. The best course of treatment for these tumours in their early stages is surgery. Nevertheless, even while surgery has advantages, there are drawbacks, including the possibility of death.⁴ Complications following surgery are common, especially in high-risk individuals.⁵ These problems decrease quality of life and increase mortality in the long run, in addition to having clinical implications in the immediate postoperative phase.^{4,6} After peritoneal recurrence after surgery, the majority of patients who receive intraperitoneal free cancer cells (IPFCCs) do not recover. Patients with peritoneal metastatic stomach cancer in Japan reported a five-year survival rate of 30%.⁷⁻¹⁰ It was shown that cytology results from younger individuals were more positive than those from older patients. In comparison to the tumour with negative cytology, the one with positive cytology is significantly larger.^{8,11} There is a higher association between the grade of lymphatic invasion and the rate of positive cytology. Patients with positive cytology results have poorer survival curves than all other patients in each stage, according to multiple studies. These imply that a positive cytology result is linked to a worse prognosis in one or more stages. A one-stage prognostic differential between positive and negative cytology findings has been proposed.^{8,12-14} One of the main types of gastric cancer relapse after curative resection is peritoneal metastasis, which is the most common cause of gastric cancer death. Despite improvements in radiographic approaches, laparoscopy staging remains influential in the staging of patients with gastric cancer.¹⁵ However, the most studied and contentious augmentation methods are immunoassay and advanced molecular biology methods employed in histopathology. The molecular biology technique of RT-PCR is costly and time-consuming.¹³⁻¹⁵ Palliative care has generally been provided to most patients rather than treatment aimed at cure. Because of complications, there is minimal probability of survival for these individuals, and the stomach resection significantly lowers their quality of life. Numerous researches from various countries have stated that the identification of IPFCC and peritoneal washings provide important information in the staging phase of gastric cancer.^{13,15-17}

Physicians face difficulties when dealing with post-operative complications since they can sometimes be unanticipated, develop suddenly, and progress swiftly towards fatality. For improved disease control and management, a large number of patients with acute pathophysiological problems need to be admitted to intensive care units (ICUs). An estimated 200 million people are expected to have major non-cardiac surgeries annually, with around 1 million of those surgeries ending in death.¹⁸ Having an understanding of the variables linked to postoperative mortality facilitates improved clinical decision-making, enabling timely intervention to optimise surgical outcomes in addition to correcting modifiable factors. While a great deal of research has been done on the potential predictors of death following surgery, less is known about the impact of postoperative complications on mortality, particularly with regard to patients who have had cancer surgery.¹⁹⁻²² Therefore, the purpose of the current investigation was to ascertain how postoperative complications affected the clinical results of patients having peritoneal cancer surgery.

II. Methods

This Cross-sectional observational study was carried out in the Department of Surgical Oncology, National Institute of Cancer Research and Hospital, Mohakhali, Dhaka, Bangladesh for twenty-one months, starting from July 2017 to March 2019 following approval of the protocol. 42 patients suffering from primary gastric carcinoma admitted to NICRH for operative treatment were the study population. Patients with biopsy-proven primary gastric adenocarcinoma and clinical T2~4a/N0~2/M0 in the preoperative TNM evaluation were included in the inclusion criteria. However, patients with a history of another malignancy, patients with unresectable gastric cancer invading adjacent organs, patients having frank peritoneal metastasis or huge ascites, and patients having a history of NACT for gastric carcinoma were excluded from the study. A purposive non-randomized sampling technique was used. A structured case record form was used to interview and collect data. All the data were compiled and sorted properly and the quantitative data were analyzed statistically by using Statistical Package for Social Science (SPSS-22).

III. Results

Table 1: Distribution of study subjects according to baseline characteristics (n=42)

Variable	Frequency	Percentage (%)
The age range of the patients		
47-55	7	16.70

56-65	14	33.30
66-75	11	26.20
76-85	10	23.80
Mean \pm SD 66.19 \pm 10.38		
Sex of the patients		
Male	27	64.30
Female	15	35.70
BMI (kg/m²) of patients		
18.5-24.9	22	52.40
25-30	17	40.50
>30	3	7.10
Mean \pm SD 24.65 \pm 3.64		
Personal Habits of Patients		
Smoker	26	61.90
Betel leaf and nut	35	83.30
Alcoholic	8	19.00
Socioeconomic Status of Patients		
Upper Class	0	0.00
Middle Class	29	69.00
Poor Class	13	31.00
Anatomical site of Patients		
Proximal Stomach	23	54.80
Distal Stomach	19	45.20

Data were expressed as frequency, percentage, and Mean \pm SD

In the present study, the mean (\pm SD) age of the subjects was 66.19 (\pm 10.38). The majority (33.3%) were in the age group of 56-65 years. 7 (16.7%), 11 (26.2%) and 10 (23.8%) were in the age group of 47-55 years, 66-75 years, and 76-85 years respectively. The youngest and the oldest patients were 47 and 85 years respectively. Among the study subjects, 27 (64.3%) were males and 15 (35.7%) were females. 22 (52.4%), 17 (40.5%) and 3 (7.1%) study subjects had BMI 18.5-24.9 kg/m², 25-30 kg/m² and >30 kg/m². The mean (\pm SD) BMI was 24.65 (\pm 3.64). In this study, out of 42 patients 26(61.9%) were smokers, 35 (83.3%) were taking betel leaf and only 8 (19%) were alcoholics in their habit. In this study, the majority of study subjects about 69% came from the middle class. only 13 (31%) study subjects came from lower socioeconomic conditions. In the present study, the proximal part of the stomach was involved in 23 (54.8%), and the distal part was involved in 19(45.2%) study subjects.

Table 2: Distribution of study subjects according to tumor size and tumor types (n=42)

Size and type of tumors	Frequency	Percentage (%)
Tumor size (cm)		
2.5-4	10	23.8
4.1-6	7	16.7
6.1-9.2	25	59.5
Mean \pm SD 6.20 \pm 1.86		
Tumor type		
Type 0	3	7.1
Type 1	6	14.3
Type 2	8	19.0
Type 3	15	35.7
Type 4	10	23.8

Data were expressed as frequency, percentage, and Mean \pm SD.

In, the present study, the Majority 25 (59.5%) of the tumor was 6.1-9.2cm and the mean \pm SD tumor size was 6.20 \pm 1.86cm. In the present study, the tumor was categorized into Types 0,1,2,3 and 4 according to the Japanese Endoscopic Society (Murakami 1971). 3 (7.1%), 6 (14.3%), 8 (19%), 15 (35.7%), and 10 (23.8%) study subjects had Type 0, Type 1, Type 2, Type 3, and Type 4 tumors respectively.

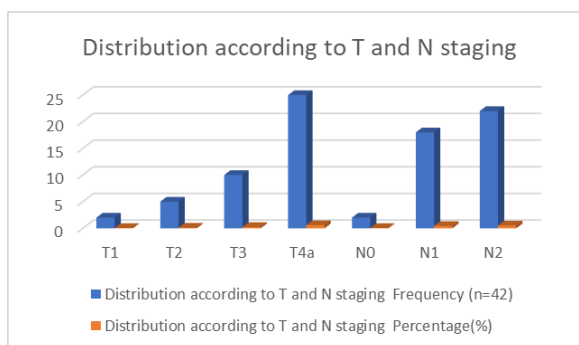


Figure 1: Distribution of study subjects according to T and N staging and metastasis (n=42)

In the present study, the majority (59.5%) of study subjects were in the T4a stage according to T stage. 2 (4.8%), 5 (11.9%), 10 (23.8%) and were in T1, T2, and T3 stage respectively. According to the N stage, the majority (52.4%) of the subjects were in the N2 stage. 2(4.8%) and 18(42.9%) were in N0 and N1 stage respectively.

Table 3: Distribution of study subjects according to metastasis(n=42)

Variables	Frequency (n=42)	Percentage (%)
Yes	42	100.00
No	0	0.00

In the present study, no (100%) metastasis occurs in all patients.

Table 4: Distribution of study subjects according to type of surgery (n=42)

Type of tumors	Frequency (n=42)	Percentage (%)
Upper Radical gastrectomy	5	11.90
Lower Radical gastrectomy	18	42.90
Total gastrectomy	19	45.20

In this study, upper radical gastrectomy was done in 5 (11.9%) patients, lower radical was done in 18 (42.9%) and total gastrectomy was done in 19 (45.2%) patients.

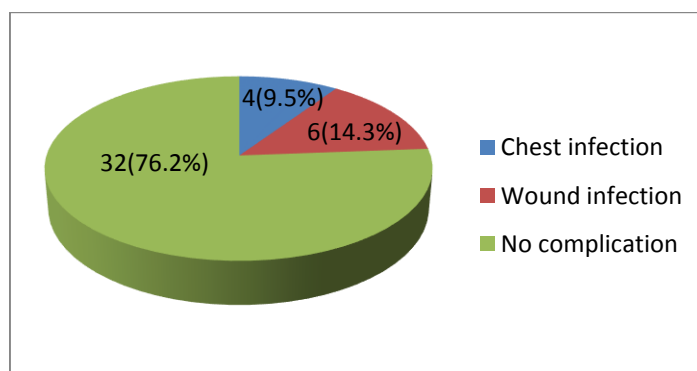


Figure 2: Distribution of study subjects according to postoperative complication (n=42)

In this study, only 4 (9.5%) cases developed chest infection, and 6 (14.3%) cases developed wound infection. 32 (76.2%) study subjects showed no complication.

IV. Discussion

In the present study, the mean (\pm SD) age of the subjects was 66.19 (\pm 10.38). The majority were in the age group of 56-65 years. The youngest and the oldest patients were 47 and 85 years respectively. Among the study subjects, the majority were males and the male-female ratio was 1.8:1. Almost similar to the findings observed by Khan S et al.; Nakagawa et al.^{8,11} 22 (52.4%), 17 (40.5%) and 3 (7.1%) study subjects had BMI 18.5-24.9 kg/m², 25-30 kg/m² and >30 kg/m². The mean (\pm SD) BMI was 24.65 (\pm 3.64). In the current study, smoking 61.90%, taking betel leaf 83.30%, and drinking alcohol 19.00% were found to their habit. This finding was in agreement with the study of Lisiecki et al.²³ In this study, the majority (69%) of study subjects came from the

middle class and only 13 (31%) study subjects came from lower socioeconomic condition. In the present study, proximal and distal stomachs were involved in study subjects. Apart from that majority of the tumor was 6.1-9.2cm and the mean \pm SD tumor size was 6.20 ± 1.86 cm. This finding was in agreement with the study of Chuwa et al. and Yamada et al.^{24,25} In the current study tumor was categorized as Type 0, Type 1, Type 2, Type 3, and Type 4 according to the Japanese Endoscopic Society (Murakami 1971). The majority of study subjects had Type 3 and Type 4 tumors. Similar findings were observed in a previous study done by Ki et al., Brito et al., Lisiecki et al., and Machairasa et al.^{14,23,26,27} It was noticed from the present study that the majority of study subjects were in T4a and N2 stage according to T and N stage. No (100%) metastasis occurred among current study subjects. Similarity was observed in studies of Muntean et al., Lorenzen et al., Lisiecki et al., and Machairasa et al. done previously.^{12,16-18} However, Ki et al., and Brito et al. found metastasis at various sites.^{14,26} This may be due to different methodologies. Total gastrectomy and lower radical gastrectomy were done in the majority of the patients. This finding was in agreement with the studies of Mezahir et al., Ki et al., and Brito et al.^{8,15,19} During the operation, strict asepsis was followed in every step and broad-spectrum intravenous antibiotic was given for three days. Initial recovery was uneventful in the cases. However, in this study, only 9.5% cases developed chest infection, and 14.3% cases developed wound infection, 76.2% study subjects showed no complication. This finding was similar to the study of Ki et al. and Brito et al.^{14,26} These increased complications might lead patients to hospitalized for a few more days.

Limitations of The Study

The study was conducted in a single hospital with a small sample size and limited resources and facilities. So, the results may not represent the whole community. As the sample was taken purposively, there may be a chance of bias which can influence the results. Besides, the study duration and follow-up period were short in comparison to other studies.

V. Conclusion

According to recent studies, patients with carcinomatosis who undergo surgery of any kind have a higher hospital death rate. In the same way, the chance of staying in the hospital increases with the emergence of any postoperative problem. It is recommended to systematically use complications as a proxy for postoperative clinical outcomes. The present findings point to the necessity of more research focused on enacting modifications to the healthcare system's structure and procedures in order to lower postoperative morbidity and mortality. If a clinical trial demonstrates that following a preventive regimen lowers the frequency of complications and mortality, these adjustments may be possible.

Ethical approval: The study was approved by the Institutional Ethics Committee.

VI. Recommendation

Similar type of study can be done with larger sample size. Randomized comparative study should be carried out and collecting samples from different parts of country is recommended.

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