RESEARCH ARTICLE

Effects of the Covid-19 Pandemic on Gastric Cancer Surgery: Experience at NICRH

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ABSTRACT

Background: Gastric cancer is a malignancy that truly demands multidisciplinary approaches between medical, radiation, and surgical oncologists. However, surgery is the only curative therapy for gastric cancer. Due to the restrictions caused by the COVID-19 pandemic, gastric cancer patient currently faces many problems, such as widespread cancelation of elective scheduled surgery. The COVID-19 pandemic outbreak has had a major impact on postoperative morbidity and mortality following curative gastric cancer surgeries.

Aim of the Study: This study aimed to take measures to prepare the patient along with performing COVID-19 RT PCR before surgical treatment of gastric cancer patients and observe the effect in terms of morbidity and mortality.

Methods: This is a prospective observational study at was carried out among 59 gastric cancer patients in the Department of Surgical Oncology. Among them, 11 patients underwent surgery after being negative for COVID-19 disease, and 48 patients had no history of COVID disease before the operation. National Institute of Cancer Research and Hospital, Mohakhali, Dhaka, Bangladesh, from July 2020 to September 2021. All the patients were selected by purposive sampling. Initially, patients diagnosed with adenocarcinoma of the stomach admitted to the Department of Surgical Oncology for treatment were enrolled in this study. After that, they were scrutinized according to the eligibility criteria. A COVID-19-negative patient was admitted. After admission, each patient was evaluated with history, physical examination and relevant investigation. Regularly, COVID test is done at 7-day intervals until surgery is done or when any patient is suspected of COVID-19. After proper staging investigations, patients were selected for operation. A pre-structured peer-reviewed data collection sheet was prepared to record data regarding socio-demographic, clinical, and histo-pathological profiles. All data were analyzed statistically by using SPSS version 25.

Result: In the present study, 48 patients were enrolled in the non-COVID group, and 11 were enrolled in the COVID group. Mean (±SD) age of the study subjects was 56.05(±12.70). The majority of patients, 40(67.50%), were in the age group of more

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than 50 years. Among the study subjects, 48(81.36%) were males and 11(18.64%) were females. There was no statistically significant difference in age, sex, and body mass index h/o taken NACT between the two groups. Regarding the histo-pathological profile, most of the patients are Grade II in both groups. Tumor size more than 4cm in 10(90.9%) patients in the COVID group. 10(90.9%) patients in the COVID group are pathological stage III/IV. Both tumor size and pathological T.N.M. staging is statistically significant. However, there are no statistically significant differences in Tumor grading, T staging, N staging, and number of retrieved lymph nodes. During the COVID-19 period, the waiting time before surgery was longer. However, However, the length of hospital stay after surgery was no longer in both groups. Out of 59 patients, 23 suffered from postoperative complications. Among them 9(81.8%) were COVID group, 19(39.6%) were non COVID. Pulmonary complications were observed in 5(45.45%) in the COVID group and 8(16.6%) in the non-COVID group. 08 patients in the non-COVID group and 02 patients in the COVID group had developed G.I.T. complications. Regarding complication management, 5(45.45%) patients & 1(9.1%), patients of the COVID group needed dressing & re-laparotomy, respectively. On the other hand 8(8.3%) & 6(12.5%) & 7(14.6%) patients of non-COVID group need regular dressing & re-laparotomy respectively. There are no statistically significant differences in postoperative morbidity and I.C.U. Admission between the two groups. Out of 59 patients, 58 and 1, respectively, were alive and died. The cause of death was postoperative COVID-19 disease.

Conclusion: Gastric cancer surgery can be safely performed even within the pandemic period if isolation measures and pre-operative screening protocol are taken properly; surgery should not be deferred. The full impact of COVID-19 on gastric cancer surgery becomes evident in the long-term follow-up. It might have had a positive impact on gastric cancer patients, especially tumor size, Nodal spreading, postoperative infection, and increased length of the postoperative period.

Keywords: Covid-19, Pandemic, Gastric Cancer and Surgery.

INTRODUCTION

Gastric cancer is a common malignant tumor of the gastrointestinal tract. Global Cancer Statistics in 2020 (GLOBOCAN) indicates that gastric cancer is the fifth and sixth most frequently diagnosed cancer in Bangladeshi males and females, respectively, and the fifth leading cause of cancer-related death in Bangladesh. It is considered a major public health threat. Gastric cancer is considered a highly curable disease if it is detected at an appropriate stage and treated properly. Surgical resection of the primary tumor and regional lymph nodes is the curative approach for gastric cancer. Coronavirus disease 2019 (COVID-19) is a infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). COVID-19 emerged in Wuhan City, Hubei Province, China. Forty-one patients were admitted to hospitals with an initial pneumonia diagnosis of an unknown etiology. Most of these patients visited a local fish and wild animal market in November 2019. Since then, COVID-19 has been declared a global pandemic by the World Health Organization [1]. According to the report of the World Meter COVID-19 coronavirus pandemic update (Data as of 12th August 2021), more than 205,846,128 people have been infected across the globe. COVID-19 is highly contagious, and the most important morbidity factor is exposure to an infection source. Patients with cancer are susceptible to the infection, resulting in poor outcome [2]. The outbreak of COVID-19 is currently the biggest international concern. In these unpredictable times of COVID-19, surgical oncologists are considering triage and rationing of all cancer surgery cases. Bartlett et al. (2020) described a number of reasons [3]. In the COVID-19 outbreak, routine surgical techniques should be based on the principles of safety and efficiency. The main purpose is to reduce the incidences of postoperative complications while accelerating the patient's recovery and discharge. It is necessary to avoid performing surgical procedures without the established guidelines, including oversized lymph node dissections with uncertain effects and complex digestive tract reconstruction methods. During this pandemic, COVID-19 plays a double-edged sword in stomach cancer patients. However, in such a special situation, due to disease consumption, malnutrition, coupled with chemotherapy, gastric cancer patients become immunocompromised, which leads to more susceptibility to COVID-19 and poor clinical outcomes [1]. Once infected, the mortality rate is higher. On the other hand, during this COVID pandemic time, patients come to us late in the advanced stage due to the down situation, shortage of hospital beds, and unavailable treatment of the periphery. As a tertiary care hospital, we don't avoid these advanced cases. We also treat the referred case. Now, it is about one and a half years of suffering. N.I.C.R.H. is one of the tertiary institutes of Bangladesh that treated cancer patients for the very first time during the COVID pandemic and is continuing. We treat all stages of gastric cancer patients and perform surgery on a priority basis. Due to our specialty, we focused on gastrointestinal system (G.I.S.) cancer surgery during the pandemic. Sozutek et al. (2020) described several reasons for gastrointestinal system (G.I.S.) cancer surgery to deserve attention [4]. The COVID-19 pandemic has led to widespread cancelation of electively scheduled surgeries; for this reason, the waiting time before surgery was, therefore, longer. Delayed resection may lead to progression, resulting in clinically significant differences in

complications, recurrence, and survival. On the other hand, regardless of these concerns, early detection and radical resection of the tumor is the key point to achieve a successful oncologic outcome in the treatment of G.I.S. cancer patients. It is well-known that delaying may have a harmful impact on the prognosis and survival of these patients. Early resection of gastrointestinal malignancies provides the best chance for curative therapy. Delayed treatment may also lead to the need for additional adjuvant or neoadjuvant therapy [5]. Therefore, Neoadjuvant chemotherapy (N.A.C.T.) has gradually become the standard treatment for patients with L.A.G.C. The superiorities of N.A.C.T., such as reducing the tumor size, achieving complete pathological remission (P.R.), increasing the R0 resection rate, and improving the overall survival (O.S.) and disease-free survival (D.F.S.). However, due to the tumor heterogeneity, the clinical response rate of N.A.C.T. is barely satisfactory. For patients who are resistant to N.A.C.T., the operation timing is postponed while the primary tumor may progress during the treatment. More than that, the NACT-induced adverse events, which could have been avoided, may deteriorate the general condition of those patients [6]. N.A.C.T. alone cannot achieve satisfactory therapeutic effects and curative results in locally advanced gastric cancer (L.A.G.C.). N.A.C.T. before cancer surgery significantly reduced physical fitness and immunity. This type of patient is more susceptible to developing COVID-19 disease and develop more complications. During and after the period. This study aimed to reduce the suffering of patients who are referred from the periphery due to a lack of effective protocol. These can be handled patient safely and effectively during this COVID-19 pandemic within limited logistics. Thereby, try to explore the feasibility of providing a reference and make a protocol to give surgical treatment of gastric cancer. Finally, we try to make a safe way to treat and perform oncologic surgery and manage anticipated challenges without deferring any type of cancer patient during any pandemic situation. This study aimed to take measures and prepare the patient along with performing COVID-19 RT PCR before surgical treatment of gastric cancer patients and observe the effect in terms of morbidity and mortality.

METHODOLOGY AND MATERIALS

This is a cross-sectional study; 59 patients were enrolled and analyzed into 2 groups. The enrolled patients were admitted to the hospital; they were divided into two groups: the pre-COVID-19 group (PCG) and the COVID-19 group (CG). The study was conducted at the Department of Surgical Oncology, National Institute of Cancer Research and Hospital, Mohakhali, Dhaka, for one year from October 2020 to December 2021. Prior to the commencement of this study, the research protocol was approved by the Research Review Committee of the Department of Surgical Oncology and the Ethical Committee of the National Institute of Cancer Research & Hospital, Dhaka.

Covid Group (CG): 11 patients (COVID-19)

Non-Covid Group: 48 patients (pre-COVID-19)

- **Inclusion criteria**

All endoscopic biopsy-proven operable cases of carcinoma stomach are admitted under the surgical oncology unit.

- **Exclusion criteria**

Patients do not undergo surgery.

The patient is not fit for general anesthesia.

Those who refuse to participate in this study.

Patients who have uncontrolled co-morbid illness.

All patients underwent thorough clinical evaluation, including detailed history taking, appropriate clinical examination as well as some relevant investigations. The patient became COVID-19 positive and was discharged. Patients were readmitted again after being negative. For pre-anesthetic check, 7 days of COVID-19 negative status patients were selected. No patient more than 7 days old COVID-19 tests were allowed and operated on to reduce mortality and morbidity. Accordingly, they were sent to the Department of Anesthesia for pre-anesthetic check-ups. Only operable and fit patients were planned for surgery. After taking fitness from there, a suitable surgery date will be provided. The preoperative evaluation included basic laboratory tests such as S. electrolyte, S. albumin, CRP, and RT PCR for COVID-19. After taking all preoperative preparations, including improvement of nutritional status, correction of anemia (if present), correction of dehydration, correction of electrolytes imbalance, and assessment of anesthetic fitness, all cases would be sent for operation. After exploration of the abdomen, operability was assessed, and surgical procedures would be done accordingly. Operative details and Histopathological details were documented. Postoperative follow-up and postoperative complications, if they occur, were recorded and managed properly. All patients were followed up starting from first postoperative day up to two months. During the hospital period, postoperative adverse events were recorded in the data sheet and later from the follow-up clinic or their home over the phone to know the patient's condition and outcome of treatment.A questionnaire/data collection sheet will be used along with face-to-face interviews and daily examination findings covering the outcome data in the study. Data will be processed manually, and Statistical analysis will be performed by using SPSS (Statistical Package for Social Sciences) version 25. Data will be compiled, edited, managed, and plotted in tabular and figure form. Descriptive statistics will be performed, and all data will be expressed as mean±SD and percentage ratio.

RESULT

In this study, the mean(±SD) age of the subject was

56.05(±12.70). The majority were in the age group of more than 50 years. Among the study subjects, 48(81.36%) were males & 11(18.64%) were females. 11(18.64%) study subjects had h/o Covid-19 positive, 19(32%) had taken NACT. Besides, most of the patients were diabetic 10(17.0%) and smokers 32 (54.23%). LRG had done on 32(54.2%) patients, TRG had done on 27(45.8%) patients. Among the study subjects 10(16.9%) were stage I, 18(30.5%) were stage II, 31(52.6%) were stage III (Table 1). The patient's demography is shown in Table 2. In the study, 7 patients of the covid group were>50 years old, and 33 patients of the non-covid group were>50 years old. Mean age covid & non covid group was 55.8(SD±12.2) & 58.1(SD±14.7) respectively. Male sex was 8(72.7%) & 40(83.3%) of covid & non covid group. Clinical symptoms at presentation of both groups were described in this table. Mean hemoglobin of covid & non covid group was 9.6(SD±2.56) & 10.88(SD±2.7) respectively. Between the two groups, a significant difference in serum albumin levels was present. However, However, there was no significant difference in BMI present between the two groups. More than 54% of patients in both groups were smokers. Figure-1 shows that 11(19%) patients were h/o covid positive & 48(81%) patient were covid negative. Figure 2 shows that before hospitalization, 7 patients became positive. However, when they came to the hospital for admission, RT-PCR was done. Only a COVID-negative patient was admitted into the surgery department. Figure 3 shows that 7 patients became positive during hospitalizations. After that, they were discharged for isolation, and when they became negative, we re-admitted them. Table 3 shows a Comparison of Histopathological characteristics in patients of covid and noncovid groups. Maximum patients (out of 59, 8 of the covid group and 35 of the non-covid group) were Grade- III. & tumor size >4cm (out of 59, 10 of the covid group & 28 of the non-covid group). 10((90.9%) & 25(52.1%) cases of covid group & non covid were stage III or IV. Lymph nodes were dissected in maximum cases. There is a significant difference present in tumor size, N staging, and pathological TNM staging. No significant difference is present in T staging and the number of dissected lymph nodes. Table 4 shows that the number of LRG and TRG between the two groups has no significant difference. There are 2 and 10 cases of COVID-19, and the non-covid group suffers from major postoperative complications. On the other hand, 7 and 9 cases of COVID and non-covid group respectively suffered from minor postoperative complications. There is no significant difference present in postoperative complication, GIT complication, or ICU admission between the two groups. Significant differences are present between the two groups in the case of the pulmonary complication variable. Mean Total post-operative day 14(±5) & 14.9(±5.6), Total hospital stay 37.5(±8.2) & 37.8(±12.4) days between covid & non covid group respectively. Table 5 shows a comparison of post-op. Complications between two groups. The highest number of patients suffered wound infection. 2nd highest complication is pulmonary infection. Significant differences are present in wound infection and pulmonary infection between the two groups. There is no significant difference present in postoperative COVID, burst abdomen, postoperative ileus, duodenal blowout, or gastro-jejunostomy leakages between the two groups. Table 6 shows that gastric cancer patients who suffer from COVID-19 disease are more prone to develop wound infection and pulmonary infection. There is a statistical association between gastric cancer and DM in the development of wound infection. There is no significant difference present in postoperative mortality between the two groups.

Table 1. Demographical characteristics of the study population (N=59)

Variable	Frequency (n)	Percentage (%)
Age		
>50	19	32.20
>50	40	67.50
Mean±SD	56.05±12.70	
Sex		
Male	48	81.36
Female	11	18.64
Covid-19 History		
Covid-19 positive pt.	11	18.64
Covid-19 negative pt.	48	81.36
Stage		
I	10	16.90
II	18	30.50
III	31	52.60

History of NACT		
Yes	19	32.00
No	40	68.00
Type of Surgery		
LRG	32	54.20
TRG	27	45.80
Personal Habit		
Smoking	32	54.23
Alcoholism	6	10.20
Comorbidity		
DM	10	17.00
HTN	7	11.90

Table 2. Demography of the patients with gastric cancer Between two groups (n=59).

Variable	Covid Group (N=11)		Non-Covid Group (N=48)		P-value
Age (In years)					
	n	%	n	%	
<50	4	36.4	15	31.30	0.743[ns]
>50	7	63.6	33	68.7	
Mean±SD	55.8±12.2				
Sex					
Male	8	72.7	40	83.3	0.415[ns]
Female	3	27.3	8	16.7	
Symptoms at presentations					
Dyspepsia	6	54.55	27	56.30	-
Anaemia need B.T	1	9.10	7	14.60	
Epigastric pain	5	45.50	35	72.90	
Weight loss	7	63.60	24	50.00	
Anorexia	7	63.60	36	75.00	
Haetemesis	1	9.10	4	8.30	
Vomiting	9	81.80	28	58.30	
Melaena	1	9.10	7	14.60	
Haemoglobin					
≤11	8	72.73	22	45.80	0.108ns
>11	3	27.27	26	54.20	
Mean±SD	9.6±2.56				
Albumin					
<3.5	8	72.73	19	39.6	0.047[s]
>3.5	3	27.27	29	60.4	
BMI (kg/m2)					
Underweight/obese	5	45.5	14.00	29.2	0.297[ns]
Healthy	6	54.5	34.00	70.8	
Personal History					
Smoking	6	54.5	26	54.2	-
Alcoholism	1	9.1	5	10.4	

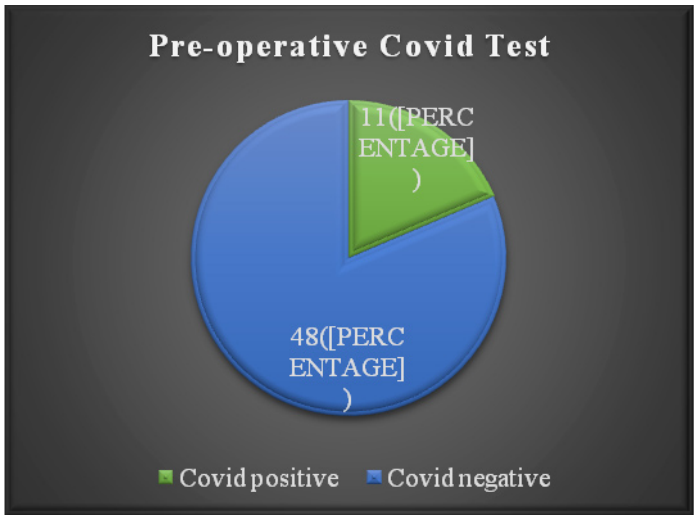

Figure 1. Distribution of the study subjects according to pre-operative covid test.

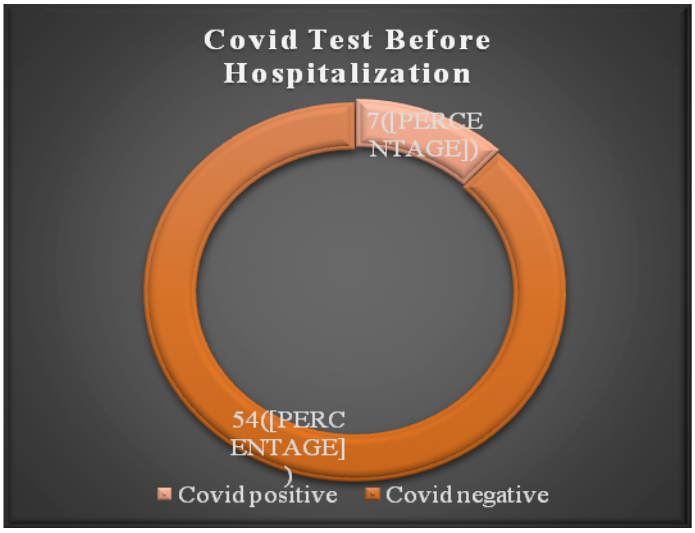

Figure 2. Distribution of the study subjects according to covid test before hospitalization.

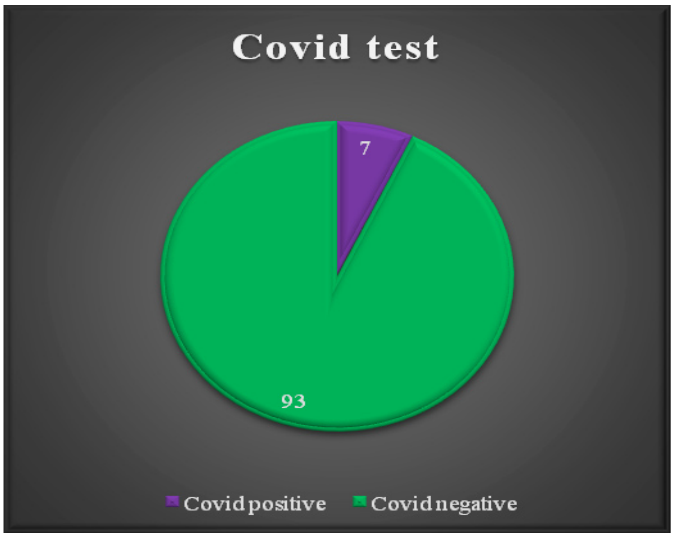

Figure 3. Distribution of the study subjects according to covid test during hospitalization.

Table 3. Comparison of Histopathological characteristics of gastric cancer patients according to the group of positive & negative for Covid-19 (n=45).

Variable	Covid Group (N=11)		Non-Covid Group (N=48)		p value
	n	%	n	%	
Tumour Grading					
Grade II	8	72.7	35	72.9	*0.628ns
Grade III	3	27.3	13	27.1	
Tumour size (cm)					
<4	1	9.1	20	41.7	* 0.040 s
>4	10	90.9	28	58.3	
T staging					
$pT_{2/}$ pT_1	7	63.65	20	41.6	*0.163ns
$pT_{3/}$ pT_4	4	18.2	28	58.4	
N staging					
pN0/ pN1	5	45.5	34	70.8	**0.003 s
pN2/ pN3	6	54.5	14	29.2	
Pathological TNM staging					
Stage II/ Stage I	1	9.1	23	47.9	*0.017s
Stage III	10	90.9	25	52.1	
Number of dissected lymph node					
<15	2	18.2	12	25	*0.484ns
≥15	9	81.8	36	75	

Table 4. Distribution of the study patients by Surgical characteristic's & postoperative outcome between two groups (n=59).

Treatment	Covid Group (N=11)		Non-Covid Group (N=48)		P Value
	n	%	n	%	
**Types of surgery					
L.P.G	5	45.5	27	56.3	0.516ns
T.R.G	6	54.5	21	43.7	
*Post-operative complications					
Yes	9	81.8	19	39.6	0.011s
No	2	18.2	29	60.4	
**Pulmonary Complication					
Yes	5	45.45	8	16.6	0.038s
NO	6	54.55	40	83.3	
*GIT complication					
Yes	2	18.2	8	16.66	0.904ns
NO	9	81.8	40	83.33	
**Complications					
Major Complication	2	18.18	10	20.83	-
Minor Complication	7	18.18	9	18.75	
No complication	2	63.64	29	60.42	

*ICU admission					
Yes	0	0	5	10.4	0.263[ns]
No	11	100	43	89.6	
	Mean±SD		Mean±SD		-
Total postoperative (day)	14.0±5.0		14.9±5.6		
Total hospital stays (day)	37.5±8.2		37.8±12.4		

Table 5. Distribution of the study patients by post op. complication between two groups (n=59).

Variable	Covid Group (N=11)		Non-Covid Group (N=48)		P Value
	n	%	n	%	
Post-operative complication:					
Pulmonary infection	5	45.5	8	16.7	**0.038[s]
Wound infection	7	63.6	8	8.3	**0.001[s]
Postoperative covid	0	0	1	2.1	*0.814[ns]
Burst Abdomen	0	0	1	2.1	*0.814[ns]
Postoperative ileus	2	18.2	1	2.1	*0.086[ns]
Duodenal Blow Out	0	0	3	6.3	*0.532[ns]
Gastro-jejunostomy leakages	0	0	4	8.3	*0.428[ns]

Table 6. Association between post-operative complication with Co-morbidity (n=59).

Wound infection					
Co-morbidity	**Yes (n=11)**		**No (n=48)**		**P Value**
	n	%	n	%	
Covid	7	63.6	4	36.4	*0.030[s]
Non Covid	8	16.7	40	83.3	
Pulmonary infection					
Co-morbidity	Yes (n=11)		No (n=48)		P Value
	n	%	n	%	
Covid	5	45.5	6	54.5	**0.038[s]
Non covid	8	16.7	40	83.3	
Wound infection					
Co-morbidity	Yes (n=15)		No (n=44)		P Value
	n	%	n	%	
Diabetic	10	20.4	39	79.6	**0.050[s]
Non Diabetic	5	50	5	50	
Post-operative mortality					
Co-morbidity	Yes (n=1)		No (n=58)		P Value
	n	%	n	%	
Covid	0	0	11	100	*0.814[ns]
Non Covid	1	2.08	48	97.92	

DISCUSSION

This study was undertaken in N.I.C.R.H. to evaluate the effects of the COVID-19 pandemic on Gastric Cancer Surgery. For this study, a total number of 59 cases of primary gastric cancer that meet the inclusion criteria were selected. Among them, 11 patients had h/o COVID-19 positive and enrolled in the COVID group who became negative before the operation. Forty-eight patients were covid-negative and classified as non-covid group. All the data were compiled and sorted properly, and then data were analyzed statistically by using a statistical package for social science (S.P.S.S. version-25). In this study, the most common age group affected was more than 50(67.50%) years. Mean age of covid & non covid group are 55.8(12.2) & 54.1(14.7). However, according to the study by Arneiro, AJ. et al. (2021) mean age was 61.7(10.3) & 62.1(12.9) years respectively [7]. The proportion of females was considerably low in comparison to males in this study. The male-to-female ratio was 36.4% and 63.6% in the covid group and 31.3% and 68.7% in the non-covid group, which was very similar to the study observed by Arnerio., A.J. et al. (2021) [7]. The majority of patients have a B.M.I. within 18.5-24.9 (62.26%). This finding was similar to the study of Li Y. et al. (2020) [1]. 15(25.4%) patients had at least one other comorbid condition. The most common comorbidity observed in this study was D.M. (17.0%), which was similar to a previous Indian study by Sahu, SK (2019) [8]. This study shows that 59 of the patients with gastric cancer with D.M. were more prone to developing wound infection. The next order of comorbidity in this study was hypertension 7(11.90%). Symptomatology in both the groups was similar, with vomiting (81.8%) and anorexia (75.0%) being dominant symptoms as covid and noncovid, respectively. The majority of the patients were smokers (54.23%), which was similar to the study of Minami, U. et al. (2010); Mean Hemoglobin levels of covid & noncovid group during admission were 9.6(2.56) 10.88(2.7) respectively, which was not similar to the study observed by Arnerio., A.J. et al. [7,9]., especially the Hemoglobin level of the COVID group, which was 11.6 (2.3). Majority patient 7(63.6%) of covid group &19(39.6%) patient of non-covid group having Albumin level <3.5. Albumin level was not supported by the study by Cai M et al. (2020) and Arnerio., A.J. et al. (2021) [7,10]. The tests and follow-up procedures were performed on all patients according to the COVID-19 screening protocol of N.I.C.R.H. Several times, RT-PCR tested all patients; among them, 11(18.64%) were positive preoperatively.07 patients had already tested positive for COVID-19 two to four months before surgery. 04 patients tested positive for COVID-19 preoperatively, and surgery was subsequently rescheduled. During the postoperative hospitalization, 04 patients were tested again, and a single patient tested positive for COVID-19, was taken to I.C.U., and suffered from pulmonary complications related to COVID-19 disease, and the patient died due to multi-organ dysfunction syndrome induced by SARS-COV2. There were no significant differences in clinical characteristics found between the groups among patients who underwent gastrectomy with curative intent (Table 4) except for tumor size and final pTNM stages. The tumor grading, pT, pN, and the number of resected lymph nodes were not significant between both groups. The number of resected lymph nodes ≤15 was higher in the COVID group than in the non-Covid group (81.8% versus 75%) p=0.632. Tumor size>4 c.m was higher in the COVID group than in the non-Covid group (90.9% versus 58.3%) p=0.042. Moreover, the final pTNM staging, stage III, was also higher in the COVID group than in the non-Covid group (90.9% versus 56.3%) p=0.018. These variables were not similar to the study by Arnerio., A.J. et al. (2021) [7]. No significant differences in clinical characteristics were found between the groups of patients who underwent gastrectomy with curative intent. Total 59(32 LRG & 27 TRG) had done. The number of T.R.G. & LRG was 6 (54.5%) and 5(45.5%), respectively, in the covid group. In the non-covid group, it was 27(56.3%) and 21(43.7%), respectively. The COVID-19 pandemic has led to widespread cancelation of electively scheduled surgeries. N.I.C.R.H. is one of the tertiary institutes of Bangladesh that has treated cancer patients for the very first time during the COVID-19 pandemic, and it is continuing. Notably, in 2019, the mean number of curative surgical treatments was 57. This number was not lower than during the COVID-19 pandemic period [11]. ArnerioAJ. et al. (2021) showed a decrease in the total number of surgical procedures in 2020-2021, with an increase in the number of diagnostic surgeries [7]. Consequently, fewer curative surgeries were performed in the COVID group. Moreover, they observed an increased number of patients who were referred for preoperative N.A.C.T. On the other hand, 19(32%) gastric cancer patients were taken N.A.C.T. from N.I.C.R.H. in our study period. This number was not as significant and higher than in the study by Arnerio. A.J. et al. (2021) [7]. This rate was not similar in the study by Wahed S et al. 2020; here, we found a significant increase in the indication for preoperative N.A.C.T. during the pandemic period [12]. Here 12(63%) patients were taken N.A.C.T. out of 19 patients. Evaluation of surgical characteristics and postoperative outcomes revealed significant differences between the COVID and control groups in surgical complications like wound infection, postoperative COVID, and burst abdomen (Table 5,6). Table 5 demonstrates the P.O.C.s of the patients in both groups who underwent curative gastrectomy. Only 12 patients had major P.O.C.s, and major P.O.C. cases were not significantly related to COVID-19. Complication management or mortality is demonstrated in Table 6a. 22% pt need conservative dressing. 7(11.9%) patients need relaparotomy. However, in the study by Kule et al. (2021), we found that 19(4.7%) patients need reoperation [13]. Table 7 shows the postoperative outcomes between the two groups. During the postoperative period, 28 patients (47.5%) developed complications, and re-intervention and

reoperation was necessary for 14 patients (23.7%). Postoperative complications were a leak of anastomosis or stump in four patients (6.8%), Duodenal blow in 3(5.1%), wound infection in 15 (25.4%), pulmonary infection 13 (22%), paralytic ileus 03 (5.1%), burst abdomen & post covid ARDS in 01 (1.7%), Among this complication significant difference present in the pulmonary infection, wound infection, post covid A.R.D.S. & postoperative ileus between both groups. There were no significant differences present in Duodenal blowout, gastrojejunostomy leak, or burst abdomen between the two groups. But the study by Arnerio. A.J. et al. (2021) found postoperative outcomes revealed no significant difference between the COVID and control groups in surgical access [7]. 03(5.1%) patients of noncovid patients during this pandemic period developed paralytic ileus. Which is very similar to the study by Wahed. S et al. (2020) [12]. However, a single patient with postoperative COVID-19 infection was taken to I.C.U. and suffered from pulmonary complications related to COVID-19. After 4 days of follow-up and multi-agent therapies, the patient died due to multi-organ dysfunction syndrome induced by SARS-CoV2. She had COVID-19-like symptoms such as fever, chills, fatigue, and shortness of breath. However, in these cases, radiological findings revealed a SARS-CoV2 infection. Postoperative SARS-COV-related mortality is similar to the study by Kule et al. (2021) [13]. An international multicenter cohort study by Thyagarjan r et al. (2022) said that the mortality rate was much higher than expected for similar surgeries in patients without COVID-19 [14]. But in the study of Wahed. S et al. found 10% postoperative COVID-19 infection but no mortality. The complication in the form of wound infection was present in 15(25.4%) of cases, and there is a statistical significance with D.M. (Table 7). Patients who suffered from postoperative pulmonary infection were 13 (22%), and there is a statistical significance with COVID-19 (Table IX). These findings were similar to the international multicenter cohort study by Thyagarjan r et al. (2022) [14]. Here, we found h/o COVID-positive patients undergoing emergent (74%) and elective (26.1%) surgeries noted that pulmonary complications occurred in 51.2% of patients. The mean (S.D.) Total length of hospital stay in this study was 37.76±8.2. However, However, according to the study of Ishibashi y et al (2021), it was 19.2±0.8 days [15]. Our mean stay day was not similar to the study by Arnerio. A.J. et al. (2021) [7]. The total length of hospital stay in our study was very long. However, the number of surgical procedures performed during the COVID-19 pandemic period was higher than the mean number of surgeries performed in previous years. The pandemic affects the T.N.M. status, postoperative pulmonary infection, and postoperative COVID-19-related mortality associated with G.C. surgery. Accordingly, G.C. surgical treatment may be safely performed with acceptable screening protocol compliance during the pandemic.

LIMITATIONS OF THE STUDY

Every hospital-based study has some limitations, and the present study undertaken is no exception to this fact. The limitations of the present study are mentioned. The sample size was small. The study period was short. This study was single-centered, so the study population might not represent the whole community.

CONCLUSION AND RECOMMENDATIONS

Under strict institutional policies, meticulous logistical planning, good communication, and maintaining high-level clinical care and measures to establish a COVID-19-free surgical pathway, gastric cancer surgery can be performed with acceptable perioperative and postoperative morbidity and mortality. These results support the continuation of gastric cancer surgery in regions with any pandemic, including COVID-19 trends similar to other centers in Bangladesh.

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CONFLICT OF INTEREST

None declared.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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