

Impact of Covid-19 pandemic on upper gastrointestinal cancer services: Experience from an oncosurgical unit

SUMIT SINGH, SURAJ SURENDRAN, MYLA YACOB, NEGINE PAUL, INIAN SAMARASAM

ABSTRACT

Background. The Covid-19 pandemic continues to affect the delivery of cancer care across the world. We evaluated the impact of the pandemic on the delivery of cancer care, to patients diagnosed with upper gastrointestinal (UGI) tract malignancies, during the first 4 months of the pandemic in India.

Methods. We retrospectively analysed a database of patients with UGI malignancies discussed in the Multidisciplinary Tumour Board (MDTB) between 24 March and 24 July 2020. The results in the study group were compared to that of a similar group of patients from the corresponding period in 2019.

Results. A total of 117 and 61 patients were discussed in the MDTB in 2019 and 2020, respectively, thereby showing a 48% reduction in the number of new cases seen in 2020. The reduction in the number of new cases was huge for oesophageal cancer (53–13; 75.5% reduction), compared to gastric cancer (53–43; 18.9%). The proportion of patients with metastatic disease at presentation was significantly higher in 2020, compared to 2019 (39.3% v. 23.1%; $p=0.023$). In 8 (13.1%) patients, the pre-existing treatment protocol had to be modified to suit the prevailing pandemic situation. Two patients with gastric cancer acquired asymptomatic Covid-19 infection during the treatment, which delayed the delivery of further therapy. Oncosurgeries were less in 2020 compared to 2019 (25 v. 63). The rate of 30-day major postoperative complications in 2020 was comparable with that in 2019 (12% v. 6.3%; $p=0.4$).

Conclusions. The number of new patients with UGI cancer, seeking elective cancer care and the number of oncosurgical procedures reduced during the Covid-19 pandemic. Continuous delivery of UGI cancer services was ensured during the pandemic through clinical prioritization, the adaptation of specific care pathways and selective modification of protocols, to suit the prevailing local conditions.

Natl Med J India 2022;35:206–9

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[To cite: Singh S, Surendran S, Yacob M, Paul N, Samarasam I. Impact of Covid-19 pandemic on upper gastrointestinal cancer services: Experience from an oncosurgical unit. *Natl Med J India* 2022;35:206–9.]

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INTRODUCTION

The landscape of the healthcare system in various countries has been altered since the emergence of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the associated Covid-19 in December 2019 in Wuhan, China. The WHO declared Covid-19 as a pandemic on 11 March 2020.¹ Since then, the surgical community has concerns regarding the safety of various surgical procedures, the optimal timing of surgery, approach to surgery and the various perioperative precautions required for the performance of safe surgery.

Among the non-Covid-19 patients, the care of cancer patients has been affected in the worst manner. The overburdening of the healthcare system with Covid-19 patients, travel restrictions imposed as a part of the national and regional lockdowns, and the uncertainties surrounding the safe delivery of cancer care, including the safety of major oncosurgeries, the economic slowdown and the financial burden on the patients, adversely affected the timely delivery of cancer care. The pre-existing guidelines and institutional protocols for cancer care had to be modified to suit the rapidly evolving pandemic situation. Furthermore, cancer patients were presumably at a higher risk for developing Covid-19 infection and its associated complications.² A study from the UK predicted that mortality among cancer patients was to rise during the pandemic.³ The reduction in cancer service usage resulted in an increased number of patients with missed diagnosis, more advanced diseases and cancer-associated mortality in the ensuing years.⁴

Upper gastrointestinal (UGI) tract cancers rank among the first five cancers in India, in terms of prevalence and cancer-associated mortality.^{5,6} In India, patients with most cancers often present at an advanced stage and the prognosis remains poor, despite the application of multimodal treatments.⁴ Hence, any delay in the delivery of cancer care or suboptimal care can potentially result in further progression of the disease and a worse prognosis. In this regard, the delivery of timely standard cancer care was challenged by the evolution of the Covid-19 pandemic in India.

We aimed to review the management of patients with UGI tract malignancies in a specialized surgical unit at a tertiary care centre, during the initial 4 months of the Covid-19 pandemic. The baseline demography of new patients with UGI cancers, modifications in the pre-existing treatment protocols, including surgical practices, and the treatment outcomes were analysed.

METHODS

We retrospectively analysed a database of patients with UGI tract malignancies discussed in the UGI Multidisciplinary Tumour Board (MDTB) between 24 March and 24 July 2020. The

data relevant for the study included patients' demography, type and stage at presentation of the UGI tract malignancy, potential deviations from the treatment protocols (as decided in the MDTB), the approach and type of operations performed and the immediate postoperative outcomes. The data of patients with UGI tract malignancies discussed in the UGI MDTB during the corresponding period in the previous year (2019) were retrieved and used for comparison.

The standard treatment protocol for locally advanced, operable oesophageal carcinoma (OC) included neoadjuvant chemoradiotherapy (NACRT) or neoadjuvant chemotherapy (NACT), followed by a minimally invasive oesophagectomy, and for locally advanced, operable gastric carcinoma (GC), the standard protocol included staging laparoscopy followed by NACT and gastrectomy. In patients with bleeding or obstructed GC, an upfront surgery was preferred, followed by adjuvant therapy. Any patient, who would have been treated as per these standard protocols, but had his/her treatment protocol altered by the MDTB due to the prevailing pandemic situation, was referred to as a patient with protocol 'deviation'.

In the operated group, the 30-day morbidity and mortality were recorded. The severity of postoperative complications was classified using the Clavien–Dindo grade (CDG) and a major postoperative complication was defined as CDG ≥ 3 .⁷

Categorical variables were expressed as frequencies and percentages and the continuous variables were expressed as mean with standard deviation or median with range, as appropriate. Categorical variables were analysed using Fisher exact test or Chi-square test. The differences were considered statistically significant if the *p* value was <0.05 .

RESULTS

Demography and tumour profile

The baseline demography of the study population and the comparator population is given in Table I.

The profile of UGI malignancies discussed in the MDTB is given in Table II. There was a 47.9% fall in the number of new patients with UGI malignancies presenting to our institution during the study period. The reduction in the number of new cases was more marked for OC (75.5%), compared to GC (18.5%). At the time of discussion in the MDTB, the proportion of patients with metastatic disease was significantly higher in 2020, compared to 2019 (39.3% v. 23.1%; *p*=0.023).

Deviations from the treatment protocol

The deviations from the treatment protocol, as decided in the MDTB, were assessed in 61 patients during the study period (2020). Forty-seven (77%) patients had investigations and treatment as per the pre-existing protocols. Six (9.8%) patients defaulted following the MDTB discussion. In 8 (13.1%) patients,

there was a 'deviation' from the pre-existing protocols, which was influenced by the Covid-19 pandemic and the prevailing local factors. The 'deviations' were as detailed below.

1. During the initial stages of the pandemic, the pre-NACT staging laparoscopy was not performed in a patient with GC, due to the suspension of laparoscopic services because of initial concerns regarding its safety.
2. Two patients with borderline operable squamous cell carcinoma of the oesophagus were assigned to definitive chemoradiotherapy rather than NACRT followed by reassessment for surgery. This decision was strongly influenced by the Covid-19 pandemic and the patients' preference for non-operative treatment amidst the pandemic.
3. Although the standard operative approach for oesophagectomy in our institution is minimally invasive, two patients with OC had to undergo open surgery, due to concerns about the safety of thoraco-laparoscopy in the initial phase of the pandemic.
4. One patient with operable GC at presentation had more than a month delay in his surgery, due to lockdown-related travel restrictions. At the time of eventual surgery, he was found to have an inoperable disease.
5. Two patients with GC had tested positive for Covid-19 during the study period. Although these patients were asymptomatic for Covid-19, the development of infection delayed the administration of further therapy (chemotherapy or surgery). One of these patients had tested positive during the NACT and had a 3-week delay before the initiation of further chemotherapy cycles. Another patient, who was found to be Covid-19-positive in the preoperative testing was operated after 3 weeks. However, he was found to have inoperable disease on the table.

TABLE I. Demographic details

Variable	2019 (<i>n</i> =117)	2020 (<i>n</i> =61)
Median age in years (range)	54 (22–72)	52 (23–78)
<i>Gender</i>		
Men	84 (71.8)	46 (75.4)
Women	33 (28.2)	15 (24.6)
<i>Geographical location</i>		
South India	30 (25.6)	46 (75.4)
North India	41 (35)	11 (18)
Northeast India	20 (17.1)	2 (3.3)
Bangladesh	26 (22.2)	2 (3.3)
<i>Eastern Cooperative Oncology Group</i>		
0–1	101 (86.3)	42 (68.9)
2–3	15 (12.8)	19 (31.1)
4	1 (0.9)	0

Values expressed as *n* (%)

TABLE II. Profile of upper gastrointestinal malignancies discussed in the Multidisciplinary Tumour Board

Location	Cancer stage					
	2019 (<i>n</i> =117)			2020 (<i>n</i> =61)		
	Metastatic (27; 23.1%)	Non-metastatic (90; 76.9%)	Total, <i>n</i> (%)	Metastatic (24; 39.3%)	Non-metastatic (37; 60.7%)	Total, <i>n</i> (%)
Oesophagus	12	41	53 (45.3)	1	12	13 (21.3)
Gastro-oesophageal junction	2	9	11 (9.4)	2	2	4 (6.6)
Stomach	13	40	53 (45.3)	21	22	43 (70.5)
Duodenum	0	0	0	0	1	1 (1.6)

TABLE III. Comparison of oncosurgical procedures performed in 2019 and 2020

Type of operation	2019 (n=63), n (%)	2020 (n=25), n (%)
Staging laparoscopy	24 (38.1)	7 (28.0)
Laparoscopic wedge resection of GIST	4 (6.4)	0
<i>Radical gastrectomy</i>	23 (36.5)	11 (44.0)
Subtotal gastrectomy	17	9
Total gastrectomy	6	2
<i>Radical oesophagectomy</i>	5 (7.9)*	3 (12.0)†
McKeown	3	2
Ivor-Lewis	2	1
<i>Palliative procedures</i>	7 (11.1)	4 (16.0)
Gastro-jejunostomy	3	4
Palliative gastrectomy	2	0
Palliative feeding jejunostomy	2	0

* Minimally invasive oesophagectomy † Open oesophagectomy
GIST gastrointestinal stromal tumour

Details of operations performed

The details of oncological surgical procedures performed during the study period and comparator period are given in Table III.

Postoperative outcomes

The postoperative complications at 30 days with the type of complication and its severity are given in Table IV. The median length of hospital stay (excluding the patients who had staging laparoscopies) was longer in the study period (2020), compared to 2019 (12 days [range 7–24 days] v. 9 days [range 4–21 days]). The rate of 30-day overall postoperative complications in 2020 was 20%. The rate of major complication (CDG ≥ 3) in 2020 was comparable with that in 2019 (12% v. 6.3%; $p=0.4$).

DISCUSSION

During the period of our study, the overall number of cases presenting with upper GI tract cancers were lower but they had more metastatic disease and major deviations from previous treatment protocols, compared to a similar period a year ago.

We found that there was a nearly 48% reduction in the number of new patients with UGI cancer during the study period, particularly the number of patients with OC. Furthermore, the proportion of patients with metastatic diseases at presentation was significantly increased in the study period, compared to a similar period in the previous year. A published multi-institutional study from India, evaluating the impact of Covid-19 on cancer care during the initial phase of the pandemic, showed a marked reduction in the number of new and follow-up patients, inpatient admissions, chemotherapy and radiotherapy administered, major and minor surgeries during the pandemic.⁴ In response to the Covid-19 pandemic, the Government of India declared a lockdown in March 2020.⁸ Regular transport services and the movement of personal vehicles were restricted during the lockdown. Besides, hospitals were advised to stop all non-essential operations and curtail outpatient department services.⁹ Many tertiary care centres, including some cancer hospitals, were partially or completely converted to Covid-19 treatment facilities. There was anxiety among the patients of contracting Covid-19 infection during travel and visit to the healthcare facility. All these factors may have adversely affected the ability of cancer patients to seek timely appropriate care, as was our

TABLE IV. Postoperative complications at 30 days: Grading of severity and type of complication

Grade	2019 (n=63), n (%)	2020 (n=25), n (%)
Mild (CDG 1–2)	5 (7.9)	2 (8.0)
Severe (CDG 3–5)	4 (6.3)	3 (12.0)
Total	9 (14.3)	5 (20.0)
Grade	Type of complication	
Mild	Urinary tract infection ²	Delayed gastric conduit emptying ¹
	Pneumonia treated with antibiotics ¹	Neuropraxia in the lower limb ¹
	Intra-abdominal collection requiring antibiotics ²	
Severe	Anastomotic leak ³	Pleural effusion requiring image-guided drainage procedure ¹
	Death from anastomotic leak ¹	Intra-peritoneal bile leak from jejunostomy ¹
		Death secondary to CLABSI ¹

CDG Clavien–Dindo grading CLABSI central line-associated blood stream infection

experience. The majority of patients with OC are referred to our institution from West Bengal and Bangladesh, compared to patients with GC. Thus, the greatest impact of the lockdown-related travel restrictions must have been on patients with OC, which probably resulted in a marked reduction in their numbers.

Since the safety of major oncological resection was a concern amid the pandemic, the MDTB had to discuss alternative treatment options with the patients, particularly for those with OC. After understanding the pros and cons of each approach, patients opted for definitive chemoradiotherapy. During the Covid-19 pandemic, alternative treatment options for digestive cancers, if available and clinically sound, should be discussed in the MDTB, and be offered to the patients.¹⁰

The delay in the initiation or an interruption in the continuation of cancer care can adversely affect the treatment-related outcomes.⁴ In addition to the delay in seeking cancer care due to reasons discussed earlier, the development of Covid-19 infection in cancer patients was a major concern, since it further delayed the care and increased the cancer-related and treatment-related morbidity and mortality.¹¹ The early implementation of separate care pathways for Covid-positive and Covid-negative patients in our institution probably resulted in a low proportion of these patients acquiring the Covid-19 infection during their treatment. Although 2 patients with GC tested positive for Covid-19 during their treatment phase, both remained asymptomatic and further therapy could be initiated after an uneventful wait period. One of these patients was found inoperable during his eventual surgery. The influence of the short-wait period of 3 weeks in this patient on his disease progression is unknown since there was no comparative imaging study available, before and after the quarantine period. Furthermore, he was found inoperable only on-table. One of the two Covid-19-recovered patients completed his chemotherapy and underwent radical gastrectomy following a wait period of 3 weeks and made an uneventful recovery. The optimal timing to re-initiation of chemo(radio)therapy and surgery is debatable for a Covid-19-recovered cancer patient, and this time interval

may be influenced by the severity of Covid-19-related symptoms, and the local institutional and government protocols. Our study period was short, the sample size was small, and there were only 2 cancer patients who developed Covid-19 infection.

In our experience, the total number of resections for OC and GC reduced in 2020, compared to 2019. The plausible reasons for this trend are reduction in the number of new patients with these cancers (especially the operable cancers), reduced number of hospital beds including intensive care beds for non-Covid-19 patients and re-allocation of anesthesiologists and operation room tables for the care of the Covid-19 patients as well.

The minimally invasive oesophageal operations place the operating room personnel at an increased risk of Covid-19 infection because of the proximity of the oesophagus to the respiratory tract and the risks of one-lung ventilation and thoracoscopy.¹² Concerns have also been raised, especially during the initial phase of the pandemic, about the presence of SARS-CoV-2 in the peritoneal fluid¹³ and the potential for aerosolization of the virus during laparoscopic procedures.¹⁴ In a web-based national survey, conducted by the Italian Society for Study of Esophageal Diseases, although the total number of oesophageal resections in 2020 for OC was comparable to a similar cohort of patients in 2019, there was a significant increase in the number of open resections in 2020, due to the pandemic effect (40% v. 21.7%; $p=0.034$).¹⁵ We suspended all thoracoscopic/laparoscopic oncological procedures until new guidelines/evidence became available promoting their safe use. Following this, these procedures were resumed with appropriate risk mitigation strategies such as the use of enhanced personal protective equipment, low-pressure pneumoperitoneum, avoidance of leak around the ports, aspiration techniques and filters for surgical smoke, judicious use of energy devices and careful desufflation of pneumoperitoneum. Furthermore, preoperative testing for Covid-19 (using reverse transcription-polymerase chain reaction) was made mandatory, which ensured reasonable safety to the operation room personnel and the patient. Our concerns about the safety of laparoscopy were the primary reason for avoiding pre-NACT staging laparoscopy in a patient with GC and performing open oesophagectomy, instead of minimally invasive oesophagectomy in 2 patients with OC, in the initial phase of the pandemic.

The international COVIDSurg collaborative study had shown increased postoperative pulmonary complications and mortality in patients with Covid-19 infection.¹⁵ They recommended the avoidance of elective surgeries during the Covid pandemic. These recommendations should be considered carefully to make sure that the patients with cancer are not deprived of timely appropriate care. However, the safe delivery of cancer services may require a modified strategy at least in few patients, as shown in the current study. In our study, the rate of postoperative complications including the major complication rates did not differ significantly between the study cohort (2020) and the comparator cohort (2019). No patients in the study cohort, including the patient who recovered from Covid-19 and received gastrectomy, developed any major pulmonary complications. However, since the number of Covid-19-recovered patients was low ($n=2$) in the operated group, a

comparison of postoperative outcomes with that of Covid-19-negative patients was not feasible.

There are few limitations to the present study. First, the results are a reflection of the cancer services offered by a single specialist UGI oncosurgical unit. Second, the results described are just a 'snapshot' of the rapidly evolving pandemic scenario and are likely to evolve with time. Third, patients who were followed up for previously treated UGI cancers in the study period were excluded since this number was relatively low. Finally, further follow-up is required to evaluate the long-term effect of pause in oncological services, which resulted in delayed diagnosis and treatment of UGI cancers.

In conclusion, this single-institution experience showed that the number of patients with newly diagnosed UGI cancer and cancer-related operations reduced during the first phase of the pandemic. Continuous cancer care can be effectively delivered during the Covid-19 pandemic, through clinical prioritization, the adaptation of separate care pathways and selective modification of protocols, to suit the prevailing local conditions.

Conflicts of interest. None declared

REFERENCES

- 1 WHO Director-General's opening remarks at the media briefing on COVID-19; 11 Mar 2020. Available at www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020 (accessed on 24 Aug 2020).
- 2 Shinde RS, Naik MD, Shinde SR, Bhandare MS, Chaudhuri VA, Shrikhande SV, *et al.* To do or not to do?—A review of cancer surgery triage guidelines in COVID-19 pandemic. *Indian J Surg Oncol* 2020;**11**:175–81.
- 3 Lai A, Pasa L, Banerjee A, Denaxas S, Katsoulis M, Chang WH, *et al.* Estimating excess mortality in people with cancer and multimorbidity in the COVID-19 emergency. 2020. doi: 10.13140/RG.2.2.34254.82242.
- 4 Ranganathan P, Sengar M, Chinnaswamy G, Agrawal G, Arumugham R, Bhatt R, *et al.* Impact of COVID-19 on cancer care in India: A cohort study. *Lancet Oncol* 2021;**22**:970–6.
- 5 Dikshit RP, Mathur G, Mhatre S, Yeole BB. Epidemiological review of gastric cancer in India. *Indian J Med Paediatr Oncol* 2011;**32**:3–11.
- 6 Samarasam I. Esophageal cancer in India: Current status and future perspectives. *Int J Adv Med Health Res* 2017;**4**:5.
- 7 Clavien PA, Barkun J, de Oliveira ML, Vauthey JN, Dindo D, Schulick RD, *et al.* The Clavien–Dindo classification of surgical complications: Five-year experience. *Ann Surg* 2009;**250**:187–96.
- 8 Advisory for Hospitals and Medical Education Institutions. Available at www.mohfw.gov.in/pdf/AdvisoryforHospitalsandMedicalInstitutions.pdf (accessed on 24 Aug 2020).
- 9 Tougeron D, Michel P, Lievre A, Ducreaux M, Gaujoux S, Guiyu B, *et al.* COVID-19 epidemic: Management of digestive cancers during the COVID-19 second wave: A French intergroup point of view (SNFGE, FFCD, GERCOR, UNICANCER, SFCD, SFED, SFRO, ACHBT, SFR). *Dig Liver Dis* 2021;**53**:306–8.
- 10 Liang W, Guan W, Chen R, Wang W, Li J, Xu K, *et al.* Cancer patients in SARS-CoV-2 infection: A nationwide analysis in China. *Lancet Oncol* 2020;**21**:335–7.
- 11 Pieracci FM, Burlew CC, Spain D, Livingston DH, Bulger EM, Davis KA, *et al.* Tube thoracostomy during the COVID-19 pandemic: Guidance and recommendations from the AAST Acute Care Surgery and Critical Care Committees. *Trauma Surg Acute Care Open* 2020;**5**:e000498.
- 12 Barberis A, Rutigliani M, Belli F, Ciferri E, Mori M, Filauro M. SARS-Cov-2 in peritoneal fluid: An important finding in the Covid-19 pandemic. *Br J Surg* 2020;**107**:e376.
- 13 Mowbray NG, Ansell J, Horwood J, Cornish J, Rizkallah P, Parker A, *et al.* Safe management of surgical smoke in the age of COVID-19. *Br J Surg* 2020;**107**:1406–13.
- 14 Rebecchi F, Arolfo S, Uglione E, Morino M, Asti E, Bonavina L, *et al.* Impact of COVID-19 outbreak on esophageal cancer surgery in Northern Italy: Lessons learned from a multicentric snapshot. *Dis Esophagus* 2021;**34**:doaa124.
- 15 COVIDSurg Collaborative. Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: An International Cohort Study. *Lancet* 2020;**396**:27–38.