

Reduction in endoscopic upper gastrointestinal malignancy detection during COVID-19-enforced lockdown

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Background: The COVID-19 pandemic had an unprecedented impact on healthcare worldwide, greatly affecting patients' access to healthcare services. In international studies, rates of oesophagogastroduodenoscopy (EGD) decreased, while the malignant yield increased proportionally. This study describes changes in endoscopy rates and in the detection of malignancy at a single South African tertiary hospital.

Methods: Records from a pre-existing registry of an upper gastrointestinal (UGI) endoscopy service were accessed and retrospectively analysed after ethical approval. Study periods were the 18-month, government-enforced COVID-19 lockdown ("lockdown", 27 March 2020 to 30 September 2021) and a matched 18-month period preceding lockdown for comparison ("pre-lockdown", 20 September 2018 to 26 March 2020). All patients presenting to the upper endoscopy service at Groote Schuur Hospital ("the service") for index EGD were evaluated for potential inclusion in the study. Patient demographics, date, and indication for endoscopy were recorded, and histologically proven malignancy was documented.

Results: During lockdown, 2 428 index EGDs were performed, compared with 4 448 in the pre-lockdown period, indicating a 45.41% decrease. Similar biopsy rates were observed: 24.10% EGDs in pre-lockdown and 23.19% EGDs in lockdown. Malignancy was proven in 119 patients during lockdown, compared with 131 in pre-lockdown – an absolute decrease of 9.16% ($p < 0.001$), but with a higher yield (4.90% vs. 2.95%). The profile of the malignancy type remained similar between the two periods, except for a decrease in squamous cell carcinoma, attributed to changing referral patterns during lockdown, which did not reach statistical significance. Dyspepsia, as the most common indication for EGD, decreased significantly during lockdown (24.23% to 13.53%; $p < 0.001$). Endoscopy for epigastric pain, atypical chest pain, and reflux decreased, while alarm symptom referrals, including gastrointestinal bleeding (11.70% to 16.75%; $p < 0.001$), dysphagia (12.62% to 14.07%; $p = 0.0927$), and anaemia (11.97% to 18.03%; $p < 0.001$), increased.

Conclusion: This study showed findings similar to international studies, with a substantial decrease in endoscopies and a proportional increase in malignancy detection. Further studies of other significant pathologies, such as peptic ulcer disease, would provide additional information on the pandemic's residual effects on this population.

Keywords: upper gastrointestinal endoscopy, COVID-19, malignancy detection

Introduction

The COVID-19 pandemic had a massive impact worldwide, affecting all countries and healthcare systems, ending millions of lives, and impacting many more. An event of similar breadth and magnitude has not been seen in recent times. Within the healthcare sector, even disciplines that did not treat COVID-19 directly experienced reduced capacity to provide healthcare services. This obstruction to access has been attributed, amongst other factors, to patient fear, state-imposed lockdown restrictions, and service cancellations due to healthcare staff shortages and redeployment. There were also early concerns and limited knowledge about healthcare staff's exposure to COVID-19 during procedures and operations – initially, there was minimal evidence on the magnitude of the risk.¹ Consequently, large components of healthcare services were suppressed. Concerns were soon raised about delaying procedures for patients suffering from time-sensitive conditions. Clinical managers faced the challenge of balancing the harm of delaying

access to critical services with ensuring the safety of healthcare providers in their system. Naturally, there is interest in evaluating and quantifying such harms, and data have been published that describe them.

In Austria, a 40.7% reduction in UGI bleeding events was observed during the height of the pandemic and national lockdown, and a 40% decline in the national rate of admissions for acute coronary syndrome.^{2,3} In the United States, inpatient and outpatient endoscopies across three hospitals in New York decreased 89% during pandemic peaks in 2020.⁴ In this study, a greater diagnostic yield was noted during the pandemic period when compared with the period preceding it. There were formal changes to policy regarding stratifying which EGDs should proceed, with one academic centre assessing each case individually and deferring most diagnostic scopes.⁵ EGDs performed were for bleeding requiring intervention and for stenting or dilatation for high-grade dysphagia or gastric outlet obstruction.⁵

To our knowledge, there has been no assessment of changes in endoscopy rates during the COVID-19 pandemic in the South African setting, or of their diagnostic yield. We hypothesise that fewer procedures were performed and that time-sensitive diagnoses, such as malignancies, were delayed or made less frequently. A registry review was designed to test this hypothesis.

Methods

This retrospective audit was conducted to determine which UGI pathologies were missed due to the 18-month COVID-19 lockdown of 2020–2021. The study aimed to determine whether malignancy detection decreased during the pandemic compared with an adjacent matched period of normal service provision (18 months pre-lockdown).

The objective was to compare the number of UGI endoscopies and their findings – specifically malignancy – performed at the upper endoscopy service at Groote Schuur Hospital in South Africa during lockdown and pre-lockdown. The intention was to determine whether the far more stringent endoscopy access during lockdown did, in fact, translate into a change in malignancy detection, and to compare the indications for endoscopy during the two periods. An additional objective was to describe the proportion of EGDs undertaken by the surgical and medical services.

Records from a comprehensive, pre-existing Human Research Ethics Committee-approved electronic registry (the Upper Gastrointestinal Surgery Registry, HREC R031/2015) documenting all EGDs performed in the service were accessed and analysed retrospectively to identify trends supporting the hypothesis. Specific approval for this retrospective review was obtained from the University of Cape Town Human Research Ethics Committee (HREC 325/2022).

This was a single-centre, retrospective audit of patients presenting to the service during the lockdown for primary EGD, including patients investigated by the UGI surgical unit and the medical gastroenterology unit. The 18-month period during which various lockdowns occurred (27 March 2020 to 30 September 2021) was determined from the South African government COVID-19 website and compared with a matched 18-month pre-lockdown period directly preceding it (20 September 2018 to 26 March 2020).⁶

All patients undergoing primary EGD during either period, regardless of indication, were evaluated for study inclusion. Patients presenting for follow-up, surveillance, or planned interventional endoscopy during the periods were excluded. This was done to prevent patients undergoing regular or repeat endoscopy from introducing bias.

Patient demographics, date, and indication for EGD were recorded, as were proven malignancy and whether the EGD was performed by the surgical or medical unit. The password-protected, computer-based registry already existed. The required data were extracted from the registry, and additional National Health Laboratory Service data were added. Malignancy was

considered proven once the histology result was confirmed in the laboratory system. Cases where histology was not found were not counted as malignancies.

Data safety and monitoring strategies conformed to those set for data collection and handling as per the registry. Data were anonymised, and patients were only identifiable by their hospital folder number. No paper-based data collection sheets were used to record the data, and analysis took place directly from the registry. Patients were not contacted to obtain missing data. No budget was required, and there was no stationery cost, as the data collection was digital. No equipment purchases or hires were required.

Data analysis

All data exploration and analyses were done using the Statistical Package for the Social Sciences version 29.0.0 and Microsoft Excel. Descriptive statistics were used to characterise the sample in terms of measured variables, with means \pm standard deviations and medians with interquartile ranges (IQR) for parametric and nonparametric data, respectively. The comparison between lockdown and pre-lockdown periods was performed using Pearson's chi-square or Fisher's exact tests (for expected fields < 5) for categorical data. The Student's t-test was used to compare numerical data. A $p < 0.05$ was considered statistically significant.

Results

During lockdown, 2 428 EGDs were performed, compared with 4 448 during pre-lockdown. The median age of the pre-lockdown patients was 56 years (IQR 42–67), while the median age for the lockdown group was 57 years (IQR 44–68). Male patients accounted for 45.01% of the pre-lockdown period and 43.62% during the lockdown period (Table I).

Table I: Demographics of patients presenting for primary EGD

	Pre-lockdown 20 September 2018 to 26 March 2020		Lockdown 27 March 2020 to 30 September 2021	
	n	%	n	%
Female	2 038	54.99	1 369	56.38
Male	1 668	45.01	1 059	43.62
Not recorded	742	-	-	-
	4 448		2 428	
Age median (IQR)	56 (42–67)		57 (44–68)	

EGD – oesophagogastroduodenoscopy, IQR – interquartile range

In pre-lockdown, 1 072 patients (24.10%) underwent biopsies, with malignancy proven in 131 patients (2.95%) and benign pathology noted in 842 patients (18.93%). Table II outlines the difference in malignancy detection rates between the lockdown and pre-lockdown periods. Histology results were not found on the laboratory system for 95 patients (2.14%). The ratio of benign-to-malignant biopsies was 6.42. During lockdown, biopsy rates were similar: 563 patients (23.19%) were biopsied, of whom malignancy was subsequently proven in 119 (4.90%) and

Table II: Malignancy detection rates

	Pre-lockdown 20 September 2018 to 26 March 2020		Lockdown 27 March 2020 to 30 September 2021		p-value
	n	%	n	%	
EGD performed	4 448	100	2 428	100	
Biopsies taken	1 072	24.10	563	23.19	
Malignancy	131	2.95	119	4.90	< 0.001
Benign	842	18.93	399	16.43	
No result found	95	2.14	43	1.77	

EGD – oesophagogastroduodenoscopy

Table III: Malignancy profile

Malignancy	Pre-lockdown 20 September 2018 to 26 March 2020		Lockdown 27 March 2020 to 30 September 2021		p-value
	n	%	n	%	
Squamous cell carcinoma	57	43.51	40	33.61	0.108
Adenocarcinoma (stomach)	29	22.14	31	26.05	0.469
Adenocarcinoma (site not stated)	11	8.40	10	8.40	0.998
Adenocarcinoma (oesophagus + OGJ)	12	9.16	12	10.08	0.804
Lymphoma	6	4.58	9	7.56	0.321
GIST	5	3.82	4	3.36	0.847
KS	4	3.05	2	1.68	0.479
Other	3	2.29	4	3.36	0.608
NET	3	2.19	4	3.36	0.608
Adenocarcinoma (duodenum)	1	0.76	1	0.84	0.946
Melanoma	0	0	2	1.68	-

GIST – gastrointestinal stromal tumour, KS – Kaposi sarcoma, NET – neuroendocrine tumour, OGJ – oesophago-gastric junction

benign findings were reported in 399 (16.43%). Histology results were unavailable for 43 patients (1.77%). The ratio of benign-to-malignant biopsies was 3.35. Therefore, lockdown resulted in a 45.41% decrease in the overall number of EGDs performed, and the absolute rate of malignancy detection dropped by 9.16% ($p < 0.001$). However, as a proportion of EGDs done, the malignancy detection rate increased from 2.95% to 4.90%.

In pre-lockdown, the medical and surgical UGI endoscopy services undertook a similar number of EGDs (2 200 vs. 2 248). However, during lockdown, with many physicians redeployed out of gastroenterology, the surgical service was primarily responsible for EGDs (1 547 vs. 881). In both periods, the proportion of patients biopsied was similar: 24.10% of EGDs pre-lockdown and 23.19% during lockdown. The surgical service biopsied a lower proportion of patients (16.45%) during pre-

Table IV: Indications for EGD

Endoscopy indication	Pre-lockdown 20 September 2018 to 26 March 2020		Lockdown 27 March 2020 to 30 September 2021		p-value
	n	%	n	%	
Dyspepsia	1 077	24.23	328	13.53	< 0.001
Dysphagia	561	12.62	341	14.07	0.093
Anaemia	532	11.97	437	18.03	< 0.001
Gastrointestinal bleed	520	11.70	406	16.75	< 0.001
Epigastric pain	338	7.61	119	4.91	< 0.001
Reflux	332	7.47	133	5.49	0.002
Other	306	6.89	313	12.91	< 0.001
Not specified	220	4.95	61	2.52	< 0.001
LOW	204	4.59	117	4.83	0.662
Vomiting	195	4.39	130	5.36	0.070
Atypical chest pain	159	3.58	39	1.61	< 0.001

EGD – oesophagogastroduodenoscopy, LOW – loss of weight

lockdown and lockdown (19.97%). In comparison, the medical service biopsied 31.90% of patients during pre-lockdown and 28.83% during lockdown. When split between the services, the surgical service had a pre-lockdown malignancy detection rate of 3.96% of all EGDs and 5.82% during lockdown. The medical service had a pre-lockdown malignancy detection rate of 1.63% of all EGDs, and 2.84% during lockdown.

The histological malignancy types (Table III) detected did not differ much between the compared periods, with the only remarkable difference being a 9.90% decrease in the number of squamous cell carcinomas detected, although this did not reach statistical significance.

When examining reported indications for referral for primary EGD, dyspepsia – the most common indication in pre-lockdown – decreased from 24.23% to 13.53% ($p < 0.001$). Dysphagia increased slightly (12.62% to 14.07%; $p = 0.092$), and both anaemia (11.97% to 18.03%; $p < 0.001$) and gastrointestinal bleeding (11.70% to 16.75%; $p < 0.001$) increased significantly. Epigastric pain (7.61% to 4.91%; $p = 0.001$) and reflux (7.47% to 5.49%; $p = 0.002$) decreased, and loss of weight (4.59% to 4.83%; $p = 0.662$) and vomiting (4.39% to 5.36%; $p = 0.07$) remained similar. Atypical chest pain also decreased (3.58% to 1.61%; $p = 0.069$). Table IV highlights the indications for EGD.

Discussion

As expected, there was a significant decrease in the number of EGDs performed in lockdown – 45.41% fewer EGDs were done in absolute terms. However, the malignancy yield increased from 2.95% to 4.90%. An increase in malignancy yield was also seen in a similar study in the United States.⁴ Further studies on EGD rates in this period also show significant decreases in the number of procedures performed (between 45% and 50%).^{7,8} Possible causes for this include a change in unit policy regarding which EGDs should be done, patients with less concerning symptoms not presenting for evaluation at the primary-provider level, or those providers being more selective in sending patients with less concerning symptoms for endoscopy.⁵ This is supported by the change in the profile of indications, as detailed below.

There was a decrease of 9.16% in the absolute number of malignancies detected from 131 to 119 patients, suggesting that although patients with cancers may have been stratified more efficiently, some patients with cancer may have been overlooked. Comparing these two periods with a matched period directly after lockdown might prove an interesting follow-up study to determine whether a significant increase in the absolute malignancy rate occurred. The median age and gender profile were well matched between the two groups. The profile of malignant histology was also mostly unchanged between the two periods. During lockdown, long-distance travel between provinces was not permitted. Considering that many patients presenting to this centre with oesophageal cancer are from the Eastern Cape, travel restrictions may explain the 9.90% decrease in squamous cell carcinoma cases. Although this result

did not achieve statistical significance, it may be due to the small sample sizes.

The number of EGDs for dyspepsia dropped significantly, which may be explained by clinicians being less likely to refer this relatively less concerning symptom and rather treating it empirically, or by patients themselves not seeking assistance for milder complaints. Dysphagia increased proportionally as a referral symptom (although it decreased in absolute numbers), but did not achieve statistical significance. This change may be due to it being a particularly concerning symptom for malignancy. This may also account for the proportional increases in anaemia and gastrointestinal bleeding referrals (both statistically significant), both of which are interpreted as possible “red flag” indicators of underlying cancer.⁹ Epigastric pain, atypical chest pain, and reflux referrals also decreased proportionally with statistical significance. This may be because, like dyspepsia, patients or clinicians may have elected to defer referral for endoscopy. This is supported by the increase in malignancy yield described above.

The surgical service was responsible for continuing and restarting upper endoscopy services during lockdown, performing double the endoscopies compared with their medical colleagues (1 547 vs. 881). Conversely, in pre-lockdown, the numbers were similar (2 200 vs. 2 248). This is due to most medical gastroenterologists being seconded from the gastrointestinal unit to assist in the clinical management of the large numbers of COVID-19 patients in intensive care, high-care, and medical wards during lockdown. Interestingly, across both study periods, the surgical endoscopists biopsied fewer of their patients (16.45% pre-lockdown and 19.97% during lockdown) than the medical endoscopists (31.90% pre-lockdown and 28.83% during lockdown). This most likely reflects the different patient profiles referred to medical gastroenterology versus those referred to UGI surgery.

The ratio of benign-to-malignant biopsies increased from 3.35 pre-lockdown to 6.42 during lockdown, providing additional evidence that malignancy comprised a larger proportion of EGDs during the pandemic. The overall change in malignant yield observed remained when divided by the endoscopist type. Surgical endoscopists detected malignancy in 3.96% of all endoscopies pre-lockdown and in 5.82% during lockdown. The medical endoscopists found malignancy in 1.63% of pre-lockdown endoscopies and in 2.48% during the lockdown. Although these results are interpreted with caution, the difference in yield between the disciplines may reflect different patient profiles managed by the different specialities, with more malignancy cases sent to surgeons.

Study limitations

This study is limited by the number of records (95 patients, 2.14%) in which the endoscopist thought the tissue appeared malignant, but no histology was found in the system. The study defined “lockdown” and “pre-lockdown” based on the issued government restriction levels. No doubt some of the pandemic’s effects were already beginning before the formal lockdown, and

so our control period may not be entirely normal. Bias should be considered regarding the quality of data entered into the database. This was done by the endoscopist – who may be a junior or senior registrar, or a specialist, which may affect the quality of the assessment entered. Unfortunately, there is no way to cross-check the veracity of data entered into the database. Another area of bias would be the endoscopist's experience and ability to recognise pathology requiring biopsy, and the risk of overlooking pathology in difficult-to-view areas of the gastroduodenal region. This risk should be mitigated by the presence of a subspecialist fellow or a subspecialist during most endoscopies.

Conclusion

This study achieved its aim of describing changes in endoscopy findings during lockdown compared with a matched pre-lockdown period. Although the absolute number of malignancies detected decreased, the yield increased significantly, and the malignancy type was similar and aligned with international data. Referral indications more commonly associated with cancer increased proportionally, while more benign referral indications decreased. An extension of this study should be considered to compare the same period post-COVID-19, which might reveal a surge in the malignancy rate. A similar study evaluating changes in the presentation of peptic ulcer disease would also be informative.

Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

This study was approved by the University of Cape Town Human Research Ethics Committee (HREC 778/2022).

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References

1. Sultan S, Lim JK, Altayar O, et al. AGA rapid recommendations for gastrointestinal procedures during the COVID-19 pandemic. *Gastroenterology*. 2020;159(2):739-58.e4. <https://doi.org/10.1053/j.gastro.2020.03.072>.
2. Schmiderer A, Schwaighofer H, Niederreiter L, et al. Decline in acute upper gastrointestinal bleeding during COVID-19 pandemic after initiation of lockdown in Austria. *Endoscopy*. 2020;52(11):1036-8. <https://doi.org/10.1055/a-1178-4656>.
3. Metzler B, Siostrzonek P, Binder RK, Bauer A, Reinstadler SJ. Decline of acute coronary syndrome admissions in Austria since the outbreak of COVID-19: the pandemic response causes cardiac collateral damage. *Eur Heart J*. 2020;41(19):1852-3. <https://doi.org/10.1093/eurheartj/ehaa314>.
4. Annadurai V, Blackett JW, Freedberg D, et al. Characteristics and outcomes of endoscopies before and during the COVID-19 pandemic in New York. *Dig Dis*. 2021;39(6):663-72. <https://doi.org/10.1159/000515431>.
5. Chinnery GE, Scriba MF, Jonas EG. Rapid emergent changes in the upper gastrointestinal endoscopy service routines at Groote Schuur Hospital with COVID-19. *S Afr Gastroenterol Rev*. 2020;18(1).
6. www.gov.za [Internet]. COVID-19 official information service. South African Government. Available from: <https://www.gov.za/Coronavirus>. Accessed 13 April 2023.
7. Becq A, Jais B, Fron C, et al. Drastic decrease of urgent endoscopies outside regular working hours during the Covid-19 pandemic in the Paris area. *Clin Res Hepatol Gastroenterol*. 2020;44(4):579-85. <https://doi.org/10.1016/j.clinre.2020.07.012>.
8. D'Ovidio V, Lucidi C, Bruno G, et al. A snapshot of urgent upper gastrointestinal endoscopy care during the COVID-19 outbreak in Italy. *J Gastroenterol Hepatol*. 2020;35(10):1839-40. <https://doi.org/10.1111/jgh.15132>.
9. British Society of Gastroenterology, Association of Coloproctology of Great Britain and Ireland, Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland [Internet]. Guidance on the indications for diagnostic upper GI endoscopy, flexible sigmoidoscopy and colonoscopy. 2019. Available from: www.bsg.org.uk. Accessed 12 December 2024.