

The Yield of Prioritization of Gastrointestinal Endoscopy Activities According to the European Society of Gastrointestinal Endoscopy Recommendations

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ABSTRACT

Background & Aims: Endoscopic procedures prioritization is an important tool for defining healthcare resources distribution in a daily practice and more important in times of limited resources such as the COVID 19 pandemic. We assessed the completion rate of endoscopic procedures that were canceled by the patients themselves, based on the prioritization strategy recommended by the European Society of Gastrointestinal Endoscopy (ESGE) and examine what were the outcomes of the procedures' cancellation according to the endoscopic different indications.

Methods: Retrospective analysis of all the self-cancelled procedures during March 2020 at our tertiary endoscopic referral center. The completion rate was estimated until July 2021. The procedure's primary indications were classified according to the ESGE position statement („always perform/high priority” vs. “low-priority/postpone always”); Endoscopic findings were classified as „significant”, defined as advanced neoplasia/ a clinically significant intervention, or „other”.

Results: We included 194 patients (mean age 60.4±15.3 years old; 44.8% females, 90.7% colonoscopies, 20.1% classified as „always perform/ high priority”). The completion rate in the „perform always/high priority” groups versus the “low-priority/postpone always” groups was 51.3% versus 70.3%, (p=0.024). In contrast, the rate of significant endoscopic findings in the „perform always/high priority” groups versus the “low-priority/postpone always” groups was 40.0% versus 7.3%, (p<0.001).

Conclusions: Patients who are prioritized according to the ESGE classification have a higher rate of significant findings but a lower likelihood of completing the procedure. This highlights the need for improving implementation of prioritization strategy based on the ESGE classification.

Key words: endoscopy – gastrointestinal – stratification – yield – colorectal cancer.

Abbreviations: COVID-19: coronavirus disease 2019; ESGE: European Society of Gastrointestinal Endoscopy; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.

INTRODUCTION

In countries with public health maintenance organization, patients often experience considerable waiting times for a medical service that have long-term implications. Thus, in a system with defined medical resources, prioritization of healthcare services is the basis for reducing wait times in order to improve the access to healthcare services thus optimizing patients' outcomes [1, 2]. However, worldwide, from time to time,

major unplanned events such as wars, climate disasters and pandemics occur which may disrupt the healthcare services heavily, leading to long waiting times and many untreated patients for years after the event, since the demand for services exceeds the supply. In the last years, a major event that gave rise to healthcare system disruption worldwide was the COVID 19 pandemic. In our area, it emerged in February 2020, with the first reports of a new severe acute respiratory syndrome caused by a novel coronavirus 2 (SARS-CoV-2) [3]. This pandemic led to high morbidity and mortality rates, affecting millions of people around the world. After the first wave of the SARS-CoV-2, subsequent omicron variants with variable severity occurred too [4, 5]. The pandemic demanded a considerable amount of financial and personnel resources to treat patients infected with the virus leaving restricted reserves for general and specialized care. In addition, since it has been

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concluded that the viral transmission occurs through direct, indirect, or close contact with an infected person, patients were also reluctant to use medical services out of fear from viral transmission. This fact has increased the demand further. As a result, in the following months, when the pandemic began to subside, the demand for health services increased - even though restrictions on health services had been lifted- leading to a high imbalance between demand and available resources. These changes highlighted the need of healthcare system to reorganize and prioritize medical services provided [6, 7]. On April 2020, The European Society of Gastrointestinal Endoscopy (ESGE) published a position statement that aimed to provide the health caregivers with decision making tools for performing endoscopies, taking into account the risk of delaying the procedure as well as the risk of exposure to the COVID-19 virus [8, 9]. This statement prioritized the endoscopic procedures according to four major categories that ranged between, endoscopic procedures that should always be performed (high priority) to endoscopic procedures that should always be postponed (low priority). We evaluated the completion rate of endoscopic procedures that were canceled by patients due to the COVID-19 pandemic, according to the ESGE prioritization of the primary indication.

METHODS

Study Population and Design

Clalit Health Services (CHS), is the largest of four integrated health care organizations in Israel, insuring 4.7 million patients (53% of the population) [10]. The CHS database is a comprehensive state-of-the-art computerized data warehouse wherein data are aggregated by continuous real-time input from health service providers and physicians, including laboratory test results, medical diagnoses, and medication dispensed. Data can be queried at the level of an individual member.

For the present study, a retrospective registry design was used.

All self-canceled procedures during March 2020 at our Gastroenterology Division in a tertiary endoscopic referral center of the CHS were included. While worldwide some units abolished procedures for their patients in that period, our center maintained regular activities by using personal protective equipment. Thus, all the patients included in our analysis were patients who abolished their procedures by themselves. A comprehensive chart review of the electronic medical records of each patient was performed, and demographic data and histological data were retrieved too. The primary indication of the endoscopic procedures was classified according to the ESGE position statement as either "always perform/high priority" vs. "postpone always/low priority". We followed the patients up to 1/7/2021 to determine whether the endoscopic procedure was performed, and all endoscopic findings were recorded. The findings were classified as "significant" (advanced neoplasia or clinically significant intervention such as dilation) or "other" according to the ESGE classification [9]. Patients who died with the follow-up period were excluded. The time of the follow-up endoscopy was extracted for these patients too.

This study was approved by the institutional ethical board, approval number RMC- 0806-20. The need for informed consent was waived because the study was registry-based, and the dataset was anonymized.

Statistical Analyses

Categorical variables were reported as frequencies (%), and nonparametric data were reported as mean with standard deviation [11]. A chi-squared test was performed for categorical data. A two-sided *P* value of <0.05 was considered statistically significant. Data analysis was carried out using SPSS statistical software (version 25; SPSS Inc., Chicago, Illinois, USA). The median time of follow-up and IQR were calculated too.

RESULTS

During the study period, a total of 194 patients canceled their endoscopic procedure. The mean age was 60.4±15.3 years old, 44.8% were females, and 90.7% of the self-canceled procedures were colonoscopies. Table I describes the characteristics of the patients.

Table I. Patients' characteristics

Total number of patients (%)	194 (100)
Age, years, mean ± SD	60.4 ± 15.3
Female, n (%)	187 (44.8)
Type of endoscopic procedure self-canceled by patients	
Colonoscopy, n (%)	169 (87.1)
Colonoscopy and esophagogastroduodenoscopy, n (%)	7 (3.6)
Esophagogastroduodenoscopy, n (%)	17 (8.8)
Endoscopic ultrasound, n (%)	1 (0.5)

SD: standard deviation.

Regarding the indications of the procedures, according to the ESGE classification, 20.1% (39/194) were classified as "always perform"/ "high priority", and 79.9% (155/194) as "low-priority"/"postpone always". The specific indications of the procedures, according to ESGE classification are given in Table II.

After a period of 15 months, (up to 1/7/2021) a total of 66.5 % (129/194) completed the endoscopic procedure, 51.3% (20/39) in the "perform always"/"high priority" group and 70.3% (109/155) in the "low-priority"/"postpone always" group (*p*=0.024) as shown in Fig. 1. The median time for endoscopy completion was 4 months (IQR 2-5).

Overall, 8.2% (16/194) of the completed procedures revealed significant findings: 40.0% (8/20) of the "always perform/high priority group" and 7.3% (8/109) of the other group (*p*<0.001), as shown in Fig. 1. The specific findings according to the indication class were (as shown in Table III): advanced adenoma, tumor or stricture who needed intervention by endoscopic dilatation. Non-advanced adenomas were defined as polyps measuring less than 10mm. Advanced adenomas were defined as adenomas with size 10 mm, villous component, or high-grade dysplasia [12, 13].

In the long-term follow-up 15 patients completed their procedures. 13 were from the low priority category had normal

Table II. Procedure indication stratified by the ESGE classification

	Procedure indication	Total number (%)
Low-priority/postpone always	Post polypectomy surveillance	47 (30.3)
	Family history CRC	19 (12.3)
	Post CRC surveillance	11 (7.1)
	Screening high risk patients (genetic susceptibility to CRC)	13 (8.4)
	Gastrointestinal symptoms	30 (19.4)
	Screening average risk patients	20 (12.9)
	Inflammatory bowel disease	3 (1.9)
	Endoscopic potential intervention	1 (0.6)
	Mild iron deficiency anemia	11 (7.1)
	Total	155 (100)
Always perform/ high priority	Severe iron deficiency anemia	8 (20.5)
	Colonoscopy for FOBT+ after organized CRC screening	7 (17.9)
	Investigation of abnormal imaging	3 (7.7)
	Endoscopic intervention	6 (15.4)
	Lower gastrointestinal bleeding	14 (35.9)
	Upper gastrointestinal bleeding	1 (2.6)
	Total	39 (100)

ESGE: European Society of Gastrointestinal Endoscopy; CRC: colorectal cancer; FOBT: fecal occult blood test.

or benign findings whereas 2 were from the high priority category, where one died and one was without significant findings.

Patients’ non-attendance for endoscopic appointments is a common phenomenon in endoscopy units [14, 15].

During the COVID19 pandemic, particularly at the early phase, the rate of missed/canceled endoscopic appointments was the highest [7] ever. In an attempt to reduce the risk of transmission, endoscopic units, including in our department, made significant modifications to adjust to the new era, such as pre-procedure COVID-19 testing and patients separation [16]. However, still, many patients were reluctant to attend their appointment [17, 18]. In our study, a substantial number of patients with “always perform/high priority” indications canceled their endoscopic procedure. They did not carry out the procedure even when the restrictions were removed. A fear of viral transmission might be a significant factor contributing to the high rates of non-attendance. However, additional health-care system related factors as well as patient factors might have added to this occurrence [14]. Hence, the importance of discussing the clinical indication of the procedure with the patients and the potential consequences of delayed investigation cannot be overstressed, especially during the pandemic [14, 19]. To reduce the rate of non-attendance, our center has a pre-endoscopy reminder system, which includes a SMS text message and phone call; however, we do not have a rescheduling system that reaches out to patients who canceled or missed their appointment. Thus, patients who had withdrawn their endoscopic appointment during the early pandemic may have forgotten to reschedule their appointment by the time the restrictions were removed. Generating a computerized system that identifies patients who canceled their appointment despite having a “high priority” indication may aid in increasing the endoscopic completion rates and improve the timely detection of clinically significant findings.

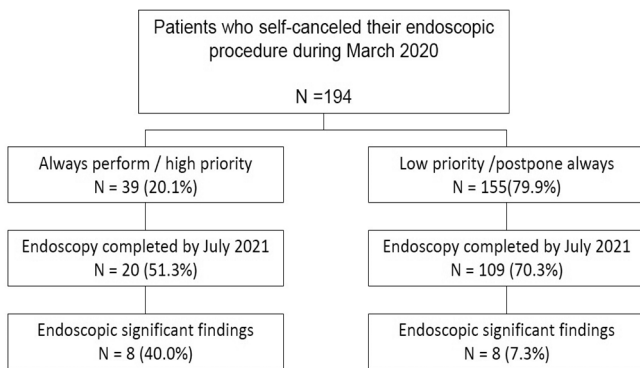


Fig. 1. Patients’ disposition.

DISCUSSION

Our findings show that a substantial portion of self-cancelled procedure were classified as high priority. However, among these patients the completion rate was lower than the patients classified as low priority procedures.

We report that about a 20% of the patients who self-cancelled their procedures were classified as a high priority. The completion rate of this group was significantly lower than in the group of patients classified as low priority. About 40% of the patients classified as high priority and who completed the procedure had significant endoscopic findings, in contrast to only 7.3% of those classified as low priority.

Delaying endoscopic investigation affects patients' outcomes. Colorectal cancer (CRC) detection is an example of the importance of timely endoscopy for improving disease outcomes. A modest delay in colonoscopy investigation following a positive test for occult blood in stool is associated with higher rates of advanced cancer and mortality [20, 21]. During the pandemic, there was a reduction in the performance rate of endoscopic investigation and a substantial decrease in stool-based tests [22]. Both trends may explain the considerable decrease of CRC detection and increased CRC-related mortality [23, 24]. Thus, efforts should be made to ensure that patients with significant indications for endoscopic investigation will complete the endoscopic procedure on time. Our study supports the prioritization system recommended by the ESGE by showing higher rates of clinically significant findings, including neoplastic lesions, among patients with "always perform/ high priority" indications.

After the restrictions were lifted and the COVID19 vaccines were developed, endoscopic units have gradually resumed their routine operation but faced new challenges. Increased demand for endoscopy procedures is derived from missed/canceled procedures that had accumulated. This resulted in an increased length of the procedure waiting times which was associated an increased number of late diagnoses and increased rates of non-attendance [14]. Thus, even when the endoscopic unit resumed its routine, it is important to identify patients with high-risk indications who should have complete the procedure earlier than patients with elective low-risk indications. Several societies have published recommendations for resuming endoscopic activity, focusing on prioritizing endoscopic procedures, and specifying the measures that should be taken to maintain patients' and healthcare providers' safety [25, 26].

Our cohort is the first study to our knowledge that evaluates the completion rates and endoscopic findings based on the ESGE position statement. Our results support the prioritization model of the ESGE and emphasize the need for a rescheduling strategy that identifies patients with "high priority" indications who should have the procedure carried out earlier. Although the procedures in our cohort were cancelled by the patients themselves, our aim was to examine whether the consequences of the procedures' cancellations related to their indications. Thus, we believe our study can highlight to health care systems which is the right approach when prioritization needs to be completed.

We acknowledge several limitations. First, there is a potential risk of missing data. Endoscopic procedures could potentially have been carried out in another hospital or outpatient clinics. However, the patient's electronic health care records include all records from CHS inpatient and outpatient facilities that provide medical service for almost all CHS members. Furthermore, most outpatient clinics, including private clinics, also reduced endoscopic activity during the early pandemic. Thus, we believe that the risk of missing data is low. We assessed each endoscopy report by reviewing the description and pictures of the findings. Histopathological confirmation of the results was available. Secondly, the number of patients included in this study was limited, yet we have a diversity of indications including high and low risk indication

classes, also, this activity reflects real-world activity in the endoscopy unit during the COVID pandemic. Thirdly, we do not have data on the 33.5% (65/194) of patients who did not undergo endoscopy, in particular hospital admissions, pathology, and cancer registry. Finally, although follow-up during fifteen months is quite long, it may not be long enough when considering progression of premalignant lesions.

CONCLUSIONS

Our findings indicate that the completion of endoscopy among high-risk patients was lower than among low-risk patients. In addition, our findings support the ESGE classification of indications. Ideally, based on our findings, endoscopic rescheduling procedures should be prioritized according to the ESGE recommendations.

Conflicts of interest: None to declare.

Authors' contributions: Z.L. conceived and designed the study. Z.L., A.I.A., M.A.G. collected and integrated the data and managed the project. R.G.B., Z.L. and M.A.G. performed the statistical analyses and results interpretation. R.G.B., Z.L., A.I.A. and M.A.G. wrote the manuscript. Z.L., A.I.A., I.B., Y.C., D.B., M.A.G. collected the data and critically revised the manuscript. Z.L., M.A.G. are the guarantors of this manuscript. All authors approved the final version of the manuscript.

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