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ORIGINAL ARTICLE

Racial Disparities in Endoscopy Cancellations During the COVID-19 Pandemic

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Abstract

Introduction The coronavirus disease 19 (COVID-19) pandemic has disrupted healthcare delivery including elective endoscopy. We aimed to determine the prevalence of endoscopy cancellations in the COVID-19 era and identify patient characteristics associated with cancellation due to the pandemic.

Methods Medical charts were reviewed for adults who cancelled an outpatient endoscopic procedure from 5/2020 to 8/2020. The association of patient characteristics with cancellation of endoscopy due to COVID-19 was assessed using logistic regression.

Results There were 652 endoscopy cancelations with 211 (32%) due to COVID-19, 384 (59%) due to non-COVID reasons, and 57 (9%) undetermined. Among COVID-19 related cancellations, 75 (36%) were COVID-19 testing logistics related, 121 (57%) were COVID-19 fear related, and 15 (7%) were other. On adjusted analysis, the odds of cancellation due to COVID-19 was significantly higher for black patients (OR 2.04, 95% CI 1.07–3.88, $p=0.03$), while patients undergoing EGD (OR 0.56, 95% CI 0.31–0.99, $p=0.05$) or advanced endoscopy (OR 0.18, 95% CI 0.07–0.49, $p=0.001$) had lower odds of cancellation. The odds of cancelling due to COVID-19 testing logistics was significantly higher among black patients (OR 3.12, 95% CI 1.03–9.46, $p=0.05$) and patients with Medi-Cal insurance (OR 2.89, 95% CI 1.21–6.89, $p=0.02$).

Conclusion Black race is associated with an increased risk of COVID-19 related cancellation. Specifically, black patients and those with Medi-Cal are at increased risk of cancellation related to logistics of obtaining pre-endoscopy COVID-19 testing. Racial and socioeconomic disparities in access to endoscopy may be further amplified by the COVID-19 pandemic and warrant further study.

Keywords Health equity · Health disparities · Healthcare delivery · Endoscopy access

Introduction

Coronavirus disease 2019 (COVID-19) severely disrupted medical care throughout the world. The initial, unprecedented outbreak in the United States brought about widespread cancellation of elective and semi-urgent endoscopic procedures resulting in a 57–96% decline in endoscopic volume [1–3]. Additionally, as a result of the COVID-19 pandemic, endoscopy workflow dramatically changed for both patients and providers.

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Socioeconomically disadvantaged patients have been disproportionately affected by COVID-19, particularly for those patients that identify as Black, Hispanic, and Asian. These groups have experienced higher rates of infection, hospitalization, and death due to COVID-19 compared to White patients [4, 5]. This will likely exacerbate existing disparities in endoscopy access for the medically underserved community. A recent study found a decline in proportions of Black and Hispanic patients compared to White patients attending outpatient endoscopies immediately after the first wave of the COVID-19 pandemic [6]. Even prior to the COVID-19 era, rates of endoscopy nonattendance were significantly higher in safety net hospital systems (21.7–41.7%) compared to hospitals caring for privately insured patients (4.1%) [7–9]. Studies have repeatedly identified Medicaid insurance type in addition to substance abuse as risk factors for endoscopy non-attendance [8, 10, 11].

We aimed to determine the prevalence of endoscopy cancellations in the COVID-19 era and identify patient characteristics associated with cancellation either directly or indirectly due to the pandemic.

Methods

Study Population

A retrospective chart review was conducted to evaluate cancellations of scheduled endoscopic procedures at the initial peak of the pandemic, between May 1, 2020 and August 30, 2020, at a tertiary care academic center in San Francisco, California. This academic referral center cares for the population of San Francisco, in addition to the surrounding areas, with a broad catchment area serving 48 of 59 counties in California from north of San Luis Obispo to the California-Oregon border and east to the Nevada border. Therefore, the population served is highly diverse with respect to age, race, ethnicity, and insurance type.

All adult (≥ 18 years) patients scheduled for outpatient endoscopic and advanced endoscopic procedures, including esophagogastroduodenoscopy (EGD), colonoscopy, sigmoidoscopy, endoscopic ultrasound (EUS), enteroscopy, or endoscopic retrograde cholangiopancreatography (ERCP), were included. Inpatient endoscopic procedures were excluded from data collection. Endoscopy cancellations were documented by office staff in the Electronic Medical Record (EMR) at time of cancellation and gathered monthly through a search of the EMR. Patients who did not appear for their appointment without officially cancelling their procedure were not included because the reason for their nonattendance was not always documented in the EMR. All patients undergoing elective endoscopy were required to have a SARS-CoV-2 PCR test within 96 hours of their procedure, and performance of this test at our institution was encouraged to avoid cancellations due to having the incorrect test performed, or delays in testing results.

Data Collection

The EMR for each patient was reviewed for demographics (age, gender, ethnicity, race, insurance, zip code, language preference, and marital status), diagnosis of inflammatory bowel disease (IBD), immunosuppression status, indication for endoscopy, and reason for endoscopy cancellation. Insurance type was categorized as private, Medicare, or Medi-Cal, California's Medicaid program which primarily serves low-income individuals including families, seniors, persons with disabilities, and low-income individuals with specific diseases such as tuberculosis, breast cancer, and HIV/AIDS [12]. Indication for endoscopy was categorized as screening colonoscopy, low or high risk of colorectal cancer, and diagnostic procedures. High risk of colorectal cancer (CRC) was determined by history of advanced adenomas, family history of CRC in a first degree relative, or personal history of CRC.

The reason for endoscopy cancellation was categorized as COVID-19 related, non-COVID-19 related, or unclear. The COVID-19 related reasons were further categorized by a logistical testing issue or fear-related driven by the patient. Examples of logistical testing issues included inability to obtain an approved test or test results in the required timeframe for a procedure, preference to not be tested, or inability to arrange transportation to/from testing or procedure. The exact logistic-related issue was not documented. Examples of fear-related reasons included hesitancy to proceed to the endoscopy unit in the setting of the pandemic out of fear of contracting COVID-19. The reason for endoscopy cancellation was determined by patient responses that were documented in the EMR when patients contacted the office staff to cancel a procedure and office staff inquired regarding motivations for cancellation. The documented responses for endoscopy cancellation were reviewed by a single reviewer for consistency in categorization.

Statistical Analysis

Descriptive statistics for baseline characteristics and endoscopy cancellations involved median for continuous variables and frequency (%) for categorical variables. All patient factors associated with endoscopy cancellations related to COVID-19 were evaluated using an univariable logistic regression model. All covariates associated with COVID-19 related cancellations with p-value < 0.10 were further evaluated using multivariable logistic regression models. Factors with plausible associations with endoscopy cancellation were also included in the multivariate analysis. These included age, gender, local San Francisco county residence,

and procedure indication. Statistical significance was defined as a p-value < 0.05 (two-sided).

The UCSF Institutional Review Board approved this study (IRB approval number 20-31829). STATA® v13 (College Station, Texas) was used for all statistical analyses.

Results

Baseline Characteristics

A total of 652 patients scheduled for outpatient endoscopy procedures were included in the analyses. Baseline characteristics are shown in Table 1. The majority were female (55%), non-Hispanic white (61%), married (52%), English-speaking (89%), and with median age of 58 years. Approximately half of patients (51%) resided in the same county (San Francisco) as the endoscopy center. Insurance coverage was split between public and private insurance with private insurance (45%), Medicare (36%), or Medi-Cal (19%; California's Medicaid program). There were 73 (11%) patients diagnosed with IBD and 105 (16%) patients on immunosuppressive therapy. Procedure types included 120 (18%) EGDs, 362 (56%) colonoscopies, 93 (14%) EGD/colonoscopies, 20 (3%) sigmoidoscopies, and 57 (9%) advanced endoscopic procedures including EUS and ERCP. The indication for most procedures was diagnostic (61%), while the remaining procedures were for CRC screening (23%), high-risk CRC surveillance (3%), and low-risk CRC surveillance (13%).

Endoscopy Cancellations

Of the 652 endoscopy cancellations, there were 211 (32%) endoscopy cancellations related to COVID-19, 384 (59%) not related to COVID-19 reasons, and 57 (9%) were undetermined (Fig. 1). Among the COVID-19 related cancellations, 75 (36%) were due to COVID-19 testing logistics, 121 (57%) were due to COVID-19 fear, and 15 (7%) were due to other reasons such as exposure to COVID-19 or testing positive for COVID-19.

Associations with Endoscopy Cancellation Due to COVID-19

Table 2 shows the uni- and multi-variate analyses for associations with endoscopy cancellation related to COVID-19. In univariable logistic regression analysis, patients undergoing EGD (OR 0.50, 95% CI 0.31–0.82, $p = 0.006$), advanced endoscopy (OR 0.27, 95% CI 0.12–0.60, $p = 0.002$), or a procedure with a diagnostic indication (OR 0.64, 95% CI 0.43–0.96, $p = 0.03$) had lower odds of cancellation due to COVID-19. There was a trend towards significance for higher odds of cancellation due to COVID-19 among Black patients (OR 1.77, 95% CI 0.97–3.25, $p = 0.06$). Other documented races, insurance type, EGD/colonoscopies, sigmoidoscopies, and procedures for CRC screening or surveillance were not associated with endoscopy cancellation due to COVID-19. On multivariate analysis adjusting for age, gender, local county residence, and procedure indication, the odds of cancellation due to COVID-19 was significantly higher for Black patients (OR 2.04, 95% CI 1.07–3.88, $p = 0.03$), while patients undergoing EGD (OR 0.56, 95% CI 0.31–0.99, $p = 0.05$) or advanced endoscopy (OR 0.30,

Table 1 Baseline characteristics

Characteristic*	Total patients $n = 652$
Age, years	58 (49–68)
Female	359 (55%)
Non-Hispanic	573 (88%)
Race	
White	391 (61%)
Black	49 (8%)
Asian	97 (15%)
Latino	52 (8%)
Other	52 (8%)
Non-English language preference	71 (11%)
Marital status	
Single	302 (48%)
Married	341 (52%)
Local county residence	333 (51%)
Diagnosis of IBD	73 (11%)
On immunosuppression	105 (16%)
Insurance	
Private	297 (45%)
Medicare	235 (36%)
Medi-Cal/covered CA	120 (19%)
Endoscopy	
Procedure type	
EGD	120 (18%)
Colonoscopy	362 (56%)
EGD/Colonoscopy	93 (14%)
Sigmoidoscopy	20 (3%)
Advanced endoscopy	57 (9%)
Sedation	
Moderate sedation	409 (63%)
Anesthesia	243 (37%)
Indication	
CRC screening	148 (23%)
CRC high risk surveillance	19 (3%)
CRC low risk s urveillance	87 (13%)
Diagnostic	397 (61%)

*Median (IQR) or *n* (%)

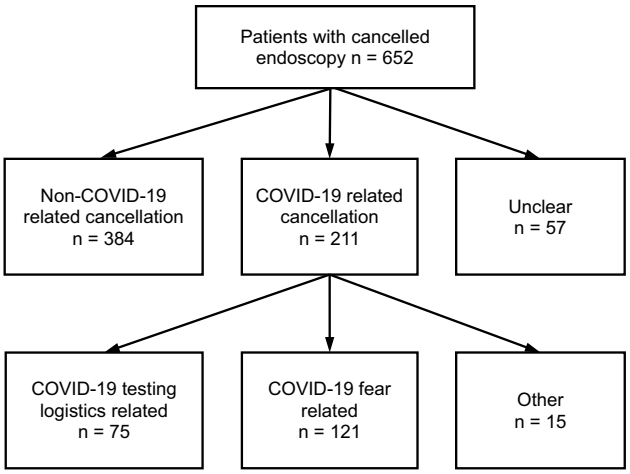

Fig. 1 Endoscopy cancellations

95% CI 0.1–0.72, $p < 0.001$) had significantly lower odds of cancellation.

Table 3 shows the uni- and multi-variate analyses for associations with endoscopy cancellation related to COVID-19 testing logistics. After adjusting for age, gender, local county residence, and procedure indication, the odds of cancelling due to COVID-19 testing logistics were significantly higher among Black patients (OR 3.82, 95% CI 1.77–8.26, $p = 0.001$), patients with Medi-Cal insurance (OR 2.26, 95% CI 1.20–4.86, $p = 0.01$), patients undergoing sigmoidoscopy (OR 3.06, 95% CI 1.03–9.13, $p = 0.05$), and for diagnostic indications (OR 2.21, 95% CI 1.02–4.80, $p = 0.04$). Patients with older age (≥ 65) had lower odds of cancellation due to COVID-19 testing logistics (OR 0.37, 95% CI 0.17–0.80, $p = 0.01$), but higher odds of COVID-19 fear related cancellation (OR 1.81, 95% CI 1.01–3.24, $p = 0.05$). The univariate analyses showed similar associations for each of these factors.

Table 2 Factors associated with cancellation related to COVID-19

Factors	Univariable		Multivariable*	
	Odds ratio (95% CI)	*p* value	Odds ratio (95% CI)	*p* value
Age ≥ 65	0.85 (0.60–1.22)	0.39	0.99 (0.61–1.61)	0.97
Female	0.80 (0.58–1.12)	0.20	0.78 (0.55–1.11)	0.17
Race				
White	1.0	–	1.0	–
Black	1.77 (0.97–3.25)	0.06	***2.04 (1.07–3.88)***	***0.03***
Asian	1.18 (0.73–1.90)	0.49	1.20 (0.73–1.98)	0.48
Latino	0.56 (0.27–1.16)	0.12	0.59 (0.28–1.24)	0.16
Other	1.12 (0.60–2.07)	0.73	1.04 (0.55–1.98)	0.89
Insurance				
Private	1.0	–	1.0	–
Medicare	0.83 (0.57–1.21)	0.34	0.89 (0.54–1.46)	0.64
Medi-Cal	0.99 (0.63–1.56)	0.97	1.17 (0.72–1.90)	0.52
Local county residence	1.25 (0.90–1.75)	0.19	0.94 (0.65–1.36)	0.76
Procedure				
Colonoscopy	1.0	–	1.0	–
EGD	***0.50 (0.31–0.82)***	***0.006***	***0.56 (0.31–0.99)***	***0.05***
EGD/colonoscopy	1.31 (0.82–2.09)	0.26	1.61 (0.96–2.72)	0.07
Sigmoidoscopy	1.02 (0.40–2.62)	0.97	1.28 (0.48–3.45)	0.62
Advanced endoscopy	***0.27 (0.12–0.60)***	***0.002***	***0.30 (0.12–0.72)***	***< 0.001***
Indication				
Screening	1.0	–	1.0	–
CRC high risk	1.10 (0.40–2.99)	0.86	1.16 (0.41–3.24)	0.78
CRC low risk	1.03 (0.60–1.78)	0.91	0.97 (0.55–1.74)	0.93
Diagnostic	***0.64 (0.43–0.96)***	***0.03***	0.80 (0.39–1.03)	0.36

The bold italics indicate variables with significant *p*-values

*All covariates that were associated with the outcome with a *p* value < 0.10 in univariable analysis were evaluated for inclusion in the multivariate model. Multivariate models were adjusted for age, gender, local county residence, and procedure indication

Table 3 Factors associated with cancellation related to COVID-19 testing logistics

Factors	Univariable		Multivariable*	
	Odds ratio (95% CI)	*p* value	Odds ratio (95% CI)	*p* value
Age ≥ 65	***0.37 (0.20–0.69)***	***0.002***	***0.37 (0.17–0.80)***	***0.01***
Female	0.84 (0.52–1.35)	0.47	0.70 (0.42–1.18)	0.18
Race				
White	1.0	–	1.0	–
Black	***3.82 (1.88–7.73)***	***< 0.001***	***3.82 (1.77–8.26)***	***0.001***
Asian	1.36 (0.68–2.73)	0.38	1.54 (0.54–3.57)	0.25
Latino	1.24 (0.50–3.11)	0.64	0.99 (0.37–2.65)	0.99
Other	1.21 (0.49–3.04)	0.67	1.07 (0.41–2.79)	0.89
Insurance				
Private	1.0	–	1.0	–
Medicare	0.82 (0.45–1.48)	0.51	1.37 (0.66–2.88)	0.40
Medi-Cal	***2.25 (1.27–4.01)***	***0.006***	***2.26 (1.20–4.26)***	***0.01***
Local county residence	1.37 (0.84–2.22)	0.21	1.02 (0.59–1.73)	0.95
Procedure				
Colonoscopy	1.0	–	1.0	–
EGD	0.93 (0.48–1.79)	0.82	0.68 (0.32–1.46)	0.33
EGD/colonoscopy	1.47 (0.77–2.77)	0.24	1.23 (0.59–2.53)	0.58
Sigmoidoscopy	***3.27 (1.19–8.96)***	***0.02***	***3.06 (1.03–9.13)***	***0.05***
Indication				
Screening	1.0	–	1.0	–
CRC high risk	0.73 (0.09–5.99)	0.77	0.71 (0.07–6.79)	0.77
CRC low risk	1.95 (0.82–4.64)	0.13	1.91 (0.76–4.82)	0.17
Diagnostic	1.86 (0.94–3.67)	0.07	***2.21 (1.02–4.80)***	***0.04***

The bold italics indicate variables with significant *p*-values

*All covariates that were associated with the outcome with a *p*-value < 0.10 in univariable analysis were evaluated for inclusion in the multivariate model. Multivariate models were adjusted for age, gender, local county residence, and procedure indication

Discussion

COVID-19 impacted medical care throughout the world. While there was initial widespread cancellation of elective and semi-urgent endoscopic procedures, the reason for cancellations after procedures were offered has not been well-defined. In this study, we aimed to determine the prevalence of patient cancellations of scheduled outpatient endoscopies due to COVID-19, categorize the COVID-19 specific reasons, and identify patient characteristics associated with cancellation due to the pandemic. We found that Black race was associated with an increased risk of COVID-19 related cancellation, and Black patients and patients with Medi-Cal insurance cancelled more frequently due to logistical issues surrounding COVID-19 testing.

The reasons for the disparity identified in endoscopy cancellations among Black patients during the COVID-19 pandemic are likely multifactorial. Our study was not designed to understand why a certain community experienced fear or logistic related issues with respect to having colonoscopy performed. A majority of COVID-19 related cancellations (57%) were fear related which may have been amplified in the Black community when compared to other populations, particularly given the disproportionate impact the pandemic has had on this community [13–15]. We speculate that mistrust in the healthcare system by the Black community may also play a role with a well-documented history that is often traced most infamously to the U.S. Public Health Service Syphilis Study at Tuskegee [16]. More contemporary health experiences may factor in as suggested by a 2020 survey that found 45% of Black respondents reported at least 1 negative experience with a health care professional [17]. Importantly, early data from the COVID-19 pandemic showed disproportionately higher hospitalization rates among Black patients; however, Black participation in early vaccine clinical trials and vaccination rates among this population is low [18–20]. Safety concerns and widespread misinformation about COVID-19 may have further heightened fear surrounding the disease and the safety of medical care in this population.

In addition to mistrust of the healthcare system, racial and ethnic minorities face challenges regarding access to care in

the US. All patients in our study required PCR-based SARS-CoV-2 testing within 96 h prior to endoscopy. COVID-19 testing related logistics, including availability of, access to, and appropriate timing of testing, accounted for 36% of cancellations. Notably, our findings suggest Black patients and patients with Medi-Cal may be at increased risk of cancellation related to COVID-19 testing logistics. While insurance coverage is an important component of access to healthcare, various personal, structural, and health care system barriers exist that affect this population. Personal barriers consisting of work and family obligations, lower education and income, fear and anxiety of colonoscopy, and colorectal cancer knowledge deficits have been identified as obstacles for access to colonoscopy [21–23]. Structural barriers include costs, lack of health insurance, lack of transportation, and inadequate access to colonoscopies [23–25]. In addition, health care system barriers, such as difficulty or delays with scheduling appointments and inadequate access to colonoscopies, impact equitable access to care for the Black population [24, 26]. When these components meet with an unprecedented global health event such as the COVID-19 pandemic, they may work together to impact a patient's ability to obtain required COVID-19 testing in the appropriate timeframe prior to endoscopy, and to follow through with obtaining the procedure. Cancellations due to COVID-19 testing related logistics reflect a new presentation of existing barriers to equitable care. Further studies are needed to identify contributing factors and mitigate these disparities.

Patients older than 65 years had higher odds of COVID-19 fear related cancellations, which may be related to their increased risk of severe disease when exposed. Early evidence demonstrated that elderly patients were particularly susceptible to adverse clinical outcomes during the COVID-19 pandemic [27]. By contrast, patients undergoing EGDs and advanced endoscopic procedures had lower odds of cancellation due to COVID-19 overall. This may reflect disease acuity and clinical symptoms requiring more urgent intervention. A similar finding by Annadurai et al. demonstrated a higher proportion of outpatient EGDs and EUS (alone or with ERCP) were performed for bleeding and malignancy indications and had greater diagnostic yield during the pandemic period [6]. On the other hand, patients undergoing sigmoidoscopies and procedures for diagnostic indications were more likely to cancel due to logistical issues with COVID-19 testing. These findings may be related to scheduling of procedures with short notice in which COVID-19 testing is unable to be completed within the required timeframe. Notably, sigmoidoscopies are not performed for colon cancer screening at our institution and are typically performed for diagnostic indications such as evaluation for IBD flare or rectal bleeding.

We acknowledge several limitations to our study. We do not have comparison data for endoscopy cancellation from prior years; however, the majority (59%) of endoscopy cancellations in our dataset were not related to COVID-19 which is likely not significantly different from prior years. Moreover, the outcome of interest is COVID-19 related cancellations, and as this is an unprecedented time in recent years, there is no baseline data. While this study included a large, diverse cohort of patients at a single tertiary care academic medical center, the results need to be confirmed in other practice locations. There was a high last minute no-show rate as well during this time period, and reasons for no-show were not always documented or collected, therefore a large swath of patients was not captured. Furthermore, no information was collected for patients who were referred but declined to initially schedule endoscopy procedures, again eliminating a large group of patients that might alter reasons patients did not undergo endoscopy during the COVID-19 era. Information about reasons for endoscopy cancellation was collected primarily through chart review and determined based on patient call logs and messaging. It is possible that this method failed to capture other reasons for COVID-19 related or non-COVID-19 related cancellation that may have impacted a patient's decision.

COVID-19 detrimentally impacted endoscopy scheduling since its outbreak in the US in early 2020. Our study suggests an increased risk of overall COVID-19 related cancellation among Black patients, with Black patients and patients with Medi-Cal cancelling more frequently due to COVID-19 testing logistics. Racial and socioeconomic disparities in access to endoscopy may be further amplified by the COVID-19 pandemic and warrant further study to identify contributing causes. This knowledge can be used to target hospital resources towards aiding these vulnerable patient populations in obtaining the necessary care they need and ensure that inclusive and equitable care is being delivered.

Author's contribution Wang, Mclean, Cheng, and Kim contributed to acquisition of data. All authors contributed to study concept and design, interpretation of data, and drafting and revision of the manuscript for important intellectual content. All authors approved the final version of the manuscript.

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Declarations

Conflict of interest The authors of this manuscript have no conflicts of interest to disclose.

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