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The impact of COVID-19 pandemic on diagnosis and management of gastrointestinal cancers

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Abstract

Gastrointestinal (GI) cancer is one of the leading causes of death that affect many patients around the world. The coronavirus disease 2019 (COVID-19) pandemic significantly impacted our healthcare system in large that diagnosis and management of GI cancer have suffered with a reduction in cancer screening. This review will describe the current practices of cancer screening during COVID-19 pandemic and summarize how each GI cancer (esophageal, gastric, colorectal, and hepatocellular cancers) has been affected by COVID-19. World widely there has been a decreasing trend in screening, diagnosis, and management of GI cancers during the COVID-19 pandemic. Many healthcare institutions are now observing the effect of this change and implementing practice variations to adapt to the pandemic.

Keywords

COVID-19 pandemic, gastrointestinal cancer, gastric cancer, cancer screening, mortality, prognosis

Introduction

Worldwide, cancer is one of the leading causes of death, and screenings for cancer are widely recognized as effective methods for reducing cancer incidence and mortality. During the coronavirus disease 2019 (COVID-19) pandemic, many cancer screenings were canceled or postponed, leaving many patients without access to recommended healthcare services. The disruption of cancer screening services had a significant impact on patients and the healthcare system.

The COVID-19 pandemic has led to multiple changes in the diagnosis and management of gastrointestinal (GI) cancers. In 2018, approximately 26% of all cancer incidences were related to GI cancers [1]. There was however, a decrease in detection rates between 2020 and 2021 as patients were less likely to visit outpatient and inpatient facilities due to the fear of infection from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), as well as limited procedures such as endoscopy, surgical resection, and certain imaging modalities.

As the COVID-19 pandemic spread across the globe, hospitals and global healthcare centers had to reallocate their resources to effectively combat the increasing number of emergent cases. As a result, oncologists were confronted with significant challenges when providing continuous cancer care to immunocompromised patients while minimizing their risks of exposure [2, 3].

Cancer screening in the COVID-19 era

Globally, the COVID-19 pandemic greatly affected the use of healthcare services, including cancer screening programs, and this approach was adopted by all countries without exception. Based on a survey conducted in Italy in early 2020, 49 of 105 gastroenterology departments had stopped providing endoscopic screenings for colorectal cancer [4]. It was expected that decreased cancer incidence would follow this practice, as demonstrated by a Korean National Cancer Screening Program study of the early COVID-19 era, which showed decreased screening of 4 cancer types in 2020 compared to 2019. These were colorectal cancer [14.8% or 365 cases *vs.* 19.1% or 463 cases, confidence interval (CI) 0.73–0.82], gastric cancer (27.2% or 967 cases *vs.* 32.7% or 1,157 cases, CI 0.79–0.87), breast cancer (23% or 414 cases *vs.* 26.3% or 472 cases, CI 0.82–0.93), and cervical cancer (20.4% or 559 cases *vs.* 22.2% or 611 cases, CI 0.87–0.97) [5].

Despite the fact that it may be argued that these practices are justified due to the circumstances, they are alarming in nature. The colonoscopy is currently delayed by more than 6 months following a positive fecal immunochemical test (FIT), increasing the risk of colorectal cancer and advanced-stage disease over time [6]. As the world adapts to the COVID era, it will be increasingly important for policy makers, governments, and healthcare systems to insist upon active strategies to guide cancer screenings. At this time, it is critical to review the impact on specific cancers, and this review will attempt to identify how the COVID-19 pandemic affected GI cancers in particular [7].

Esophageal cancer

Esophageal cancer is the eighth most commonly diagnosed cancer and the sixth most common cause of cancer death in the world [8]. Survival remains low, in the range of 10–30% at 5 years post diagnosis in most countries [9]. Morgan et al. [10] in a recent study provided an overview of the burden of esophageal cancer in 185 countries in 2020 and projections for the year 2040. Reported that an estimate of 604,100 people diagnosed with esophageal cancer in 2020, 85% of the cases were squamous cell carcinomas and 14% were adenocarcinomas, with incidence and mortality rates 2–3 times higher in male than female population. Additionally, the projected number of cases is expected to increase to 957,000 by 2040, with deaths rising to 880,000 in the same year due to population growth and aging.

The COVID-19 pandemic has dramatically impacted GI services worldwide. As coronavirus infection rates rose, many professional bodies advised that all endoscopy, except emergency and essential procedures, be stopped immediately. Upper GI endoscopy was considered a high-risk procedure due to a greater potential for aerosolization and transmission of the SARS-CoV-2 virus [11]. As a result, there was a decline in endoscopic activity which led to a reduction in screening, diagnosis and treatment in esophageal cancers.

A study done in Germany found that the number of cancer case presentations (at tumor board in a high-volume tertiary referral center) decreased by 3.2% during the COVID year 2020 compared with the pre-COVID year 2019. During the first shutdown, March to May 2020, the total number of presentations was 9.4% less than that during March to May 2019. Along with the reduction in presentation, the number of patients with curable esophageal cancer had significantly decreased by 37% [12]. A study in 2020

conducted an international survey amongst cardiothoracic surgeons to investigate the changes observed in esophageal and gastric cancer management and surgery before and during the COVID-19 pandemic. The main findings include wide option of definitive chemoradiotherapies for esophageal adenocarcinoma and squamous cell carcinoma, uncertainty and heterogeneity surrounding prioritization of patients undergoing cancer resections; and high rate (44.6%) of workforce symptomatic from COVID-19 is likely to impact delivery of cancer services during a pandemic. Clearly, there are management challenges and several practice variations such as routine COVID-19 testing for patients, personal protective equipment, and postoperative disposition in caring for patients with esophagogastric cancers during the pandemic [13].

A study in Northern Ireland between March and September 2020 demonstrated that during the first 6 months of the COVID-19 pandemic, the diagnosis of esophageal cancer declined by 26.6%, and diagnosis of Barret's esophagus declined by 59.3% when compared with the equivalent time frame in 2017 to 2019. This decline could be explained by factors such as the suspension of endoscopy services and disruption to clinical activity, demonstrating the impact of COVID 19, with marked fall in pathologic diagnosis of esophageal cancer in the initial stages of the pandemic [11].

In conclusion, a comprehensive management of esophageal cancer should emphasize carefully-designed therapeutic strategies that may be tailored to the patient, taking under consideration the aggressive nature of the malignancy, as well as the evolving limitations and concerns of the healthcare infrastructure in the setting of the pandemic. It is imperative that endoscopic services are protected during subsequent waves of the pandemic to preserve the ability to rapidly detect and diagnose esophageal cancer and premalignant conditions.

Gastric cancer

Worldwide, gastric cancer is the fifth leading cause of cancer mortality and the third leading cause of cancer-related death [14]. Most cases of gastric cancer occur in people 60 years of age or older, with males experiencing twice the incidence as females [14]. Family history, *Helicobacter pylori* infection, low socioeconomic status, smoking, high salt intake, and a low-fruit and vegetable diet are also risk factors [15, 16]. By using markers of atrophy in the stomach, serum pepsinogens, serum ghrelin, or serum antibodies to *Helicobacter pylori*, and by examining the stomach mucosa with barium photofluorography or endoscopy, it is possible to screen gastric cancer, but it is usually detected at a later stage [15].

As mentioned previously, during the COVID-19 pandemic, stomach cancer diagnoses and screenings were delayed, limiting early intervention and treatment options. Tokunaga et al. [17] assessed COVID-19's impact on gastric cancer treatment in 62 Japanese hospitals, and they found that Tokyo, which had the highest number of COVID-19 patients, had a 50% reduction in gastrectomies in 2020 compared to the previous year, as well as a reduction in the number of new gastric cancer diagnoses. In a similar analysis, Korean data revealed a 62.1% drop in gastric cancer screenings between March 2020 and March 2019 [18]. In contrast, a study from Brazil found no significant differences in surgical outcomes among patients with gastric cancer during the first year of the pandemic compared with the previous five years, but surgical treatments decreased [19].

According to a systematic review that examined 22 articles, gastric cancer screenings, including endoscopies, have decreased overall, and treatment has sometimes been delayed [20, 21]. Oral therapy has been more common than intravenous therapy among most patients, and 89.2% of patients have begun seeking complementary treatments as a result [22]. Additionally, patients have raised concerns about the vulnerability of COVID-19, lack of social support, and transportation problems [20].

Colorectal cancer

Colorectal cancer has decreased in incidence and mortality as a result of early screening and interventions, but it remains the third most common cancer diagnosed in both men and women, with most cases occurring in the proximal colon [23]. Environmental factors, genetics, diet, and age can all play a role in the pathogenesis. The American Cancer Society recommends colonoscopies for adults with average risk, starting at age 45 and repeating every 10 years in the absence of relevant findings [23].

Screening for colorectal cancer as well as diagnostic testing leading to this diagnosis, was affected worldwide by COVID-19, resulting in significant delays in patient care, diagnosis, and prognosis [24–26]. A study by D'Ovidio et al. [26] evaluated the effectiveness of colorectal cancer screening during the COVID-19 pandemic, comparing lockdown data in 2020 with the same period in 2019. During lockdown, the number of selective colonoscopies decreased, but the rate of high-risk adenomas and cancer detection rates increased significantly, while low-risk adenomas were found less frequently. However, there could be an explanation for this by the lockdown group having increased frequencies of high-risk factors, such as a positive FIT, rectal bleeding, and a change in bowel habits.

According to Lee et al. [27], public hospital screening was significantly lower than previous years during this pandemic, while private hospital screening in New York did not vary. Mentrasti et al. [28] report that this decline in colorectal cancer screenings continued throughout 2020, leading to a higher incidence of advanced cancer diagnosis.

Hepatobiliary cancers

Hepatobiliary cancers, including hepatocellular carcinoma (HCC), cholangiocarcinoma (CCA), and gallbladder carcinoma (GBC), are deadly cancers largely due to their asymptomatic nature at an early stage, aggressive development, as well as the lack of routine screening techniques for the general population [29, 30]. Further complicating cancer screenings and diagnosis was the COVID-19 pandemic's recommendation that professional societies delay routine cancer screenings and recommend stay-at-home orders to patients.

Primary liver malignancies are predominantly HCC, which accounts for 80–90% of all liver neoplasms and has an estimated 5-year survival rate of 18% [31]. Although there are many factors associated with HCC development, cirrhosis leads to the highest risk, and the disease is frequently associated with viral hepatitis and alcohol use. Nevertheless, nonalcoholic fatty liver disease related cirrhosis is rapidly overtaking these factors [32].

Even though early detection of HCC can improve survival and allow for potentially curative treatment, most cases are diagnosed at late stages [33]. However, this can be achieved through appropriate screening. Semi-annual surveillance is recommended for patients with cirrhosis, including patients with hepatitis B virus infections, hepatitis C virus infections with or without sustained virologic response, and nonalcoholic fatty liver disease using abdominal ultrasound, with or without alpha fetoprotein (AFP) [34]. Unfortunately, several reports, including the recent article by Kim et al. [35], indicate dramatic reductions in screening and diagnosis rates in all types of cancer during COVID-19 pandemic, specifically by 44% and 13%, respectively, in HCC.

The management and prognosis of HCC have been adversely affected by the COVID-19 pandemic. The negative related effect of markedly reduced screening programs, as well as restricted access to imaging exams, procedures and hepatology referral centers were the consequence of highly restricted resources. This poses a consequential question if the treatment-related morbidity and mortality in patients with cirrhosis and cancer have been affected as a result. Although more recently screening volumes increased following the implementation of safety protocols and the reopening of cancer screening services, previous declines may not have been overcome.

Pancreas cancer

Pancreas cancer is a major challenge to our system as the current guidelines do not propose a screening method for the general populations and it is rather reserved for high-risk individuals. COVID-19 and its impact on diagnosis of pancreatic cancer remain a question to our healthcare system. A recently published Japanese study based on cancer registry, reported that the total number of pancreatic cancer diagnosis has decreased from 3,249 to 3,186 cases from 2019 to 2020. This translates to a 1.9% in relative change. It is also interesting to see that a greater number of advanced clinical stage was seen in 2020 compared to that of 2019 (374 *vs.* 400 cases of stage III pancreatic cancer, relative change of 7.0%). The total number of

treatments also decreased during that time [36]. However, it has been shown that pancreatic cancer has been affected the least compared to the other GI cancers. It is worth noting that decline in diagnosis of pancreatic cancer due to COVID-19, however, it is unclear if the confounding variables exist as no consensus exists for screening methods for the general (average-risk) populations.

Conclusions

The COVID-19 pandemic has limited the resources to appropriately screen and manage GI cancer, and as a result the rate of diagnosing the cancers has significantly decreased. This is due to the abrupt shutdown of healthcare facilities and delay in screening and surveillance possibly due to scheduling and fear of COVID-19 infection. The delays in diagnosis in turn will result in increased number of future diagnosis as well as prognosis of the patients. It is imperative that the healthcare systems assess their current policy with cancer screening so that the diagnosis and management of GI are not delayed but also programmatically amended to recapture and accommodate a potential surge of delayed screening and/or surveillance.

Abbreviations

CI: confidence interval

COVID-19: coronavirus disease 2019

GI: gastrointestinal

HCC: hepatocellular carcinoma

Declarations

Author contributions

BSY: Conceptualization, Writing—original draft, Writing—review & editing. AP: Writing—original draft, Writing—review & editing. KVH: Writing—original draft, Writing—review & editing. AV: Writing—original draft, Writing—review & editing. ARVS: Writing—original draft, Writing—review & editing. SMD: Writing—original draft, Writing—review & editing. DAJ: Conceptualization, Writing—original draft, Writing—review & editing, Supervision. All authors read and approved the submitted version.

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Not applicable.

Consent to participate

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Consent to publication

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