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The Impact of the COVID-19 Pandemic on Barrett’s Esophagus and Esophago-gastric Cancer

**Short title:** COVID-19 impact on Barrett’s esophagus

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**Abbreviations:**
BE- Barrett’s esophagus
EAC - Esophageal adenocarcinoma
NIBR- Northern Ireland Barrett’s Registry
NICR- Northern Ireland Cancer Registry
BSG- British Society of Gastroenterology
SNOMED- Systemized Nomenclature of Medicine

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**Author Contributions**
RCT, AL and HGC conceived of the study. DD, VC and DTM collected data through the relevant Northern Ireland Cancer Registry and pathology systems. RT, AL and HCG wrote the manuscript. RT, AL, DD and HCG analyzed and interpreted the data. All authors approved the manuscript.
INTRODUCTION

The COVID-19 pandemic has dramatically impacted gastroenterology services worldwide. As coronavirus infection rates rose many professional bodies advised that all endoscopy, except emergency and essential procedures be stopped immediately.\(^1\),\(^2\) Upper gastrointestinal endoscopy was considered a high risk procedure due to a greater potential for aerosolisation and transmission of the SARS-CoV-2 virus.\(^2\) The resulting decline in endoscopic activity has been swift and profound. Markar et al demonstrated that by April 2020 activity was over 90% lower than the previous year in 68% of health trusts in England with an estimated 750 esophago-gastric (EG) cancers undiagnosed.\(^3\) In the US, 98.6% of centers postponed all elective endoscopies for a mean of 5.8 weeks with remaining uncertainty on how to address the backlog.\(^4\) The British Society for Gastroenterology (BSG) guidance on restarting endoscopy in the deceleration and early recovery phase of the pandemic continues to advise against surveillance endoscopy with capacity reserved for urgent procedures.\(^5\)

We aimed to describe the impact of the COVID-19 pandemic on the pathological diagnosis of Barrett’s esophagus (BE) and EG cancer within population-based databases in Northern Ireland.
METHODS

The Northern Ireland Cancer Registry (NICR) is a population-based register, covering approximately 1.9 million inhabitants and all four pathology laboratories in the region. Ethical approval for the NICR (including the waiving of requirement for individual patient consent) was granted by the Office for Research Ethics Committees of Northern Ireland (ORECNI reference 20/NI/0132).

Electronic pathology reports were received by the NICR and used to identify all unique patients diagnosed with histopathologically confirmed EG cancer (corresponding to International Classification of Disease version 10, (ICD-10) codes C15 and C16), or BE (corresponding to SNOMED location codes T56010 or T56000 in combination with morphology codes D530910 or M73320), between 1st March 2020 and 12th September 2020 (weeks 10-37). Data was compared with the three-year average number of histopathologically confirmed patients during the same time period between 2017 and 2019.
RESULTS

Between March and September 2020 the proportion of EG cancer diagnoses declined by 26.6%, compared with the equivalent timeframe in 2017-2019 (Figure 1A&C). There was evidence of recovery in the summer months with diagnoses in the first half of September returning to expected levels. In total, 53 fewer EG cancer cases than expected were diagnosed between March and September 2020.

The proportion of BE diagnoses declined by 59.3%, compared with the equivalent timeframe in 2017-2019 (Figure 1B&C). Notably, in April, only three unique patients had a BE diagnosis in Northern Ireland representing a 95.5% decline in diagnoses compared to previous years, with a maximal weekly decline of 96.1% (Supplementary Figure 1). There was limited evidence of recovery in the summer months with BE diagnoses remaining 20% below expected levels at the end of the study period. In total, 236 fewer BE cases than expected were diagnosed between March and September 2020.
DISCUSSION

We have demonstrated that during the first six months of the COVID-19 pandemic pathological diagnoses of BE fell by 59.3% compared to historical rates; with a 95.5% decline in April alone. The suspension of endoscopy services, disruption to clinical activity and decline in presentation of symptomatic patients also led to a 26.6% fall in EG cancer diagnoses.

Our study represents the first report to quantify the impact of the COVID-19 pandemic on pathological diagnoses of BE. The BSG advised that all endoscopy, except emergency and essential procedures, be stopped immediately, resulting in the suspension of BE surveillance.\(^1\) Whilst the American Gastroenterology professional societies guidelines commented that surveillance or treatment of pre-malignant conditions should not be delayed.\(^6\) Worldwide, these guidelines have led to variations in practice but other contributing factors may include local service pressures such as staffing levels and the availability of PPE. Further updated guidance released by the BSG during the deceleration and early recovery phase of the first wave of the pandemic recommended that surveillance of BE remain suspended.\(^5\) This is illustrated by our data which has quantified the slow recovery in BE diagnoses, with rates remaining below their historical baseline.

An important strength of our study is its population-based data from Northern Ireland. However, caution is required over the identification of unique patients and data stability due to reporting delays and the use of pathological BE diagnoses detected by SNOMED codes compared to the more accurate curation methods employed by the Northern Ireland Barrett’s esophagus register (NIBR). The NIBR is a population-based registry of all patients diagnosed with columnar-lined esophagus in Northern Ireland.
since 1993. The detailed data extraction undertaken by the NIBR was not feasible for the rapid reporting of BE cases. Comparison of the SNOMED coding used here with NIBR data for 2016-2018, indicates that SNOMED coding will detect approximately two thirds of BE cases (VC 2020, personal communication). Therefore, we are likely to be underestimating the absolute number of cases, however it is likely that the proportional decline in BE diagnoses remains the same.

Efforts to mitigate the effects of COVID-19 on endoscopy services are ongoing. Recommendations on best practice have been rapidly instituted worldwide to limit SARS-CoV-2 infections in patients and healthcare workers. The introduction of non-endoscopic strategies, such as the use of the Cytosponge device, have also been suggested to triage patients with mild-to-moderate dysphagia. Implementation of these procedures has been challenging and the preservation of endoscopic activity during subsequent waves of the pandemic will require ring-fenced resources to prevent further disruption to diagnostic services.

The disruption to BE surveillance may have long term clinical consequences. The risk of progression of non-dysplastic, short segment BE is low and so a six month or more delay may not be a major risk for this patient group. However, for other, higher risk patients the effect of the suspension of BE surveillance programs may be more substantial. Detailed follow up will be required for to assess for changes in dysplasia or cancer incidence in the BE surveillance population in the future.

In summary, we have shown the profound impact of COVID-19 on EG cancer and BE with a marked fall in pathological diagnoses in the initial stages of the pandemic. While the diagnosis of EG cancer shows some signs of recovery, BE detection and monitoring continues to lag behind expected rates. It is imperative that endoscopic
services are protected during subsequent waves of the pandemic to preserve the ability to rapidly detect and diagnose cancer and pre-malignant conditions.

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Legends to Figures and Tables

Figure 1: Frequency of Esophago-gastric cancer (A) and Barrett’s esophagus (B) diagnoses per month in 2020 compared to the monthly average for 2017-2019. (C) Percentage decline in Esophago-gastric cancer and Barrett’s esophagus diagnoses for the time period of March to September 2020. (* data only available until the week ending 12th September 2020).