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TITLE PAGE

Title: Comment: The Case for Limiting the Use of Diagnostic Upper and Lower Gastrointestinal Endoscopy. If Not Now, When?

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Abbreviations:

CRC	colorectal cancer
IBD	inflammatory bowel disease
IBS	irritable bowel syndrome
PPV	positive predictive value

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Luminal gastroenterology remains a fascinating and diverse specialty, attracting high numbers of applicants to fellowship posts. One potential reason for this is that it is a practical discipline, due to the introduction of fibreoptic endoscopy in the 1960s, wherein physicians see patients and can investigate their symptoms themselves. However, current evidence suggests many diagnostic endoscopies being done are of low yield, which represents an opportunity to enhance the value of care.[1] Low value care with respect to use of diagnostic endoscopy has led to long waiting lists for procedures, a large backlog of cases, exacerbated by the COVID-19 pandemic, and the proposal in recent years that, to clear this backlog and reduce waiting times, training of additional endoscopists is required. In addition, there is a huge carbon footprint from endoscopy. Endoscopy departments are the third highest generators of hazardous waste in the hospital, and the second highest generator of waste overall.[2] In the USA, it is estimated more than 85,000 metric tonnes of carbon dioxide are emitted per year due to endoscopy.[2] This means we are providing low value care, and to the detriment of the environment. Rather than continuing to perform ever increasing numbers of endoscopies, it is worth considering that, over the last 20 years, more judicious use of endoscopy has been implemented in two specific situations.

In the first of these, uninvestigated dyspepsia, there has been a move away from prompt upper endoscopy as a management strategy. This was because meta-analyses of randomised controlled trials demonstrated prompt endoscopy provided no symptomatic benefit over alternative management strategies, such as testing for, and treating, *Helicobacter pylori*.[3,4] In addition, yield of endoscopy for upper gastrointestinal malignancy in these trials was extremely low, and a prompt endoscopy strategy cost much more, because the main cost driver in the management of uninvestigated dyspepsia is endoscopy itself.[3,4] Prompt endoscopy is, therefore, not cost-effective for the management of uninvestigated dyspepsia

and guidelines no longer recommend it, unless alarm symptoms are present or the patient is from a region with a high risk of gastric cancer.[5]

The second is the diagnosis of patients with suspected irritable bowel syndrome (IBS). Historically, IBS was a diagnosis of exclusion, and many patients underwent colonoscopy to exclude colorectal cancer (CRC) or inflammatory bowel disease (IBD). However, the advent of symptom-based criteria, which are accurate for diagnosing IBS,[6] as well as the widespread use of faecal immunochemical testing for CRC detection and faecal calprotectin to facilitate IBD diagnosis, has made colonoscopy unnecessary for most patients presenting with typical symptoms of IBS. This is borne out by studies validating the application of the Rome criteria for IBS to patients with lower gastrointestinal symptoms.[6] In those with suspected IBS meeting Rome criteria the yield of colonoscopy is extremely low, even in patients with a possibly valid indication for performing the procedure.[6] National guidelines now recommend a positive diagnosis of IBS is made using symptom-based criteria, thus minimising use of colonoscopy.[7]

Recent analyses of the UK National Endoscopy Database suggest these are not the only areas where use of diagnostic endoscopy could be limited with few adverse consequences. In one study examining the yield of more than 380,000 diagnostic upper endoscopies in the UK, across a range of upper gastrointestinal symptoms, the overall positive predictive value (PPV) of endoscopy for upper gastrointestinal cancer was 1% across all patients for all indications.[8] This increased to 1.3% in those aged 50 years or over, 1.4% in those with weight loss in combination with another gastrointestinal symptom, and 3% in those with dysphagia. The PPV was less than 1% for all other upper gastrointestinal symptoms and was less than 1% in all patients aged under 50 years, irrespective of indication for endoscopy. Importantly, almost three-quarters of upper endoscopy in the UK were performed for symptoms with a less than 1% PPV for cancer. In a study from the same group

examining yield of more than 380,000 diagnostic lower endoscopies in the UK, across a range of lower gastrointestinal symptoms, findings were similar.[9] The PPV of lower endoscopy for colorectal cancer was 1.5% across all patients for all indications. This increased to 1.9% in those aged 50 years or over, 2.1% in those with anaemia, and 2.5% in those with rectal bleeding. Again, PPVs for all other lower gastrointestinal symptoms were less than 1%, yet these indications accounted for more than 50% of all lower endoscopies performed.

Endoscopy is associated with risks. In a UK study linking primary care, secondary care, and death registry data, the excess of acute medical contacts following a diagnostic upper endoscopy was assessed.[10] Up to 0.4% were followed by an emergency admission for a cardiovascular or respiratory problem. This represented a 0.1% excess of hospital admissions for a cardiovascular or respiratory problem compared with age- and gender-matched controls who had not undergone an upper endoscopy. Similarly, almost 4% of procedures were followed by a primary care contact for a cardiovascular or respiratory problem which, after adjustment, represented a 0.13% excess compared with controls. Together with the findings from the National Endoscopy Database, this suggests the magnitude of the risks of endoscopy begin to approach the diagnostic yield of the procedure for malignancy for certain groups of patients.

Overall, we must work towards a policy that promotes judicious use of endoscopy to reduce diagnostic delay and improve outcomes. Suggested approaches to minimise use of low value endoscopy in the initial diagnosis of specific organic gastrointestinal conditions are provided in the Web Appendix (page 1). In the case of some patients with refractory symptoms, it should be accepted that endoscopy may, ultimately, be required. However, this should not be undertaken simply to reassure, and indeed there is evidence that reassurance, where it occurs, may be short-lived.[11] The avoidance of a nuanced in-person discussion has

been made feasible by the ability to request an invasive procedure without the need for a consultation. Hence, part of reducing endoscopy burden involves the ability to explains symptoms to patients, rather than focusing solely on cancer exclusion via algorithmic pathways without any face-to-face interaction with the patient. As an example, if patients with dyspepsia are provide with an explanation as to why they do not need upper endoscopy to investigate symptoms in the absence of alarm features, procedures are avoided.[12]

We, therefore, believe it is time for national societies to limit the use of diagnostic endoscopy to only those indications for which there is a cancer risk above a certain pre-determined threshold, or where there is a high degree of clinical suspicion for other organic pathology, such as IBD. To do this, a list of agreed indications for diagnostic upper and lower endoscopy needs to be ratified and implemented, with our suggestions for cancer detection based on the findings from the National Endoscopy Database studies provided in Table 1. There would also need to be provision of relevant information to key stakeholders, including secondary care colleagues, general practitioners, and patients themselves, about the rationale for limiting the use of diagnostic endoscopy. This could obviate the need for 75% of upper endoscopies and more than 50% of lower endoscopies, conserving scarce resources for the health service, reducing waiting times, and ensuring the correct procedure is being done for the correct indication, and by the correct member of the healthcare team. It would also lessen the environmental impact of endoscopy drastically. If we do not reduce unnecessary and low value endoscopy now during the climate emergency, and with the post-pandemic and financial strains on healthcare systems, then when?

AUTHORS CONTRIBUTIONS

CJB and ACF conceived and drafted the article.

DECLARATION OF INTERESTS

CJB: none. ACF: none.

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Table 1. Suggested Appropriate Indications for Diagnostic Upper and Lower Endoscopy for Cancer Detection*.[8,9]

Diagnostic Upper Endoscopy	**Diagnostic Lower Endoscopy**
Dysphagia in any sex at any age	Rectal bleeding in any sex at any age
Weight loss with any other upper gastrointestinal symptom in any sex at any age	Anaemia in any sex at any age
Weight loss in men aged 50 years or more	Weight loss in women aged 70 years or more
Nausea or vomiting in men aged 50 years or more	Altered bowel habit in women aged 70 years or more
Anaemia in men aged 50 years or more	Diarrhoea in women aged 80 years or more
Dyspepsia in men aged 80 years or more	Abdominal pain in women aged 80 years or more
	Weight loss in men aged 50 years or more
	Altered bowel habit in men aged 50 years or more
	Diarrhoea in men aged 50 years or more
	Abdominal pain in men aged 70 years or more
	Constipation in men aged 80 years or more

*All these indications were associated with a ≥1% chance of detecting upper or lower gastrointestinal cancer at either upper or lower endoscopy.