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Stool-based DNA testing versus colon capsule endoscopy for colorectal cancer screening during the COVID-19 pandemic: a response to 'Colon capsule endoscopy: an innovative method for detecting colorectal pathology during the COVID-19 pandemic?'

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Dear Editor,

We applaud the ingenuity of MacLeod *et al.* [1] for their insight into the potential of colon capsule endoscopy (CCE) as an alternative modality for colon cancer screening and diagnosis. We have similarly been committed to approaching this dilemma in the context of scarce resources as well as risks inherent to the COVID-19 pandemic [2]. However, we did not include CCE in

our discussion and commend the authors for their ingenuity.

Noninvasive screening tests for colorectal cancer (CRC) are projected to be necessary for the appropriate triage of delayed screening colonoscopy procedures in the setting of the COVID-19 pandemic and are amplified in the setting of a resurgence in June 2020.

The current literature, including systematic reviews and meta-analyses, supports CCE as a potential non-invasive technique for CRC screening. A prospective clinical trial by Rex *et al.* [3] showed that, in a screening population at average risk, CCE identified patients with one or more conventional adenomas 6 mm or larger with 88% sensitivity and 82% specificity.

The findings from the Deep-C cross-sectional study compared multitarget stool DNA faecal immunological testing with colonoscopy as the reference standard [4]. According to Imperiale *et al.* [4], who used multitarget stool DNA tests, the sensitivity for detecting CRC was 92.3% and the specificity 86.6%, with the sensitivity for detecting advanced adenomas being 42.4% and for detection of polyps with high-grade dysplasia 69.2%.

There are significant limitations to CCE, including associated complications that may occur [5]. Prior abdominal surgery, suspected bowel obstruction, possibly from a colonic mass, or stricture lesions, especially associated with inflammatory bowel disease, would not allow CCE to be a viable option due to the risk of capsule retention, obstruction and possible bowel perforation [5].

Another limitation to CCE in the setting of the COVID-19 pandemic would be the need for experienced and trained physicians to provide accurate and timely results. Following from this is the cost: the average cost of CCE is estimated at \$950 or €700 [5] compared with the average cost of Cologuard™ at approximately \$600. Multitarget DNA stool tests are safer, more cost-effective, more readily accessible and easier for patients to use than CCE. These aspects of multitarget DNA stool tests make such tests more efficacious as an alternative screening modality for CRC in the setting of the COVID-19 pandemic.

Due to the cost, risk and other alternatives, CCE should not be considered as an alternative to screening colonoscopy during the current pandemic. We suggest that it is only considered as a surrogate for diagnostic colonoscopy, and only in the setting of a positive multitarget DNA stool test and capsule patency studies, if conventional colonoscopy is prohibitive.

This is a very interesting opportunity to potentially improve the algorithm for high-risk patients and screening for colon and rectal cancer. To summarize:

- 1 Colonoscopy is the gold standard when appropriate;
- 2 DNA-based molecular stool studies should be used when the risk/resources are prohibitive for colonoscopy;
- 3 Diagnostic CCE should be considered for patients who are positive on stool-based molecular screening and are unable to undergo conventional diagnostic colonoscopy.

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Gas aerosol jetstreams from trocars during laparoscopic surgery – a video vignette

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Dear Editor,

Minimally invasive surgical procedures have been restricted during the COVID-19 pandemic, in part to reduce inpatient occupancy and minimize pressure on critical care and anaesthesia but also because of concern about the potential for transmission of infection via aerosols created by laparoscopy [1,2]. Viral particles have now been identified in the blood, stool [3] and peritoneal fluid [4] of infected patients, although the infectious potential of any such particles that may be carried via surgical gases is unclear.

While the main focus of guidelines to date has been on careful management of surgical smoke [5], invisible gas leaks frequently occur around and through laparoscopic trocars. In the associated video (Video S1 in the online Supporting Information) we illustrate, in a simple and reproducible way, the release of intra-abdominal aerosol that occurs as a jet stream around trocar insertion sites and during trocar instrumentation. To do this, we set up a high-fidelity pneumoperitoneum model (a fresh porcine cadaver) in our dedicated in-hospital applied research and training facility. After standard trocar placement (12 mm camera port) using the Hassan technique, CO₂ was insufflated to achieve an intra-abdominal pressure of 12 mmHg. Two other trocars (5 and 12 mm) were also inserted under direct observation off midline in the usual fashion. Thereafter, a humidifier (Aerosurgical, Aerogen, Dangan, Galway, Ireland; 1–5 µm mist) was placed in series with the insufflation channel via the Hassan trocar to fill the abdomen with humidified CO₂, thus increasing the relative visibility of the intra-abdominal gas. With the room darkened, the laparoscope light was shone perpendicular to the trocars to identify through illumination any leakage of humidified gas around and via the trocars, including during instrument insertion and removal. Gas jets were seen (and could be videoed using standard videography) and, with respect to trocar instrumentation, heard by their characteristic sound (familiar to all surgeons performing minimally invasive