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Straight-to-test faecal tagging CT colonography for exclusion of colon cancer in symptomatic patients under the English 2-week-wait cancer investigation pathway: a service review

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AIM: To present the initial 12 months of data of a straight-to-test (STT) computed tomography colonography (CTC) protocol as the first-line investigation for change in bowel habit (CIBH) and iron deficiency anaemia (IDA) in patients over 60 referred directly from primary care.

MATERIALS AND METHODS: In 12 months, 1,792 STT CTC for IDA and CIBH were performed. No colonoscopies were performed as the primary investigation in this cohort. Data from this cohort were gathered prospectively.

RESULTS: The colorectal cancer (CRC) detection rate was 4.9% and polyp detection rate was 13.5%. The CRC rate increased related to age ($p=0.001$), the CRC detection rate was 2.6% in patients aged 60–69 years, compared to 4.9%, 7.4%, and 11.4% in the 70–79, 80–89, and >90 years age groups. The CRC rate was higher in patients with IDA compared to CIBH (6.8% versus 3.9%, $p=0.017$). There were significantly more left-sided cancers ($p=0.0165$). Non-colonic cancers were found in 4.3% of patients and 6.8% had incidental findings that required further investigation and 11.9% had a new, potentially significant, incidental finding.

CONCLUSION: These results are comparable to colonoscopy in terms of diagnostic accuracy and similar to those of CTC in published multicentre trials. This exciting model of care within radiology enables earlier testing, reduces waiting times, with fewer outpatient appointments, and results in good clinician and patient satisfaction.

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Introduction

There are approximately 40,000 new cases of colorectal cancer (CRC) per annum in England.¹ The stage of disease at

diagnosis has a major impact on 5-year survival rates.² Survival at 5 years from diagnosis is 93.2% in patients diagnosed with Dukes A CRC compared to only 6.6% in those with advanced metastatic disease at presentation. Unfortunately, only around 13% of patients are diagnosed with an early cancer.³ With this in mind, the National Institute for Health and Care Excellence (NICE) produced guidelines for the diagnosis and management of CRC. This guideline, along with the well-established National Health Service (NHS) 2-

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week wait pathway set by the Government in 2000, aim for early diagnosis and treatment to maximise the impact on disease prognosis and improve survival.^{1,2,4} These guidelines incorporate both screening for occult CRC in non-symptomatic patients and diagnosis of CRC in symptomatic patients.

In the symptomatic population, colon cancer usually presents with a myriad of symptoms, the majority of patients are found to have change in bowel habit (CIBH) and/or iron deficient anaemia (IDA). This cohort of symptomatic patients (CIBH and/or IDA) in primary care is referred for secondary care assessment or straight-to-test (STT) colonoscopy via the 2-week wait pathway; however, endoscopy service demand is said to have doubled since 2012^{5,6} and a recent document published in 2015 — “Scoping the Future” — illustrates a “just about coping” picture of the endoscopy units in England, with an estimated further increase in demand of 6.5% per annum projected over the next 5 years.⁷ Although the projected growth in the endoscopy activity is thought to be multifactorial, the single largest contributor to this was the rollout of the bowel cancer screening programme.⁷

These issues related to endoscopy were apparent locally, and along with healthcare leaders in primary and secondary care, the radiology department in our institution (University Hospitals of Leicester) developed a radiology-based investigation pathway for the detection of CRC in symptomatic patients (Fig 1). This pathway involves all primary care patients >60 years of age with CIBH and/or IDA with a World Health Organisation Performance Status of 2 or better being referred for STT intravenous contrast-enhanced computed tomography colonography (CTC) for the exclusion of colon cancer. Many centres employ STT clinical pathways for CTC; however, this as far as the authors are aware is the first pathway in the NHS where STT CTC replaces colonoscopy as the investigation of choice in the symptomatic population with CIBH and/or IDA. The present study describes the initial 12 months of data from this exciting new radiology service innovation.

Materials and methods

The service went live in November 2015 and was fully operational by January 2016, with an approved business case making resource available for 1,800 STT primary care CTC examinations per year. The pathway is coordinated by specifically trained cancer centre and cancer imaging trackers within radiology and overseen by the medical lead for imaging and a dedicated service manager. Requests are processed within a short time frame, with scan justification done under protocol by dedicated booking staff to enable patients to receive a timely appointment within 10 days. With regards to performing the CTC, pre-procedure preparation involves ingestion of a non-laxative regime using diatrizoate to tag the faeces, 100 ml diatrizoate (Gastrograffin, Bayer PLC, Reading, UK) is taken the day before the scan in two aliquots of 50 ml at 12.00 and 18.00 hours, combined with a clear liquid diet. This method of preparation has been used within our institution (Leicester General

Hospital) for many years and bowel preparation adequacy is routinely assessed within the ongoing local CTC quality-assurance programme. All scans are performed in two body positions as per accepted standards by dedicated trained radiographers, who operate, manage, and conduct the service on a day-to-day basis. All patients were scanned on a Toshiba Aquilion 128 CXL scanner, with the following imaging parameters: 120 kV and modulated tube current, with the second series performed on a low-dose protocol. Patients are given hyoscine butylbromide to reduce bowel spasm, insufflation is automated and the supine scan is performed with intravenous contrast enhancement using 100 ml iopamidol (Niopam 340, Bracco, High Wycombe, UK) contrast injected at a rate of 3 ml/s with a 65 second delay to scanning. At the point of referral, all patients have a serum urea and electrolyte sample taken in primary care to enable the radiographer to safely assess patients' risk of contrast-induced nephropathy, contrast medium is withheld if the glomerular filtration rate is <40 ml/min/1.73 m² as per departmental protocol. Radiographers also complete a pre-scan questionnaire in relation to whether it is deemed safe to give hyoscine butylbromide; this is withheld if there are any high-risk comorbidities. The radiographers perform an initial on-table review, with cases thought to be positive for CRC or other significant pathology highlighted to the duty CTC radiologist for confirmation. These patients then undergo a CT thorax for completion staging at the same attendance. All examinations are reported by consultant radiologists who have had formal, accredited CTC training with the aim to report all scans based on an accepted template report (Electronic [Supplementary Material](#)). Preference for two-dimensional (2D), three-dimensional (3D), and fly-through CTC reading varies between reporters. There is in-built governance and quality assurance with the aim of 10% of cases to be double reported, this includes cases deemed equivocal by the primary reporter. There are nine CTC reporters who report between 8–16 CTC examinations per week. Reports are explicit as to whether any further investigations or referrals are required, with a dedicated team to act on these results and facilitate further investigations as required, additional imaging investigations are arranged at the time of reporting the CTC by the radiologist if and when they are required. Patients with no findings are discharged back to primary care.

Data in relation to patients referred to the new 2-week-wait STT CTC service were collated on a prospectively maintained database after approval from the institution's audit committee lead. This included patient demographics, referral criteria, patient pathway, and timeline data, CTC dose-length product (DLP), CTC findings, along with findings of subsequent investigations. The data from all patients referred during the first fully operational year from 1 January 2016 to 31 December 2016 are presented.

Results

In the first fully operational 12 months, there were 2,072 requests for 2-week-wait STT CTC from primary care for

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