

Introduction:

Colorectal cancer (CRC) is the 3rd most common cause of cancer death. Colonoscopy is the 'gold standard' for CRC screening and early diagnosis but still sometimes misses lesions. Our aim was to identify potential factors that might influence CRC miss rates on colonoscopy.

Methods:

Data on all new CRC diagnoses during a 3-year period (1st September 2014 - 31st August 2017) were collected retrospectively from the electronic records of a UK teaching hospital. A CRC miss was defined as a case where CRC was missed on 'initial' colonoscopy and identified within 3 years upon subsequent 'diagnostic' colonoscopy. We analysed demographic data, and features of the 'initial' and 'diagnostic' colonoscopies.

Results:

691 new CRC cases were identified during the 3-yr period. 12 of these were CRC misses (1.74%). Missed CRC cases had an average age of 65.25 yrs (29-80) and M:F ratio of 1:3. Previous history of CRC was seen in 1/3 of cases (n=4). All 12 cases were adenocarcinomas with various histopathological and endoscopic features (Table 1). 'Initial' colonoscopy endoscopic findings and referral pathway did not affect CRC miss rate (Table 2). However, in 4/8 cases (50%) where a polyp was identified, its location was identical to the cancer later identified on 'diagnostic' colonoscopy.

Interestingly, adjusting for volume of colonoscopies performed by each endoscopist type, trainees and surgeons were 2.5 and 5 times respectively, more likely to miss CRC than physician endoscopists (Table 3). Finally, 4 out of 12 (33.33%) cases had the 'initial' colonoscopy that missed CRC on a Saturday morning. This translates to a 4-fold increased risk of missing CRC on a Saturday morning service list compared to any weekday morning (n=4) or afternoon (n=4) session.

Conclusions:

Despite a small missed CRC cohort, our results suggest that risk of missing CRC on colonoscopy might be higher in female patients and patients with previous history of CRC. The majority of cancers missed were moderately-to-poorly differentiated with low grade dysplasia and a degree of invasion. Furthermore, the miss rate might be linked to scope operator with trainee and surgical endoscopists perhaps more likely to miss CRC than physician endoscopists. It was common for 'initial' colonoscopy to identify a polyp which in ½ of cases was at the same anatomical site as the cancer identified later. The risk of colonoscopy missing CRC was higher on a Saturday service list than a normal working day session. Patient age, referral pathway, cancer anatomical location did not affect CRC miss rate. Overall, our findings suggest discrepancies that warrant further investigation in larger more cohorts with more statistical power in order to improve CRC screening.

Table 1. Diagnostic colonoscopy histopathological and endoscopic characteristics in missed CRC cohort

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|--|------------|
| Anatomical site in colorectum (% total) | |
| Sigmoid | 3 (25%) |
| Splenic flexure | 1 (8.33%) |
| Transverse | 3 (25%) |
| Hepatic flexure | 2 (16.67%) |
| Ascending | 2 (16.67%) |
| Caecum | 1 (8.33%) |
| | |
| Dysplasia (% total) | |

| | |
|---|-------------|
| Low grade | 11 (91.67%) |
| High grade | 1 (8.33%) |
| Differentiation status (% total) | |
| Good | 2 (16.67%) |
| Moderate | 4 (33.33%) |
| Poor | 6 (50%) |
| Invasion (% total) | |
| Nil | 4 (33.33%) |
| Local | 6 (50%) |
| Lymph node | 2 (16.67%) |

Table 2. 'Initial' colonoscopy characteristics in missed CRC cohort

| | |
|--------------------------------------|------------|
| Endoscopic findings (% total) | |
| Normal | 3 (25%) |
| Diverticular disease | 1 (8.33%) |
| Polyp(s) | 8 (66.67%) |
| Referral pathway (% total) | |
| 2-week wait | 4 (33.33%) |
| Routine | 4 (33.33%) |
| Bowel cancer screening | 4 (33.33%) |

Table 3. CRC misses by endoscopist type

| Scope operator | CRC misses (% total) | Endoscopist miss rate (misses/total colonoscopies) |
|-----------------------|-----------------------------|---|
| Trainee endoscopist | 3/12 (25%) | 0.004 (3/750) |
| Surgical Endoscopist | 2/12 (16.67%) | 0.008 (2/250) |
| Physician Endoscopist | 7/12 (58.33%) | 0.00159 (7/4400) |