

Quality improvement report

Quality improvement programme to achieve acceptable colonoscopy completion rates: prospective before and after study

Jennifer E Ball, Jane Osbourne, Sarah Jowett, Mike Pellen, Mark R Welfare

Abstract

Problem A large audit of colonoscopy in the United Kingdom showed that the unadjusted completion rate was 57% when stringent criteria for identifying the caecum were applied. The caecum should be reached 90% of the time. Little information is available on what units or operators need to do to improve to acceptable levels.

Design Quality improvement programme using two completed cycles of audit.

Setting Endoscopy department in a university linked general hospital in northeast England.

Key measures for improvement Colonoscopy completion rate.

Strategy for change Two audit cycles were completed between 1999 and 2002. Changes to practice were based on results of audit and took into account the opinions of relevant staff. Lack of time for each colonoscopy, poor bowel preparation, especially in frail patients, and a mismatch between number of colonoscopies done and completion rate for individual operators were responsible for failed colonoscopies. Appropriate changes were made.

Effects of change The initial crude colonoscopy completion rate was 60%, improving to 71% after the first round of audit and 88% after the second round, which approximates to the agreed audit standard of 90%. The final adjusted completion rate was 94%.

Lessons learnt Achievement of the national targets in a UK general hospital is possible by lengthening appointments, admitting frail patients for bowel preparation to one ward, and allocating colonoscopies to the most successful operators.

Background

Outline of problem

Colonoscopy is the optimal procedure for examining the colon.¹ Performance is operator dependent, and completion rates vary.² Completion to the caecum is confirmed through use of a combination of signs—indentation or transillumination in the right iliac fossa and view of the appendix, the triradiate fold, or the ileocaecal valve.³ A completion rate of 90% is considered acceptable and since the start of our programme has been accepted by the UK endoscopy community.⁴ Median colonoscopy completion rates

found in an audit in three regions in the United Kingdom were between 57% and 73%, depending on how completion is defined,⁵ although some institutions report adjusted completion rates of more than 90%.⁶ In the United States, crude completion rates of 95% have been reported in large series (such as one series of 3465 colonoscopies⁷), suggesting that a 90% completion rate is achievable in routine practice. The impact of incomplete colonoscopies on the success of a proposed national colorectal screening programme has been highlighted.^{5, 8} We were aware that our colonoscopy completion rate was low, and we wished to attain the suggested standard so that our patients would benefit by avoiding subsequent barium enema or missed lesions.

Outline of context

North Tyneside General Hospital provides secondary care services to approximately 210 000 people in northeast England. Colonoscopies were carried out in a dedicated endoscopy unit staffed by nurses with endoscopy training, led by a senior nurse with more than 10 years' experience. Most endoscopy lists consisted of two colonoscopies and six to eight gastroscopies, and assistance was usually by one trained endoscopy nurse and one healthcare assistant at the beginning of the audit. No lists were dedicated to colonoscopy alone. Doctors at all stages of training were doing colonoscopy, including consultants, academics (a professor, senior lecturers, and research fellows), specialist registrars in gastroenterology and surgery, clinical assistants, and staff grades. Nurses did not do colonoscopy but were training in sigmoidoscopy at the time. Bowel preparation consisted of a low residue diet for 48 hours, with clear fluids only for the last 24 hours, and two sachets of Fleet Phosphosoda (De Witt, Runcorn, Cheshire) to be taken 12 hours apart. Midazolam and pethidine were used for conscious sedation as needed.

Key outcome measure

We believed that a crude completion rate of 90% was an attainable target. We considered colonoscopies to be complete if the caecum or terminal ileum was intubated or the anastomosis after resection was reached. The endoscopist confirmed completion with common methods such as visualisation of the ileocaecal valve,

North Tyneside General Hospital, North Shields NE29 8NH

Jennifer E Ball
pre-registration house officer

Jane Osbourne
sister, endoscopy department

Sarah Jowett
specialist registrar

Mike Pellen

Mark R Welfare
senior lecturer

Correspondence to: M R Welfare
doctormarkw@aol.com

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triradiate fold, or appendiceal orifice or transillumination. We calculated crude rates as an indicator of the overall effectiveness of the service. For 2002 we also calculated an adjusted rate, excluding failure due to poor bowel preparation, stricture, or equipment failure, because this has been suggested as a better measure of the technical skills of endoscopists.⁹

Assessment of the problem

We used audit against the suggested minimum standards to identify reasons for incomplete colonoscopies and instituted appropriate changes to improve performance. We carried out two full cycles of audit with the following format. We did a detailed examination of each colonoscopy during a defined time period, examining reported reasons for incomplete examination. Results for individual colonoscopists were known only by themselves. We held departmental meetings to review the results, achieving consensus on methods of improving completion rates by using the results of the audit and considering the views of endoscopists and nursing staff. An agreed action plan was then put in place. We examined completion rates at the end of the cycle.

For the first cycle the baseline was all colonoscopies in 1998, when the crude completion rate was 60% (480/600) and no colonoscopist had a completion rate of greater than 90%. We reviewed in detail 124 colonoscopies from 8 April to 17 May 1999 to determine reasons for incomplete colonoscopy, an action plan was instituted in mid-1999, and we assessed the effectiveness of the change on all 1328 colonoscopies done in 2000. For the second cycle detailed analysis of all colonoscopies in 2000 served as the baseline, and an action plan was instituted in mid-2001. We assessed the effectiveness of the change on all 1166 colonoscopies done in 2002.

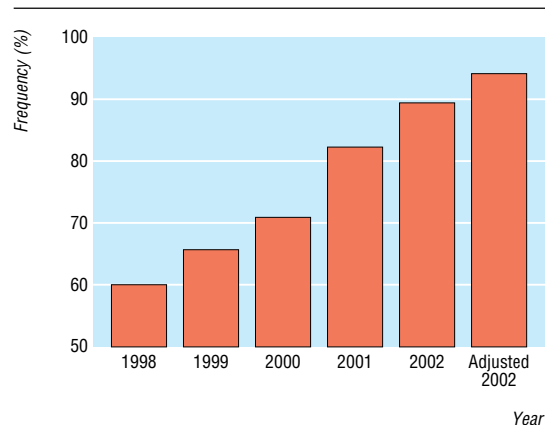
Strategy for change

Cycle one: 1999-2000

The most common reasons for incomplete colonoscopy in the sample of 124 from April-May 1999 were technical difficulties ($n = 23$), intolerance by the patient ($n = 18$), and poor bowel preparation ($n = 11$). At the departmental meeting, staff said that time pressures during endoscopy lists led to more patient discomfort, which in turn made the procedure more technically difficult. In addition, no advice was given to referring doctors to admit frail patients for bowel preparation, and admission was to several different wards with varying levels of experience in managing bowel preparation in frail patients. We increased appointment times from 20 minutes to 30 minutes (thereby reducing the number of patients on each list), and referring doctors were advised that frail patients (not specifically defined) should be admitted primarily to the gastrointestinal ward (subject to availability of beds) to receive their bowel preparation, irrespective of which consultant they were under. By the end of cycle one, the crude colonoscopy completion rate in 2000 had increased to 71.2% (978/1377).

Cycle two: 2000-2

Detailed analysis of the 1328 colonoscopies done in 2000 identified considerable interoperator variation in



Crude completion rate over a five year period and adjusted rate in 2002

completion rates (varying from 34% to 100%) and showed that colonoscopists who were achieving completion rates of more than 90% were all doing less than eight colonoscopies a month, whereas those doing the most colonoscopies (up to 21/month) had completion rates less than 83%. The most successful colonoscopists were therefore doing the least colonoscopies.

At the departmental meeting to decide on further action, we decided to concentrate the colonoscopies in the hands of the more successful colonoscopists. We did this chiefly by dividing the gastroscopy and colonoscopy workload differently, so that the more successful operators had primarily colonoscopies on their endoscopy lists, rather than having mixed lists. The technically easier procedures such as diagnostic gastroscopy were done by nurse endoscopists or other endoscopists with appropriate skill levels. The least successful operators either shifted to do only gastroscopy or gave up endoscopy sessions altogether. The endoscopists who continued to do colonoscopy also agreed to have further training to maintain skills. Three consultant colonoscopists have now attended the St Marks training course, and another has done a course on teaching colonoscopy. We also reinforced guidance that a consultant should be available in the endoscopy department when colonoscopy was done by any trainee, even those in their final year of training, as recommended in the Joint Advisory Group guidelines.⁴

Effects of change

The crude completion rate for the colonoscopies done in 2002 improved to 88.1% (984/1166). Thirty one (2.6%) were incomplete because of retained stool, and 24 (2.0%) were incomplete owing to impassable strictures or cancers. Excluding these cases from the analysis produced an adjusted completion rate of 93.8%.

The performance of all endoscopists improved over time. For example, one gastroenterologist (MRW) improved his crude completion rate from 79% to 95% between 1998 and 2002. This suggests that the quality improvement programme had a specific effect on both individual and departmental performance.

The figure summarises the changes in crude completion rates between 1999 and 2002 and gives the adjusted rate for 2002. The audit target of 90% crude completion rate has been approximately achieved. Between December 2000 and June 2002, prospective audit of complications revealed only two colonic perforations in 2077 procedures—a rate of 1 in 1000, which is lower than the rate of 1 in 769 seen in the national audit.³

Lessons learnt and next steps

We were able to improve our crude completion rate, through two complete audit cycles, from 60% in 1998 to 89% in 2002, with an adjusted rate of 94% and an acceptable complication rate. The main changes we made were to increase colonoscopy appointment times, improve bowel preparation in frail patients, and concentrate the colonoscopies in the hands of the most successful operators. The factors identified in our audit are likely to be common to some other endoscopy units, but additional factors would probably arise through local audit. Some of the improvement may have occurred just because of the process of observation and regular review and the operators' knowledge that their practice was being audited.¹⁰ The costs of this quality improvement programme, although not measured, were minimal and likely to be much less than the (potential) costs of failed colonoscopy.

We now need to go on to consider additional improvements to the quality of our colonoscopy service. Completion could be verified by nursing staff in attendance or by video. Other markers of service quality could include surveys of the patients' experience, including discomfort, or the frequency of complications and missed abnormalities. Discomfort and complications could potentially be driven up by excessive concentration on completion rate as the only quality indicator, because operators may continue to attempt to reach the caecum when patients are distressed.

It is vital that colonoscopy completion rates in the United Kingdom improve before a screening programme for colorectal cancer can be successfully implemented. Relatively simple steps that can be taken by units that are not performing well could lead to acceptable completion rates.

Key learning points

Audit can identify systematic and correctable reasons for poor completion rates

All operators may improve their performance, but lists should be reorganised so that the best operators are doing the most colonoscopies

Sufficient time must be allowed for successful colonoscopy

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Contributors: JEB carried out the third phase of the audit, collated data, and contributed to drafts of the paper. JO was responsible for decision making and implementing the action plan from audit cycles and contributed to drafts of the paper. MP carried out the second phase of the audit and contributed to drafts of the paper. SJ was involved in data gathering and analysis for phase one of the audit and contributed to drafts of the paper. MRW oversaw all phases of the audit, including data gathering and action plans, collated all information, and contributed to drafts of the paper. MRW is the guarantor.

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Kieran Walsh *editorial registrar, BMJ Learning*
(bmjlearning@bmjgroup.com)