Quality assurance and recommendations for quality assessment of screening colonoscopy in Belgium

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Abstract

As population-wide screening for colorectal cancer is adopted by many western countries for all individuals aged 50-75. The success of screening colonoscopy programs is highly dependent on the quality of the procedures. High-quality complete endoscopy with excellent patient preparation and adequate withdrawal time is necessary for effectively reducing colon cancer risk.

In Belgium formal quality assurance programs and principles of credentialing do not exist. The current reimbursement system for colonoscopy does not reward a careful performed examination but rapidly performed examinations at unnecessarily short intervals. There is a clear need for evidence-based quality measures to ensure the quality of screening colonoscopy.

In this guideline review we present an overview of the literature concerning criteria for best practice and important quality indicators for colonoscopy. A summary of the latest guidelines is given. Our goal of this update is to provide practical guidelines for endoscopists performing screening colonoscopy. We hope to provide a broad consensus and an increasing adherence to these recommendations. (Acta gastroenterol. belg., **2009**, 72, **17-25**).

Key-words : screening colonoscopy, quality assurance.

Introduction

As population-wide screening for colorectal cancer is being be adopted by many western countries for all individuals aged 50-75, quality assurance for colonoscopies is imperative. The goal of such screening programs is to reduce mortality by colorectal cancer via early detection and/or endoscopic removal of adenomatous polyps. The success of screening colonoscopy programs is therefore highly dependent on the quality of the procedures ; continuous quality assessment is essential to optimize their efficiency and reliability.

The performance quality of colonoscopy in clinical practice varies among examiners. Detection rates of adenomas are higher when examiners spend more time performing the examination (1). Available studies on tandem colonoscopy reported that the adenoma miss rate increased significantly with smaller size of polyps, varying from 2% for large adenomas > 10 mm to 13% for adenomas 5-10 mm in size and to 26% for the smallest adenomas 1-5 mm in size (2). Another study showed that 2-6% of the colon cancers was missed during routine colonoscopy (3). Furthermore, a significant variation in the prevalence of complications, especially perforation, has been reported, varying from 1/500 up to 1/4000 (4-5).

Methods to distinguish high-quality endoscopies performed by trained endoscopists from procedures performed by inadequately trained examiners are not available (6). Although adverse events are rare, there appears to be a great need for evidence-based quality measures to ensure the quality of screening colonoscopy and to avoid variations in performance.

The American Society for Gastrointestinal Endoscopy (ASGE) has proposed a set of quality assurance guidelines (6). We believe that every endoscopist should make efforts to adhere to these standards. The credentialing process should focus on quality and must be free from political or economic pressure. The goal of (re)credentialing is to assure continued clinical competence, to promote continuous quality improvement and to assure patient safety.

A high quality endoscopy guarantees that the patient undergoes a procedure that is medically justified, that the examination is performed according to current standards, that the correct and clinically relevant diagnoses are made or excluded, that the necessary treatment is instituted and that all this is happening with minimal risk. Every patient should receive optimal care.

Quality indicators for colonoscopy

1. *Preprocedure*

The preprocedure period includes all contacts between the patient and referring physicians, endoscopists, nurses and unit staff before the administration of sedation or insertion of the endoscope.

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A. Facilities

– Time interval between the decision to perform endoscopy and performance of the procedure. This interval should be reasonable and based on the indication. In the United Kingdom (UK), it is recommended to schedule patients with positive faecal occult blood tests within 2 weeks.
– A (waiting) room with appropriate bathroom facilities must be available.
– Endoscopy suites have to be equipped with appropriate monitoring. Baseline pulse oxymetry should be recorded before administration of any sedation. Pulse oximetry and supplemental oxygen should be routinely employed if required. All endoscopy patients must be sufficiently recovered from procedures and sedation prior to discharge.

B. Disinfection of used material

Endoscopes should be cleaned to a high level of disinfection, as outlined in established guidelines (ESGE/ESGNA Technical Note on Cleaning and Disinfection (7) and WGO-OMGE/OMED Practice Guideline Endoscope Disinfection (8) (reference article). Virtually all transmissions of infections have been the result of errors in the process of cleaning and disinfection. Therefore adherence to the guidelines is mandatory. Cleaning and disinfection should be performed in dedicated rooms by trained staff.

1. Preliminary cleaning consists of the mechanical and MANUAL cleaning of internal and external surfaces (brushing, flushing and rinsing of internal channels and external exposed surfaces with a detergent). For the cleaning of endoscopes detergents that effectively loosen organic and non-organic material must be used. Use of non-foaming enzymatic detergents is recommended.

2. Disinfection of endoscopes should be performed immediately after use. A liquid chemical germicide must be used. Various classes of disinfectants are available. It is recommended to use an automatic endoscope reprocessor that flushes high-level disinfectant throughout the endoscope and concludes by rinsing with sterile water and drying each endoscope with forced air. The drying process reduces the possibility of recontamination with waterborne microorganisms.

If the endoscope is manually disinfected, it should be completely immersed in high-level disinfectant/sterilant, and all channels must be perfused.

3. The endoscopes must be stored in a clean environment. They must be stored in a vertical position to facilitate drying

4. Sterilization is used for processing endoscope accessories.

5. Disposable accessories should not be used more than once. Endoscopic accessories that penetrate the mucosal barrier should be either disposable or cleaned ultrasonically and sterilized or autoclaved between each patient.

6. All healthcare personnel in an endoscopy unit should receive training in standard disinfection measures.

7. A qualified professional should do periodic preventive maintenance and testing of equipment, and a service log should be maintained for all equipment.

2. *Intraprocedure*

The intraprocedure period begins with the administration of sedation or insertion of the endoscope and lasts until removal of the endoscope.

A. Quality of preparation

There is no standardized system for reporting the quality of bowel preparation. The U.S. Multi-Society Task Force on Colorectal Cancer recommended that an adequate examination should allow to reliably detect polyps > 5 mm (9). Recommended intervals for screening and surveillance assume adequate preparation.

Although an adequate preparation is necessary for an accurate examination, there is no widely accepted definition of what an adequate preparation really implies. There is no consensus among gastroenterologists regarding the cleanliness of the colon, and there is no consensus concerning a bad preparation. In case of poor-quality preparation most gastroenterologists recommend a shorter interval until the next procedure rather than to repeat it shortly afterwards. This policy has not systematically been studied. Prospective studies and guidelines are necessary to standardize the quality of bowel preparation (10).

An adequate bowel preparation allows to reliably identify lesions larger than 5 mm. The quality of preparation has to be (photo-)documented.
If the bowel preparation is inadequate in > 10% of the examinations, special attention should be given to the method of patient instructions and the type of bowel preparation.

B. Proportion of complete colonoscopies (rate of cecal intubation)

A complete colonoscopy is a procedure in which the endoscopist is able to pass the tip of the colonoscope beyond the ileocaecal valve, allowing effective visualisation of the medial wall of the caecum lying proximal to the ileocaecal valve. In colonoscopy, the ability to reach and examine the caecum is an obligatory measure of competence. Caecal intubation rates increase with increasing experience (11). Endoscopists who perform less than 200 examinations per year have a lower caecal intubation rate than endoscopists who perform more procedures (11). Patients undergoing a colonoscopy in a screening program have a higher likelihood of having a complete colonoscopy. Adjusted rates for screening colonoscopy were obtained by excluding incomplete colonoscopy due to severe colitis or poor preparation (11). Caecal intubation rates above 90% are consistently

achieved by experienced colonoscopists, which is an overall appropriate target for caecal intubation. Intubation rates of > 95% should be achievable for screening examinations in experienced hands (12).

Caecal intubation can be verified with certainty by visualisation of the lips of the ileocaecal valve and the appendiceal orifice. Photographic documentation is necessary.

A minimum caecal intubation rate of more than 95% is proposed for screening colonoscopies. Incomplete examinations due to poor preparations are excluded. Photo documentation of caecal landmarks is necessary. This is also important from medical-legal perspective.

C. Adenoma detection rate

The adenoma detection rate in the practice of an endoscopist depends on the quality of the examination and the demography of the patient population.

Adenoma prevalence rates are largely function of age and gender and are independent of the indication for the endoscopy. Studies showed that 25-40% of the asymptomatic population above 50 years in the United States have adenomas (9). Male gender and older age are associated with a higher detection rate. The prevalence of advanced adenomas (> 1 cm, with high grade dysplasia or with villous elements) is 3 tot 10%. Specific targets are derived from results of screening colonoscopy studies. Following the U.S. Multi-Society Task Force colonoscopists should to be able to detect adenomas in minimum 25% of male and 15% of female patients and this irrespective of the indication (9).

An important variation exists among different examiners with regard to adenoma detection, with as much as a 10-fold difference in detection rates, from 110 adenomas per 100 colonoscopies to 10 adenomas per 100 colonoscopies (13). This variation even exists for large adenomas (> 10 mm) (13). Studies suggest a four- to tenfold variation in the numbers of adenomas detected per colonoscopy, and a two- to threefold variation between the most sensitive and least sensitive examiners in detection of large adenomas. If the colonoscopy withdrawal technique is not optimal, adenoma miss rate will increase (14).

Since the goal of screening colonoscopy is the detection and removal of neoplastic lesions, this casts a shadow over the efficiency of colonoscopy. Paradoxically, endoscopists with a lower detection rate who follow the guidelines will recommend a long interval, and those who detect more adenomas will ask more patients to return after a shorter interval, even though their patients' colons will be more effectively cleared of adenomas. As long as these variations are present, the guidelines for postpolypectomy surveillance will not protect the patient optimally (15).

The optimal technique for colonoscopy implies that sufficient time is spent to withdraw the scope and to inspect the colon. Most endoscopists examine the colon primarily during withdrawal. Therefore, this is the most important phase of the colonoscopy. Currently, a mean of 6-10 minutes is the recommended minimum. This withdrawal time is associated with higher adenoma detection rates. Higher detection rates are also associated with more careful examination of the proximal sides of folds and flexures, adequate colonic distention, and clearing fluid. Wide-angle colonoscopes appear to improve the efficiency but do not eliminate miss rates.

Documentation of the time of caecal intubation and scope withdrawal down to the rectum (with time documentation of the rectal retrovision or anal area) allows determination of the withdrawal time, at least for normal examinations. New techniques such as autofluorescence and chromoendoscopy are tested but until now have provided mixed results. Adenoma detection seems to be improved with chromoendoscopy, but it does not exceed the most accurate performers with white-light endoscopy.

In conclusion, the detection rate of adenomas is an important indicator of the quality of endoscopy (16). Lower detection rates can be an indication of a poorer quality of the examination. Higher detection rates are mostly associated with a longer withdrawal time.

Mean examination withdrawal times with white-light colonoscopy should average at least 6-10 minutes. Biopsies and polypectomies are not included in this time. Documentation of the total procedure time is required, with recording of the following time points : 1) time at which withdrawal from the caecum is started, and 2) time of end of procedure, when the endoscope is withdrawn completely or during rectal retrovision.

Adenoma detection rates in individuals undergoing first-time examinations should be > 25% in men and > 15% in women > 50 years old.

Major abnormalities must be photodocumented.
Resected polyps should be collected for pathological examination.

D. Endoscopic removal of colonic polyps

Most polyps diagnosed during colonoscopy can be completely removed using well-established polypectomy techniques (17). Surgical resection is only indicated when an experienced endoscopist is unable to completely and safely remove a large polyp, or when an invasive malignant polyp requires surgical intervention. Endoscopic resection should be considered when the macroscopic appearance of the polyp is not suspicious for malignancy. The polyp should be soft and mobile. Biopsies of polyps to establish the presence of malignancy are inadequate, only complete excision permits accurate histological diagnosis.

– Pedunculated polyps are removed by transection of the stalk with a polypectomy snare. After ensnaring, pure coagulation or endo-cut is applied. The major risk is postpolypectomy bleeding. This can to a certain extent

be prevented by injecting the stalk with dilute epinephrine and/or the use of ligating devices such as a hemoclip or a detachable snare. The comparative safety and efficacy of these approaches have not been well studied.

– Large sessile polyps should be resected by endoscopic mucosal resection (EMR) in a piecemeal fashion to avoid perforation. Every part ensnared should be lifted from the wall. Injection of saline (+/- methylene blue and/or epinephrine) into the submucosa prior to polypectomy may increase the ease and safety of snare-resection, especially in the right colon, by reducing the risk of perforation (18). Following appropriate resection, the polypectomy site should be clean.

Small remnants of adenomatous tissue can be treated with argon plasma coagulation. Every effort should be made to retrieve all resected polyp fragments for pathologic analysis. If pathology reveals the need for subsequent surgery, tattooing can be done within two weeks by injecting black India ink on two contralateral sides of the bowel to allow identification at surgery. If complete resection is not possible after 2 or 3 examinations, the patient should be referred for surgery. Endoscopic submucosal dissection (ESD) may increase the rate of en bloc resections, but the benefit for the patient has to be established because the procedure is invasive and associated with a higher risk of perforation (19).

– Small colonic polyps (< 1 cm) are usually resected by biopsy and/or snare techniques, with or without electrocautery. If > 20 small polyps are encountered, representative and numerous biopsies should be obtained.

– Malignant polyps are polyps that contain cancer that has invaded into the submucosa. Many early malignant lesions can be managed endoscopically (20). If resection is complete, if the resection margins are free of cancer, if the cancer is not poorly differentiated and if there is no histological evidence of vascular or lymphatic invasion, the risk of residual or recurrent cancer after colonoscopic resection of a malignant polyp is less than the risk of surgery. Repeat colonoscopy can be performed in 2-3 months to check the polypectomy site if the resected polyp was sessile.

The most common complications of polypectomies are bleeding and perforation. Procedural bleeding immediately after polypectomy is usually minor and not regarded as a complication. Hemostasis can be achieved endoscopically in most cases with hemoclips and injection with epinephrine. Delayed hemorrhage can occur even after more than one week (18). The patient has to be informed and instructed to come to the unit should this occur. Warfarin therapy should be discontinued 3 to 5 days before the procedure. The decision to administer intravenous heparin once the INR falls below the therapeutic level should be individualized depending on the condition risk for thromboembolism. In the absence of a preexisting bleeding disorder, endoscopic procedures may be performed on patients taking aspirin and other NSAID's in standard doses (21). Clopidogrel should be discontinued for 7-10 days prior to polypectomy and may be restarted the day following the procedure because its onset of action is slow. In patients in whom the risk of stopping clopidogrel is considered high, aspirin may be used when clopidogrel is discontinued. Patients on combination therapy (eg, clopidogrel and aspirin) may be at an additional increased risk of bleeding (22,23).

Perforation is the most serious complication. It can be prevented to a certain extent by a careful technique. Ensnaring of a colonic fold must be avoided. If a sessile polyp covers a fold, both sides have to be cleared separately. Submucosal injection can be useful. The snare has to be closed tightly before applying coagulation.

Delayed perforation may occur due to thermal injury to deeper layers of the bowel wall. Surgery is usually indicated if perforation occurs, although small perforations in a clean colon can be treated with clips and sometimes conservatively with antibiotics and nil by mouth.

3. *Postprocedure*

The postprocedure period extends from the completion of the procedure to subsequent follow-up and discharge from the unit.

Patients need to receive instructions and follow-up regarding the pathological result of resected lesions. Patients can be notified by letter, phone call or subsequent follow-up visit, but the plan should be documented. Immediately after the procedure, a procedure report ('protocol') must be prepared. A copy of this report should be delivered to the general physician of the patient.

4. *Endoscopy report (24)*

Standardized reporting systems are necessary, saved on the practice/hospital computer system. The following data have to be mentioned :

– patient identification and demographics (date of birth, gender)
– sedation : administered drugs and dosage
– procedure complications : complications are defined as adverse events which necessitate intervention. Complications are defined as immediate, occurring during the procedure or prior to discharge from the endoscopy unit, and delayed, occuring up to 30 days after the procedure.
– informed consent (see **A**)
– date and time of the procedure
– name of endoscopist and possibly also assistent and/or nurse
– documentation of relevant history and clinical examination (see **B**)
– assessment of patient risk and co-morbidity (ASA qualification) (see **C** and Table 2)
– technical endoscopic procedure

- indication for the procedure (see **D**)
- instrument type – actual model and instrument number (infection transmission)
- caecal intubation
- clear documentation of anatomic landmarks and photodocumentation (see **E**)
- assessment of degree of difficulty (tortuosity, looping, resistance, discomfort, ..)
- withdrawal time
- retroflexion in the rectum
- type of bowel preparation and quality of preparation
- biopsies (see **F**)
- colonoscopic findings (see **G**)
- diagnostic impression
- results of a therapeutic intervention if performed
- complications, also late ones (see **H**)
- follow-up plan (recommendations for discharge planning and immediate follow-up) and treatment plan (eg. restarting of anticoagulation)
- final recommendations for repeat procedures or additional evaluation and treatment will be delayed until the pathology is received. There should be a system to communicate all pathology reports and final recommendations for follow-up or surveillance based on pathology reports to both the patient and referring clinician.

A : informed consent is recommended for every procedure and every type of sedation or analgesia except for emergency situations or in non competent patients. The informed consent has to display the four most frequent complications : perforation, possibility of missing a polyp, postpolypectomy bleeding and cardiopulmonary problems related to sedation. The overall complication rate is low, especially in patients who undergo a screening colonoscopy (risk of perforation less than 1/4000, risk of important postpolypectomy bleeding < 1%).

Endoscopists should aim for an incidence of minor reactions to sedation of less than 1%, of more complicated reactions (eg. ventilation with mask) < 1/300, of perforation < 1/2000 for screening colonoscopies, and of postpolypectomy bleeding < 1/100.

B : medication, chronic anticoagulation, presence of an intraventricular antiarrhytmia device or a pacemaker, previous abdominal surgery or GI procedures, prophylactic antibiotics for high-risk patients.

C : all patients undergoing endoscopic procedures should be assigned an anesthesia score, using the American Society of Anesthesiologists score (ASA) (Table 2). Patients with an ASA score of 4 should undergo endoscopy in the hospital and not in an office setting.

D : colonoscopists should know the appropriate indications for colonoscopy and document the indication. Endoscopy is necessary if the information from this examination or the treatment will be of benefit to the patient, and is not necessary if the information or treatment will not influence further medical management. For every examination the indication has to be mentioned. Further information is recorded such as time of latest colonoscopy, family history data, including CRC and adenomas in first-degree relatives, total number of family members, age of family member with CRC, adenomas with first degree relatives, other familial illnesses, presence of genetic conditions such FAP or HnPCC. In the postpolypectomy follow-up adherence to guidelines is necessary (Table 1).

E : following the recommendations of the ESGE (European Society of Gastrointestinal Endoscopy) for an illustrated report on colonoscopy (25) it is proposed to take 8 images to illustrate the totality of the examination. If specific lesions are found, complementary images have to be made. The exact position of the tip of the endoscope in the colon is difficult to identify. The reference points are approximate ones, except for the ileocaecal valve and the appendiceal orifice. This is also important from medical-legal perspective.

Videoendoscopy has made it possible to obtain prints during endoscopy, or directly on a video printer, or, if a computerized system is used, on any color printer, or on the computer disk.

Endoscopic images have to be made with a clean lens and avoiding contact with the mucosa to avoid over-illumination.

Image 1 : The lower part of the rectum 2 cm above the dentate line . This image shows the whole lower rectum.

Image 2 : The middle part of the sigmoid. This illustrates the most common sigmoid diseases, especially diverticulitis.

Image 3 : The descending colon just below the splenic flexure (the spleen is seen by transillumination).

Image 4 : The transverse colon just after the splenic flexure. The left side of the transverse colon is seen.

Image 5 : The transverse colon just before the hepatic flexure. The liver is seen by transillumination. The hepatic flexure is easily identified.

Image 6 : The ascending colon just under the hepatic flexure. The ascending colon is seen with a forward view.

Image 7 : The ileocaecal valve.

Image 8 : The caecum and the appendiceal orifice. This image confirms that the examination was complete and that the portion situated below the ileocaecal valve was examined.

F : All endoscopists should be able to take biopsies and perform polypectomies. Polypectomy should be possible for all polyps seen during colonoscopy, except if numerous many small, diminutive (1-5 mm) hyperplastic polyps are seen, especially in the rectosigmoid. Experienced colonoscopists can collect more than 95% of the resected polyps for pathology.

Broad sessile polyps can be removed by piecemeal

Table 1. — **Guidelines for screening and surveillance for the early detection of colorectal adenomas and cancer in individuals at increased risk or at high risk (31)**

From : Levin B., Liebermann A. *et al*. Screening and Surveillance for the Early Detection of Colorectal Cancer and Adenomatous Polyps,, 2008 : A joint Guideline from the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology. *CA Cancer J. Clin*., 2008, **58** (3) : 130-60.

Risk Category	*Age to begin*	*Recommendation*	*Comment*
Increased risk-patients with history of polyps at prior colonoscopy			
Patients with small rectal hyperplastic polyps		Colonoscopy or other screening options at intervals recommended for average-risk individuals	An exception are patients with hyperplastic polyposis syndrome. They are at increased risk for adenomas and colorectal cancer and need to be identified for more intensive follow-up.
Patients with 1 or 2 small tubular adenomas with low-grade dysplasia	5 to 10 years after the initial polypectomy	Colonoscopy	The precise timing within this interval should be based on other clinical factors (such as prior colonoscopy findings, family history, the preferences of the patient and the judgment of the physician).
Patients with 3 to 10 adenomas or 1 adenoma > 1 cm or any adenoma with villous features or high-grade dysplasia	3 years after the initial polypectomy	Colonoscopy	Adenomas must have been completely removed. If the follow-up colonoscopy is normal or shows only 1 or 2 small tubular adenoma(s) with low-grade dysplasia, then the interval for the subsequent examination should be 5 years.
Patients with > 10 adenomas on a single examination	< 3 years after the initial polypectomy	Colonoscopy	Consider the possibility of an underlying familial syndrome.
Patients with sessile adenomas that are removed piecemeal	2-6 months to verify complete removal	Colonoscopy	Once complete removal has been established, subsequent surveillance needs to be individualized based on the endoscopist's judgment. Completeness of removal should be based on both endoscopic and pathological assessment(s).
Increased risk-patients with colorectal cancer			
Patients with colon and rectal cancer should undergo high-quality perioperative clearing	3-6 months after cancer resection, if no unresectable metastases are found during surgery, alternatively, colonoscopy can be performed intra-operatively.	Colonoscopy	In the case of nonobstructing colon cancers, this can be done by preoperative colonoscopy. In the case of obstructing colon cancers, CTC with intravenous contrast or DCBE can be used to detect neoplasms in the proximal colon.
Patients undergoing curative resection for colon or rectal cancer	1 year after the resection (or 1 year following the performance of the colonoscopy that was performed to clear the colon of synchronous disease).	Colonoscopy	This colonoscopy at 1 year is in addition to the perioperative colonoscopy for synchronous tumors. If the examination performed at 1 year is normal, then the interval before the next subsequent examination should be 3 years. If that examination is nomal, the interval should be 5 years. Following the examination at 1 year, the intervals may be shortened if there is evidence of HNPCC or if adenomas are found. Periodic examination of the rectum for purpose of identying local recurrence, usually performed at 3-6 months intervals for the first 2-3 years, may be considered after low-anterior resection of rectal cancer.
Increased risk-patients with a family history			
Either colorectal cancer or adenomatous polyps in a first-degree relative before age 60 years or in 2 or more first-degree relatives at any age	Age 40 years or 10 years before the youngest case in the immediate family	Colonoscopy	Every 5 years
Either Colorectal cancet or adenomatous polyps in a first-degree relative age > 60 years or in 2 second-degree relatives with colorectal cancer.	Age 40 years	Screening options at intervals recommended for average-risk individuals	Screening should begin at an earlier age, but indivuals may choose to be screened with any recommended form of testing.

Table 1. — **Continued**

Risk Category	*Age to begin*	*Recommendation*	*Comment*
Genetic diagnosis of FAP or suspected FAP without genetic evidence	Age 10 to 12 years	Annual FSIG to determine if the individual is expressing the genetic abnormality and counseling to consider genetic testing	if the genetic test is positive, colectomy should be considerd.
Genetic or clinical diagnosis of HNPCC or individuals at increased risk of HNPCC	Aged 20 to 25 years or 10 years before the youngest case in the immediate family	Colonoscopy every 1-2 years and counselling to consider genetic testing	Genetic testing for HNPCC should be offered to first-degree relatives of persons with a known inherited MMR gene mutation. It should also be offered when the family mutation is not already known, but 1 of the first 3 of the modified Bethesda criteria is present.
Inflammatory bowel disease, chronic ulcerative colitis, and Crohn's colitis.	Cancer risk begins to be significant 8 years after the onset of pancolitis or 12-15 years after the onset of left-sided colitis.	Colonoscopy with biopsies for dysplasia	Every 1 to 2 years, these patients are best referred to a center with experience in the surveillance and management of inflammatory bowel disease.

Abbreviations : FSIG, flexible sigmoidoscopy ; DCBE, double-contrast barium enema ; CTC, computed tomographic colonography ; FAP, familial adenomatous polyposis ; HNPCC, hereditary nonpolyposis colon cancer ; MMR, mismatch repair.

Table 2. — **Definition of ASA status**

Class 1	Patient has no organic, physiological, biochemical or psychiatric disturbance. The pathological process for which the operation is to be performed is localized and does not entail systemic disturbance.
Class 2	Mild to moderate systemic disturbance caused either by the condition to be treated surgically or by other pathophysiological processes.
Class 3	Severe, systemic disturbance or disease, from whatever cause, even though it may not be possible to define the degree of disability with finality.
Class 4	Severe systemic disorders that are already life threatening, not always correctable by operation.
Class 5	The moribund patient who has little chance of survival but is submitted to operation in desperation.

resection. Endoscopic resection should be possible for all benign looking lesions that are less than 30% of the circumference and cover no more than 2 haustrations.

Judgment of the endoscopic resectability demands a lot of experience. Patients with large polyps that are endoscopically resectable should be offered the option of endoscopic resection, either by the original endoscopist, or by a more experienced endoscopist.

G : description of mass or polyps, morphology, location, estimates of polyp size, method of removal, completeness of removal and retrieval.

H : adverse events are events that require an unplanned intervention. Direct complications (events occurring during colonoscopy) and late complications (events occurring after the procedure has been completed) should be recorded.

5. *Discharge of the patient from the unit*

The patient can be discharged if certain criteria are fulfilled. The patient has to receive instructions concerning the diet, medication, resuming the activities and driving the car. An emergency phone number should be given to the patient in case problems arise.

It is necessary that the endoscopist, if necessary, contacts the patient and/or referring doctor in function of the result of the pathology.

6. *Recommended intervals for repeat colonoscopy*

Colonoscopists should have knowledge of the appropriate indications for colonoscopy, their relative predictive value and the intervals at which colonoscopy should be repeated for given indications/lesions. There is a growing recognition that many patients with resected adenomas (and probably also with resected cancer) undergo repeat colonoscopies at too short intervals. Three surveys have shown that certain endoscopists perform follow-up colonoscopy at intervals shorter than proposed in any guideline (26-28) (Table 1). Overuse of colonoscopy leads to unnecessary spending of health care resources and discomfort to the patients. It should be avoided given the large population to be screened and the waiting lists in certain centers, even in Belgium.

Use of recommended postpolypectomy and post-cancer resection surveillance intervals is necessary.

Proposed postpolypectomy surveillance guidelines (9, 29, 30, 31) (Table 1)

1. High-quality baseline colonoscopy is emphasized as critical for effectively reducing colon cancer risk.
2. Complete colonoscopy should be done at the time

of the initial polypectomy to clear the colon of all synchronous neoplasia

3. Additional clearing examinations may be required after resection of a large sessile adenoma, or if the colonoscopist is not reasonably confident that all adenomas have been found and removed.
4. Selected patients at low risk for metachronous advanced adenomas may not require follow-up because of advanced age or comorbidity.
5. Surveillance should be discontinued when, because of advanced age or comorbidity, it seems unlikely that it will be of benefit.
6. After one negative follow-up surveillance colonoscopy, subsequent intervals may be increased to 5 year.
7. Appropriate intervals for screening patients (9, 30, 31) (Table 1 : Guidelines for screening and surveillance for the early detection of colorectal adenomas and cancer in individuals at increased risk or at high risk) :

   a) Patients with small rectal hyperplastic polyps are considered to have normal colonoscopies, and the interval before the subsequent colonoscopy should be 10 years, with exception of patients with hyperplastic polyposis syndrome. They are at increased risk for adenomas and colorectal cancer and need to be identified for more intensive follow-up.
   b) Patients with only one or two small (< 1 cm) tubular adenomas with only low-grade dysplasia should have a follow-up evaluation in 5 to 10 years. The precise timing within this interval should be based on other clinical factors (such as prior colonoscopy findings, family history, and the preferences of the patient and the judgment of the physician).
   c) Patients with 3 or more adenomas, high-grade dysplasia, any adenoma > 1 cm or adenomas with villous features should have their next colonoscopy in 3 years. Providing that piecemeal removal has not been done and the adenoma(s) are completely removed. If the follow-up colonoscopy is normal or shows only one or two small tubular adenomas with low-grade dysplasia, then the interval for the subsequent examination should be 5 years.
   d) Patients who have more than 10 adenomas at one examination should be examined at a shorter interval established by clinical judgment, and the clinician should consider the possibility of an underlying familial syndrome.
   e) Patients with sessile adenomas that are removed piecemeal should be considered for follow-up examination at short intervals (2-6 months) to verify complete removal. Once complete removal has been established, subsequent surveillance needs to be individualized based on the endoscopist's judgment. Completeness of removal should be based on both endoscopic and pathologic assessments.
   f) More intensive surveillance is indicated when the family history indicates hereditary nonpolyposis colorectal cancer.

Conclusion

Quality assurance of the gastrointestinal procedures and guidelines and recommendations for clinical purpose (6,24,32,33).

Quality assurance programs depend on the collection of reliable data.

It is recommended that these quality indicators be routinely tracked on all patients undergoing endoscopy. Endoscopists should establish a continuous quality improvement program and set a high priority on adenoma detection rates.

If the quality criteria are followed, quality assessment and a program designed to improve quality is necessary. This can be used to correct problems and give licentions. The most important data collected are the endoscopy reports and an endoscopic unit record.

In the *endoscopy report* specific information has to be collected in all patients undergoing a screening colonoscopy. For some parameters only a sample of patients may need to be surveyed (eg satisfaction). For other areas such as demographics, indications and complications all patients undergoing endoscopic procedures should be tracked. This is particularly true for complications because they occur so infrequently.

Information that has to be obtained from everyone is :

- demographic information : age-gender-ASA
- indication
- sedation + adequacy of sedation and use of reversal agents (naloxone en flumezenil)
- complications
- success of the procedure (technical success, was the information clinically relevant ? Was a therapeutic intervention successful ?)

The *endoscopic unit record* contains all information of the endoscopic procedures. This may be kept in a log form or entered into a computer database. A selection of procedures can be made and investigated. Information contained in this record should include the following : date of procedure, patient identification, endoscopist, assistant, procedure, duration of the examination, findings, notation of tissue sampling, therapeutic interventions and complications if necessary, informed consent and nursing notes.

Endoscopic practice should be reviewed regularly by clinicians privileged to perform endoscopic procedures.

The information should be discussed multidisciplinary. The endoscopists should be able to see the information. Collecting these relevant endoscopic information leads to better patient care.

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