

PROPOSED SCORE FOR THE SELF-ASSESSMENT OF AN ENDOSCOPY DEPARTMENT PERFORMANCE IN COLONOSCOPY SCREENING

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Abstract

The **aim** of the paper was to propose a score for performance evaluation in colonoscopy units.

Method. We proposed a score (**CDCD score - Cecal intubation, polyp Detection rate, Cleansing and Documentation of cecal intubation**) based on the following parameters that assess the quality of colonoscopy units: total colonoscopies rate, polyp detection rate, rate of cecal intubation photo record, rate of recorded Boston bowel preparation scale (BBPS) (rated 1 to 5 stars). The mean score obtained based on the above mentioned criteria was used as a quality parameter of the endoscopy unit.

We applied and calculated this score in all screening colonoscopies performed in our Endoscopy Department during the last 4 years.

Results. The study group included 856 screening colonoscopies. The rate of total colonoscopies was 92.1% (789/856 cases) and the polyp detection rate was 23.9%. Regarding the quality of bowel preparation, the BBPS was recorded in 51.1% cases. The cecal intubation was photo recorded in 44% of cases.

We considered that of the 4 parameters, the highest weight for an excellent quality belonged to the cecal intubation rate, followed by the polyp detection rate, because they evaluate the endoscopic technique, while the other 2 are more administrative. Thus, for the unit's assessment we used the following equation: $UNIT'S\ QUALITY\ CDCD\ SCORE = (3 \times cecal\ intubation\ rate + 3 \times polyp\ detection\ rate + 1 \times photo\ documentation + 1 \times BBPS\ documentation) / 8$. Thus, the CDCD Score for our unit was ≈ 4 stars (3.7 stars).

Conclusion. The proposed CDCD score may be an objective tool for the quality assessment in different endoscopy units.

Keywords: screening colonoscopy, quality assurance, performance, self-assessment

Introduction

Colorectal cancer is the second most frequent cancer in the developed world [1] and also the second leading cause of cancer death in several countries [2,3].

Colorectal cancer usually has a good prognosis, if discovered and treated in the early stages. For this purpose and for detecting colonic polyps, colorectal screening programs are developed. The screening methods available for colorectal cancer screening include fecal occult blood tests, sigmoidoscopy, endoscopic colonoscopy, virtual CT colonoscopy, colonic capsule or genetic tests [4-20]. Discussions regarding the value of each tests are obsolete, but probably the endoscopic colonoscopy is the best method, since it is diagnostic (for cancers and polyps) and also therapeutic (removing the discovered polyps) [21-24].

But in order to play a central role in the screening program for colorectal cancer, colonoscopy must fulfill some conditions. Several quality indicators were proposed: pre-procedure (appropriate indication and correct use of surveillance intervals, informed consent); intra-procedure (documentation of bowel preparation quality, cecal intubation rates with photo documentation of cecal landmarks, adenoma detection rate, withdrawal time longer than 6 minutes, adequate polypectomy); post-procedure (complications incidence rate: perforation, post-polypectomy bleeding and their correct management) [25-30]. While some of these indicators are well accepted, others are still under debate, such as the withdrawal time longer than 6 minutes [31].

Many countries around the world aim to implement colonoscopy as "gold standard" for colorectal cancer screening, replacing fecal occult blood tests. But for this, colonoscopy must prove its value and performance. It is known that not all centers and endoscopists have the same performance level. Therefore, a classification of colonoscopists and endoscopy units is needed, so that only the ones with a minimal performance level will have the right to perform colonoscopic screening for colorectal cancer (or to be reimbursed by the insurance system). In some countries (such as Germany or the USA) certification procedures are made in order to select endoscopy units and colonoscopists to participate in the colorectal cancer screening program [32,33].

Starting from these data, the aim of this paper is to propose an easy to perform self-assessment system for the endoscopists and Endoscopy Centers, which would allow the stratification of colonoscopy providers.

Material and method

Because the stars system for hotels' ranking is well known and very "visual", a similar system for endoscopy units is proposed. Four endoscopic quality parameters are proposed and for each one a ranking from 1 to 5 stars. The proposed parameters are:

1. **Cecal intubation rate (Cecal)** with the following

quantification: 5 stars $\geq 95\%$, 4 stars 94.9-90%, 3 stars 89.9-85%, 2 stars 84.9-80%, 1 star 79.9-70%.

2. **Polyp detection rate (PDR) (Detection)** defined as the proportion of screened subjects, in whom at least one polyp was identified, with the proposed evaluation criteria: 5 stars $\geq 20\%$ polyps detected, 4 stars 19.9-15%, 3 stars 14.9-10%, 2 stars 9.9-5%, 1 star 4.9-1%.

3. Rate of **cecal intubation photo record** (photos or videos), as a medical proof of the endoscopic results. We propose the following quantification for this parameter: 5 stars $\geq 90\%$ intubation recorded, 4 stars 89.9-80%, 3 stars 79.9-60%, 2 stars 59.9-40%, 1 star 39.9-20%.

4. Information concerning the correct **Cleansing of the colon**, using **evaluation scores** (such as the Boston bowel preparation scale-BBPS) - the rate of recorded Boston bowel preparation scale (BBPS) [35]. The BBPS is a scoring system applied to the 3 broad regions of the colon: right colon, transverse colon and left colon, each part evaluated from 0 to 3, with a maximum of 9 points (perfectly cleaned colon). This quantification can be useful in the follow up, in case of missed polyps or other pathology. The rate of recorded Boston bowel preparation scale (BBPS): 5 stars $\geq 90\%$, 4 stars 89.9-80%, 3 stars 79.9-70%, 2 stars 69.9-60%, 1 star 59.9-50%.

We consider that of the 4 parameters, the highest weight for an excellent quality should be attributed to the cecal intubation rate, followed by the polyp detection rate, because they evaluate the endoscopic technique, while the other 2 are more administrative. This is why, in the unit assessment we propose the following equation:

$$\text{UNIT QUALITY CDCD SCORE} = (3 \times \text{cecal intubation rate} + 3 \times \text{polyp detection rate} + 1 \times \text{photo documentation} + 1 \times \text{BBPS documentation})/8$$

The proposed name for this score is CDCD Score (from **cecal** intubation, **polyp detection** rate, **cleansing** of colon, documentation of cecal intubation).

We decided to use this proposed score for the assessment of the endoscopy unit of our department, for a period of 4 years.

During this period, a number of 856 screening colonoscopies were recorded. We evaluated in this cohort of colonoscopies the cecal intubation rate, the rate of cecal intubation photo record, the rate of Boston bowel preparation scale (BBPS) record and polyp detection rate. We scored each parameter from 1 to 5 stars and we assessed the performance of our department.

All the patients signed the inform consent before colonoscopy. The study was approved by the Local Ethical Committee and was in accordance with the Helsinki Declaration of 1975.

Results

The study group included 856 screening

colonoscopies, with a rate of total colonoscopy of 92.1% (789/856 cases) (4 stars).

The polyp detection rate was 23.9% (5 stars). The distribution according to gender in the group that had polyps was almost equal: 46.3% (95) women and 53.7% (110) men. Regarding the quality of bowel preparation, the mean BBPS was 6.9 ± 1.4 , recorded in 438/856 cases - 51.1% (1 star for our department). Concerning the quality of colon preparation, only 40.1% (176 subjects) had an excellent bowel preparation (8 or 9 points in Boston score) and 65.7% (288 subjects) a good one (6 or 7 Boston points).

The cecal intubation was photo recorded in 44% of cases (2 stars).

If we consider as a 5 star endoscopy unit the one with perfect quality parameters we could appreciate that our department can be granted with 4 stars for the cecal intubation rate, 5 stars for the polyp detection rate, while for the cecal intubation photo record rate with only 2 stars and for the rate of recorded BBPS with only 1 star; this represents overall a mean of 3.7 stars $[(3 \times 4 + 3 \times 5 + 1 \times 2 + 1 \times 1) / 8]$.

Discussion

Despite the fact that we proposed only 4 parameters for the quantification of an endoscopy department performance, other parameters can be used [25-28,35].

Polyp Retrieval Rate (PRR) – ideally, all the polypectomized polyps must be retrieved from the colon, but this is not always achieved in practice. The clinical practice guidelines recommend a PRR higher than 80% for polyps smaller than 10 mm and 95% for polyps of 10 mm or higher [36]. This recommendation is made to allow histological evaluation in order to avoid early cancer misdiagnosis (mimicking benign polyps).

Perforation Rate is another important parameter of performance. The perforation rates in screening diagnostic colonoscopy (without polypectomy) vary, but probably 1 perforation in more than 1000 screening colonoscopies is acceptable (5 stars as a quality parameter) [26,36].

In our self-assessment we decided to use to use only 4 essential and simple parameters: the rate of cecal intubation, polyp detection rate, documentation of the cecal intubation and documentation of the colon cleansing.

From the endoscopist's point of view, the rate of total colonoscopies is maybe the most important parameter. Whenever the indication for colonoscopy is colorectal cancer screening, the cecal intubation rate must be greater than or equal to 95% [25]. Incomplete colonoscopy is a dangerous situation, because it can give a false sense of security to the patient. On the other hand, this parameter is probably the most important technical parameter and must be used for the accreditation of a center or endoscopist for endoscopic colorectal cancer screening program.

The *Adenoma Detection Rate*, defined as the proportion of colonoscopies in which at least one histologically proved adenoma was found is also an

important quality control parameter for screening colonoscopy [25-28]. Due to the lack of interdepartmental database in Romanian hospitals we chose to use a similar parameter – the Polyp Detection Rate (PDR), defined as the proportion of subjects in whom at least one polyp was identified at screening colonoscopy. The expected ADR in a colorectal cancer screening cohort should be at least 20% [37] and is directly influenced by the endoscopist's skills [38], less skilled colonoscopists missing polyps more frequently than the expert ones. The average PDR in screening colonoscopy is 34% for male and 28% for female [39] and we can propose that in order to obtain 5 stars, the PDR in any center should be $\geq 20\%$, 4 stars 19.9-15%, 3 stars 14.9-10%, 2 stars 9.9-5%, 1 star 4.9-1%.

An evaluation system for endoscopy centers can be a motivation for performance improvement. Cecal intubation rate can be improved by perfecting the endoscopic technique, ADR can be improved by a longer withdrawal time (more than 6 minute) [40], by using the "third eye" endoscope [41] or by using chromo-endoscopy.

Photo documentation of the cecal intubation is very simple and must be a part of every endoscopic procedure. But for this, the endoscopist must be motivated to do it and to have a ready to use recording system at all times.

Quantification of the colon cleansing by using evaluation scores such as the Boston bowel preparation scale - BBPS is also important because the time interval until the next colonoscopic evaluation can be set according to the quality of colon preparation. If at the first colonoscopy the colon is "dirty", BBPS < 6, polyps can be missed [42] so probably the next endoscopic evaluation must be performed earlier, in 3-5 years, and not in 10 years as proposed by the current guidelines for colorectal cancer screening [43].

If a self assessment scoring system is used for performance assessment of screening colonoscopies (even if it is an imperfect one), different endoscopy centers can be compared. Also it can be used by the insurance system and by the National Society of Endoscopy to decide which centers and which endoscopists can be accepted for screening colonoscopy.

Concerning the evaluation of our endoscopy department, we found that we are of average performance (four stars), but due only to simple technical problems (photo documentation of cecal intubation and recorded BBPS), which can be quickly improved. The next proposed step is to evaluate each endoscopist from our team, to improve their respective weak points.

In **conclusion**, we propose a very simple evaluation score for any endoscopic department – the CDCD score that can be used to decide which centers can be accepted as participants in the colorectal screening program. Stars quantification (such as in hotels) is a very intuitive classification, easy to use.

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