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Proximal serrated polyp detection rate: a complementary quality indicator for adenoma detection rate?

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ABSTRACT – **Background** – The effectiveness of colonoscopy for colorectal cancer (CRC) screening depends on quality indicators, which adenoma detection rate (ADR) being the most important. Proximal serrated polyp detection rate (pSPDR) has been studied as a potential quality indicator for colonoscopy. **Objective** – The aim is to analyze and compare the difference in ADR and pSPDR between patients undergoing screening colonoscopy and an unselected population with other indications for colonoscopy, including surveillance and diagnosis. **Methods** – This is a historical cohort of patients who underwent colonoscopy in the digestive endoscopy service of a tertiary hospital. Out of 1554 colonoscopies performed, 573 patients were excluded. The remaining 981 patients were divided into two groups: patients undergoing screening colonoscopy (n=428; 43.6%); patients with other indications including surveillance and diagnosis (n=553; 56.4%). **Results** – Adenoma detection rate of the group with other indications (50.6%) was higher than that of the screening group (44.6%; *P*=0.03). In regarding pSPDR, there was no difference between pSPDR in both groups (screening 13.6%; other indications 13.7%; *P*=0.931). There was no significant difference in the mean age (*P*=0.259) or in the proportion of men and women (*P*=0.211) between both groups. **Conclusion** – Proximal serrated polyp detection rate showed an insignificant difference between groups with different indications and could be used as a complementary indicator to adenoma detection rate. This could benefit colonoscopists with low colonoscopy volume or low volume of screening colonoscopies.

HEADINGS – Colonoscopy. Health care quality indicators. Colonic polyps. Adenomatous polyps.

INTRODUCTION

Colorectal cancer is one of the most prevalent cancers in the world, with high morbidity and mortality, and colonoscopy plays an important role in its prevention[1]. In addition to identifying pre-malignant lesions, colonoscopy allows to resect them and discontinue the pathways of carcinogenesis (adenoma-carcinoma and serrated-carcinoma). Nevertheless, colonoscopy is an operator-dependent examination and the efficacy of prevention depends on the performance of the procedure. Low-quality examinations do not adequately allow the visualization of the colon mucosa; therefore, lesions may be missed. Missed lesions compromise patient survival and are related to what is known as interval cancer (cancer that arises in the interval between screening and surveillance colonoscopies)[2]. Thus, all efforts should be considered to improve the procedure performance and reduce missed lesions. In order to improve the quality of colonoscopies, performance quality parameters were created. The best indicators are those that assess the outcome of the procedure (e.g. reduced incidence of CRC or reduced incidence of interval cancer), but are difficult to obtain due to the need for a long-term follow-up so that these results may be detected, especially when the procedure is preventive[3,4].

The most used quality indicators for colonoscopy are process-related (e.g. cecal intubation rate, withdrawal time, quality of bowel preparation and adenoma detection rate). The most important indicator is adenoma detection rate (ADR)[3,4]. It is obtained by dividing the total number of colonoscopies with one or more adenomas by the total number of colonoscopies. It is the only validated quality indicator that has been shown to be related to the incidence of interval cancer and colorectal cancer death[5]. Despite being the best quality indicator, ADR has some limitations; therefore, new indicators have been studied[6].

Although the traditional paradigm has been that most colorectal cancers (CRC) arise from adenomas through the adenoma-carcinoma sequence, it is now well recognized that the serrated pathway is a significant contributor to colorectal carcinogenesis (up to 30% of CRCs)[7]. Serrated polyps including hyperplastic polyps, sessile serrated adenomas and traditional serrated adenomas are often flat, covered with mucus (especially in the proximal colon) and may be difficult to see during colonoscopy or may be discarded as "benign" hyperplastic polyps by inexperienced operators. Some types of serrated polyps share molecular and epidemiological characteristics with interval cancer[7]. Although there are no studies correlating serrated detection rate (SDR) with a reduced incidence of interval cancer, some studies have shown a strong correlation between ADR and SDR[8-11].

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The proximal serrated detection rate (pSPDR) has been preferred for use as a quality indicator than the clinically relevant serrated detection rate (crSPDR – sessile serrated adenoma, traditional serrated adenoma, proximal hyperplastic polyp >5 mm and distal hyperplastic polyp >10 mm)[12]. The characterization of clinically relevant serrated polyps depends on the size of the lesion and the histological type. There is low agreement among pathologists when characterizing serrated lesions, especially between hyperplastic polyp and sessile serrated adenoma, which may represent an important bias. There may also be disagreement about the size of the lesion among endoscopists leading to another bias for crSPDR. Two studies showed a strong correlation between pSPDR and crSPDR[10,12]. Thus, pSPDR is more reliable and easier to measure because it considers all proximal serrated polyps (above the sigmoid colon), regardless of size and histological type and exclude all serrated polyps of the rectum and sigmoid.

The aim of this study is to assess whether there is a difference in the ADR and pSPDR between two groups with distinct indications for colonoscopy: a screening group including asymptomatic patients over 50 years of age, with no family history of CRC who underwent the first colonoscopy; and a group that includes patients over 50 years of age, with other indications for colonoscopy than screening, including surveillance and diagnostic.

METHODS

Study design

This is a historical cohort study approved by the CEP (Research Ethics Committee – CAAE: 28768918.2.0000.5128) of Mater Dei Hospital which used data collected from patient records and a self-administered questionnaire to patients prior to colonoscopy. We assessed data from all patients who underwent colonoscopy in the Endoscopy Department of Mater Dei Hospital (Belo Horizonte/Brazil) from January 2018 to June 2018. Procedures were performed by six endoscopists, title members of SOBED (Brazilian Society of Digestive Endoscopy) with proven expertise, assisted by two residents who usually perform supervised examinations. No informed consent was collected since it was an observational non-interventionist study. Colonoscopies were performed with sedated patients, accompanied by an anesthesiologist. High definition endoscopic processors (Fujinon 4400 and 4450 series) and colonoscopes with and without magnification were used. Chromoscopy was used only to evaluate lesions that had already been found with white light. Patients included in the study were divided into two groups. Group one was called the screening group and was composed of only patients who underwent the first colonoscopy examination, with no symptoms and no family history of CRC in first-degree relatives were selected. Group two was called other indications and included an unselected population of all patients who did not fit the screening group (patients who had colonoscopy, a history of polyps or CRCs, positive fecal occult blood, symptomatic patients with abdominal pain, diarrhea, hematochezia). We avoided dividing this group according to indication to minimize a selection bias, since many patients in this group had more than one indication for the exam.

Exclusion criteria

It was defined the following exclusion criteria: patients under 50 years of age; patients who underwent the exam during hospitalization; patient with inadequate bowel preparation or who were instructed to repeat the exam in a shorter period of time due to unsatisfactory preparation; patients with inaccurate indication for the exam; patients diagnosed with or suspected of having inflammatory bowel disease; exams considered incomplete, in which cecal intubation was not possible; family or personal history of polypoid syndromes.

Data collection

Medical records of all patients undergoing colonoscopy between January 2018 and June 2018 at Mater Dei Hospital endoscopy service were evaluated. Data were collected directly from colonoscopy reports, stored in the electronic medical record and from self-administered questionnaires that are used in pre-colonoscopy consultations. The following information was obtained from the questionnaires: indication of the exam, family history of CRC in first-degree relatives, positive fecal occult blood test, history or clinical suspicion of polypoid syndromes or inflammatory bowel disease and the presence of symptoms such as diarrhea, abdominal pain and hematochezia. From the colonoscopy report, data regarding presence, location and quantity of polyps extracted, and the results of the anatomopathological examination were added. We defined as proximal serrated polyps in this study, all serrated polyps found from the cecum to the descending colon, excluding all serrated polyps from the rectum and sigmoid colon. All proximal serrated polyps were included in the study regardless of their histological classification (hyperplastic polyps, traditional serrated adenomas or sessile serrated adenomas/polyps) and lesion size[12].

Statistical analysis

The collected data were analyzed using the SPSS version 21.0 program. Numerical variables were assessed for normality using the Kolmogorov-Smirnov test for data selection and presentation. Categorical variables were presented using absolute and percentage values. Quantitative variables were compared using the Student's *t*-test and for the analysis of qualitative variables the chi-square test was used. Significance level was adopted for values below 5%. Sample size calculation was performed, considering the 95% confidence interval and margin of error of 5%, and expected values based on a pilot study with 235 patients using Minitab 16.0 software. The sample size defined for each group was 404 patients.

RESULTS

Out of the 1554 colonoscopy examinations performed at the Department of Endoscopy of Mater Dei Hospital, 573 were excluded due to: patient being under 50 years of age (n=321); hospitalization (n=155); inadequate bowel preparation (n=40); inaccurate indication (n=39); inflammatory bowel disease (n=10); incomplete examination (n=8). Nine hundred and eighty-one patients were included in the study and divided into two groups: screening group (n=428; 43.6%) and other indications group (n=553; 56.4%) (TABLE 1).

In the screening group, there were 248 (57.9%) female and 180 (42.1%) male patients, 191 (44.6%) patients had adenomas and 58 (13.6%) patients had proximal serrated polyps. In the other indications group, there were 306 (55.3%) female patients and 247 (44.7%) male patients, 280 (50.6%) patients had adenomas and 76 (13.7 %) patients had proximal serrated polyps. There was no difference in the proportion of men and women in both groups (P=0.414).

TABLE 1. Demographic data and polyp findings in patients undergoing screening and with other indications for colonoscopy.

Group/Variables	Screening n (%)	Other indications n (%)	*P*-value
Total of patients	428	553	–
Age (m ±SD – years)	60±7.2	63±7.59	0.259
Female	248 (57.9%)	306 (55.3%)	
Male	180 (42.1%)	247 (44.7%)	0.414
Adenomas	191 (44.6%)	280 (50.6%)	0.030
Proximal serrated polyps	58 (13.6%)	76 (13.7%)	0.931

The mean age in the screening group was 60 (±7.2) and in the surveillance/diagnostic group it was 63 (±7.59). There was no difference in the mean age between the two groups (*P*=0.259).

The ADR was 44.6% in the screening group and it was 50.6% in the other indications group. A higher proportion of patients in the screening group had adenomatous polyps (*P*=0.03). The pSPDR was 13.6% in the screening group and it was 13.7% in the other indications group. There was no difference in the proportion of proximal serrated polyps between the two groups (*P*=0.931).

Higher proportion of male patients (239/427; 55.9%) had adenomatous polyps when compared to female patients (232/554; 41.8%) – *P*=0.0001 (FIGURE 1). There was no significant difference between the proportion of men and women regarding the detection of proximal serrated lesions (15.2% in men 65/427; 12.5% in women 69/554) – *P*=0.211 (FIGURE 2). However, the median age of females was higher than that of males (*P*=0.009).

DISCUSSION

Even though it is the best indicator today, ADR has some limitations and therefore, new indicators have been studied. The study that validated ADR as a quality indicator included only patients who underwent the first screening colonoscopy, aged over 50 years, asymptomatic and with no family history of CRC. Subsequent studies compared the ADR of patients with indication for screening with that of patients with indication for surveillance. Surveillance groups had higher ADR compared to screening groups[6,10,13].

Up to this point, the calculation of ADR is limited to screening colonoscopies, as the inclusion of tests with other indications may significantly change it.

A study conducted by Kahi et al. (2014) showed a significant difference in ADR between patients with different indications for colonoscopy.

The study divided the patients into three groups according to the exam indication: screening, surveillance and diagnosis. The surveillance group had the highest ADR, followed by the screening group and lastly by the diagnostic group[13].

The use of ADR is not mandatory in several countries yet. Although there is a lot of evidence showing its validity as a quality indicator, it is still not universally adopted.

Much of this is due to the difficulty in collecting, integrating and analyzing data and several doctors do not know how to do it. In some services, systems integrating information make it easier to analyze and obtain quality indicators, but unfortunately this is not the reality in several places.

With the screening group restriction, colonoscopists with low volume of exams or low volume of screening colonoscopy can take a long time to reach a significant sample to obtain the ADR (around five hundred screening tests).Our study has shown a significant difference in ADR between the screening group and the other indications group (*P*=0.03), with the ADR of the screen-

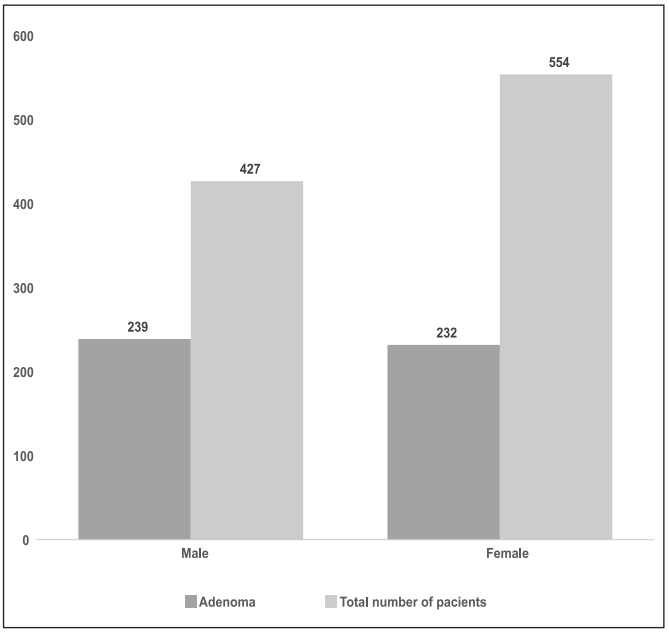

FIGURE 1. Proportion of male patients with adenomatous polyps (239/427; 55.9%) compared with female patients (232/554; 41.8%).

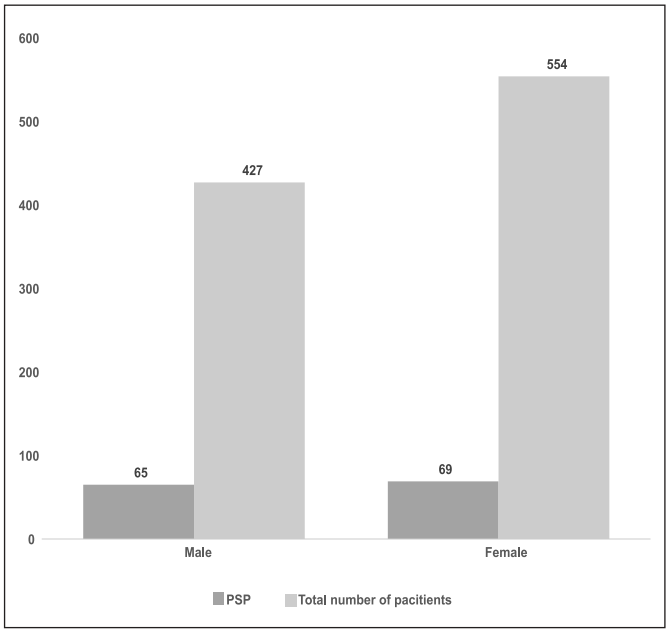

FIGURE 2. Proportion of male patients with PSP (65/427; 15.2%) compared to female patients (69/554; 12.5%). PSP: proximal serrated polyp.

ing group (44.6%) being lower than that of the other indications group (50.6%). Once again, the result corroborates with what is observed in the literature and confirms the limitation of ADR to the screening group or the need to define different parameters for each indication[10,13,14].

There is no recognized benchmark for pSPDR today. A study by Anderson et al. (2017) calculated benchmarks for SPDR (pSPDR and crSPDR) derived from ADR benchmarks, considering the strong correlation found between these indicators. The pSPDR benchmark found in this study was 11% for an ADR benchmark of 25%[10].

A study conducted by Kligman et al. (2018) compared ADR of patients undergoing screening colonoscopy to that of patients submitted to CRC screening program based on FIT (Fecal Immunochemical Test). The FIT-positive patient group had a higher ADR than that of the screening group[15].

In 2013 and in 2017, Anderson et al. published two studies using the New Hampshire Colonoscopy Registry database[10,14]. In both studies, patients were divided into two groups: screening and surveillance. There was a significant difference in ADR between the screening and surveillance groups, but the difference in pSPDR was not significant.

There was a significant difference in ADR between the screening group and other indications group in our study, but the difference in pSPDR was insignificant (P=0.93). The possibility of using pSPDR as an overall quality indicator for an unselected population, without considering the indication of the exam, is a relevant finding. The data collection to obtain the pSPDR uses the same sources that are used in the calculation of the ADR. Thus, little effort is required on the part of the colonoscopist to obtain pSPDR when ADR is already being calculated. Another advantage to use a quality indicator over an unselected population is there is no risk of a selection bias and eliminate the potential of artificially increasing the ADR by changing the colonoscopy indication[16]. It is also not necessary to exclude most patients to calculate the indicator, which leads to an increase in the sample size, benefiting professionals who have a low number of exams.

Regarding gender, ADR was significantly higher in males. Therefore, it is necessary to use different parameters for ADR according to gender (30% male; 20% female). Comparing pSPDR between genders, there was no significant difference in the present study (15.2% in 65/427 men; 12.5% in 69/554 women; P=0.211). However, there was an age difference between the genders, which does not allow us to make this statement. This finding was seen in other studies and, if proven, could make the pSPDR an even broader quality indicator and a general parameter could be established without the need to consider the gender or the indication of the test[10,17].

Literature points to a great variability in the detection of serrated polyps among endoscopists[18,19]. A study conducted by Breatgne et al. (2016) showed that the variability in detection of proximal serrated polyps among endoscopists is twice as high as that observed in the detection of proximal adenomas. It is possible that using SPDR as a quality indicator could reduce this variability.

Given the significant contribution of serrated polyps to the development of CRC and the molecular and epidemiological features they share with interval cancer, a more comprehensive measure of colonoscopy quality may require the determination of SPDR[11].

The main argument against using SPDR as a quality indicator is the strong correlation pointed out in some studies between ADR and SPDR[3,20]. Examiners who find more adenomas also find more serrated polyps, thus it would be unnecessary to use a new quality indicator as ADR would be enough to determine whether the detection of serrated polyps is satisfactory. However, if pSPDR were collected from an unselected population, there would be a significant increase in the sample. This would make it possible to obtain a quality indicator much faster until the ADR can be achieved.

CONCLUSION

Proximal serrated polyp detection (pSPDR) rate showed an insignificant difference between the screening group and other indications group. Although there are no studies proving its association with a reduction in interval cancer or a reduction in mortality from colorectal cancer, a strong correlation between this pSPDR and adenoma detection rate (ADR) was demonstrated. Applied to an unselected population this quality indicator could be achieved much faster than ADR due to the significant increase in the sample and it could also avoid interference in the indicator by a selection bias. Since it is an indicator associated with ADR, pSPDR does not have the strength to replace it, but if used in a complementary way it can favor colonoscopists with low volume of exams or with low volume of screening colonoscopies.

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Authors' contribution

Leite FAV: writing of text, survey execution, data collection. Rocha LCM: survey execution, supervision, text review. Silva RRR: survey execution, text review. Vilela EG: statistical analysis, text review. Alberti LR: text review. Madureira CM: data collection.

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RESUMO – **Contexto** – A efetividade da colonoscopia no rastreamento do câncer colorretal (CCR) depende de indicadores de qualidade, sendo a taxa de detecção de adenoma (TDA) a mais importante. A taxa de detecção de pólipos serrilhados proximais (TDPSp) tem sido estudada como um potencial indicador de qualidade para a colonoscopia. **Objetivo** – O objetivo é analisar e comparar a diferença de TDA e TDPSp entre pacientes submetidos à colonoscopia de rastreamento e uma população não selecionada com outras indicações para colonoscopia, incluindo vigilância e diagnóstico. **Métodos** – Esta é uma coorte histórica de pacientes submetidos à colonoscopia no serviço de endoscopia digestiva de um hospital terciário. Das 1554 colonoscopias realizadas, 573 pacientes foram excluídos. Os 981 pacientes restantes foram divididos em dois grupos: pacientes submetidos à colonoscopia de rastreamento (n=428; 43,6%); pacientes com outras indicações, incluindo vigilância e diagnóstico (n=553; 56,4%). **Resultados** – A taxa de detecção de adenoma do grupo com outras indicações (50,6%) foi superior à do grupo de rastreamento (44,6%; *P*=0,03). Em relação ao TDPSp, não houve diferença entre os dois grupos (triagem 13,6%; outras indicações 13,7%; *P*=0,931). Não houve diferença significativa na idade média (*P*=0,259) ou na proporção de homens e mulheres (*P*=0,211) entre os grupos. **Conclusão** – A taxa de detecção proximal de pólipos serrilhados mostrou uma diferença insignificante entre os grupos com diferentes indicações para colonoscopia e poderia ser utilizada como um indicador complementar a TDA. Isso beneficiaria colonoscopistas com baixo volume de colonoscopias ou baixo volume de colonoscopias de rastreamento.

DESCRITORES – Colonoscopia. Indicadores de qualidade em assistência à saúde. Pólipos do colo. Pólipos adenomatosos.

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