



# Quality Criteria for Colonoscopy in a Digestive Endoscopy Unit in Abidjan

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## ABSTRACT

**Aim:** to assess the quality criteria of colonoscopy in an endoscopy unit. Patients and methods: descriptive and analytical cross sectional study with retrospective and prospective recruitment including all diagnostic and or therapeutic colonoscopies performed in a Polyclinic between June 2017 and June 2020.

**Material and methods:** Colonoscopies whose reports had missing data were excluded and any colonoscopy interrupted, rescheduled within 48 hours. The Chi2 test was used to compare the different variables. The odds ratio (OR) and 95% confidence intervals (CI) were calculated to assess the strength of association between the major indicators and the different independent variables. The significance level was set at  $p < 0.05$ .

**Results:** Out of a total of 1194 colonoscopies performed by 04 endoscopists, 1098 colonoscopies were retained. The average age was 51.7 years (02 to 86), with a sex ratio of 1.12. Abdominal pain (25%), rectal bleeding (20.8%) and transit disorders (11%) were the main indications. Screening colonoscopy accounted for 10.7%. The diagnostic yield of colonoscopy was 77.2%. The most frequent organic lesions were polyps (18.11%,  $n=173$ ) followed by hemorrhoidal disease (17%,  $n=162$ ) and colonic diverticulosis (11.51%,  $n=110$ ). There were 23 cases of colorectal tumor of malignant appearance. The rate of adequate bowel preparation was 82% and 25 colonoscopies were assessed according to the BBPS, 80% of which had a Boston score  $\geq 6$ . The complete colonoscopy rate was 99.3%. The TDP was 15.82%; the overall ADD was 10.6%, varied according to the endoscopist from 3.92 to 16.12%; with an ADHD of 2.91%. In univariate analysis, good colonic preparation ( $p=0.019$ ), age  $\geq 40$  years ( $p=0.01$ ) and the indication for CRC screening ( $p=0.01$ ) were factors correlated with the detection of polyps. In multivariate analysis, age  $\geq 40$  years (OR: 1.95; 95% CI: 1.12-3.40;  $p: 0.017$ ) and good co-lonic preparation (OR: 2.19; 95% CI: 1, 10-5.38;  $p: 0.04$ ) were independently associated with the detection of polyps. Factors independently associated with adequate bowel preparation were absence of diabetes (OR: 17.37; 95% CI: 6.50-46.38;  $p: 0.001$ ) absence of pelvic surgery (OR: 6.02; 95% CI: 2.17-16.7;  $p: 0.001$ ) and the absence of arterial hypertension (OR: 3.38; 95% CI: 1.56-7.30;  $p: 0.02$ ). The factor associated with the detection of adenomas were age  $\geq 40$  years (OR: 10.08; 95% CI: 1.2-82.60;  $p: 0.01$ ).

**Conclusion:** the quality of colonoscopy is still suboptimal compared to the required international standards. Age  $>40$  years, absence of comorbidities and adequate colonic preparation were factors associated with major indicators of colposcopy quality Key words: Colonoscopy, Quality indicators, Adenoma, Colorectal cancer.

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## INTRODUCTION

Colonoscopy is the gold standard examination for the morphological exploration of the colon, for the diagnosis and treat-

ment of neoplastic colorectal lesions, common to all strategies for the detection and prevention of colorectal cancer (CRC) [1]. The current practice of colonoscopy and the few studies focus-

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ing on the evaluation of these major criteria taken concomitantly have led us to carry out this work.

The main goal is to assess the quality of colonoscopies and determine the factors associated with the 2 major quality indicators (Figure 1).

## MATERIALS AND METHODS

A cross sectional study with retrospective and prospective recruitment including all screening, diagnostic and therapeutic colonoscopies carried out in the digestive endoscopy unit and in the anatomopathology department of the Polyclinique Internationale Sainte Anne-Marie (PISAM) during the period from June 2017 to June 2020, i.e. a period of 3 years. We recruited from colonoscopy reports and anatomic pathology reports from patients during the study period. Colonoscopies with missing data and any incomplete colonoscopy rescheduled within 48 hours were excluded. The endoscope set used corresponded to OLYMPUS colonoscopes equipped with the NBI virtual staining system, generation Exera III-190 and Karl STORZ colonoscopes with full HD 22 camera equipped with the FISE virtual staining system. For colic preparation, continuous intake has been the order of the day since 2017 with the use of polyethylene glycol (PEG) distributed as follows: 4 liters of preparation to drink the day before the exam from 7 pm. to midnight. The fractional intake reserved for hospitalized patients and elderly patients with the use of PEG distributed as follows: 2 liters to drink the day before the examination from 7 pm. to midnight and 2 liters to drink in the morning 2 to 3 hours before the examination. The residue free diet 2-3 days before the colonoscopy was prescribed except in emergency cases. To optimize colonic preparation, some operators used the Normacol enema before the exam. Almost all colonoscopies were performed under sedation. Operators were provided with biopsy forceps, cold loops and diathermic loops of 27 to 33 mm in diameter for the resection of polyps. Resected polyps were collected using a polyp trap or mesh loop and forwarded to the anatomy pathology laboratory. The parameters studied: demographic (age, sex), clinical (indications, history), endoscopic (a-colonic preparation evaluated either qualitatively according to the terms good, average or poor or quantitatively according to the Boston score evaluating the quality of the segment preparation by segment, right colon, transverse colon and left colon, side 0 to 3 points. It was qualified as adequate if the overall score is  $\geq 6$ , in accordance with the European recommendations of the ESGE. b-cecal intubation, c-results colonoscopy, d-description of the polyps: size in mm, location and appearance, e-complications: perforation or hemorrhage, f-iconography: cecum, ileocecal valve and/or mucosal lesion) and anatomopathological (type histological and description of adenomas: size in mm, contingent: tubular, villous, tubulovillous, low and high grade degree of dysplasia). For the evaluation of the adenoma detection rate (ADD): we measured the ADD for screening colonoscopies (age 50 years and over, after exclusion of incomplete colonoscopies, surveillance and treatment) which corresponded to the ratio of the number of colonoscopy with at least one adenoma out of the total number of colonoscopies. It was calculated on the population after exclusion of the above mentioned parameters and also according to the four endoscopists.

## RESULTS

Out of a total of 1194 colonoscopies performed by 04 endoscopists, 1098 colonoscopies were evaluated (91.95%). The average age was 51.7 years with extremes ranging from 02 years to 86 years. The predominance was male with a sex ratio of 1.12. Abdominal pain (25%), rectal bleeding (20.8%) and transit disorders (11%) were the main indications. Screening colonoscopy accounted for 10.7%. The diagnostic yield of colonoscopy was 77.2%. The most frequent organic lesions were polyps (18.11%, n=173) followed by hemorrhoidal disease (17%, n=162) and colonic diverticulosis (11.51%, n=110). There were 23 cases of colorectal tumor of malignant appearance. The rate of adequate colonic preparation was 82% and 25 colonoscopies were evaluated according to the BBPS, 80% of which had a Boston score  $\geq 6$ . The colonoscopy was complete in 99.3% of cases, incomplete in 8 patients secondary to impassable tumor stenosis (06 cases), a scarred abdomen (01 case) and a dolichocolon (01 case). The TDP (polyp detection rate) was 15.82%. The ADD (adenoma detection rate) was 10.6% with a variation according to the endoscopist from 3.92 to 16.12%; with ADHD (advanced adenoma detection rate) of 2.91%. In univariate analysis, good colonic preparation ( $p=0.019$ ), age  $\geq 40$  years ( $p=0.01$ ) and the indication for CRC screening ( $p=0.01$ ) were factors correlated with the detection of polyps and in multivariate analysis, only age  $\geq 40$  years (OR: 1.95; 95% CI: 1.12-3.40;  $p: 0.017$ ) and good colonic preparation (OR: 2.19; 95% CI: 1.10-5.38;  $p: 0.04$ ) were independently associated. Factors independently associated with adequate bowel preparation were no diabetes (OR: 17.37; 95% CI: 6.50-46.38;  $p: 0.001$ ), no pelvic surgery (OR: 6, 02; 95% CI: 2.17-16.7;  $p: 0.001$ ) and the absence of arterial hypertension (OR: 3.38; 95% CI: 1.56-7.30;  $p: 0.02$ ). Those associated with the detection of adenomas were age  $\geq 40$  years (OR: 10.08; 95% CI: 1.2-82.60;  $p: 0.01$ ).

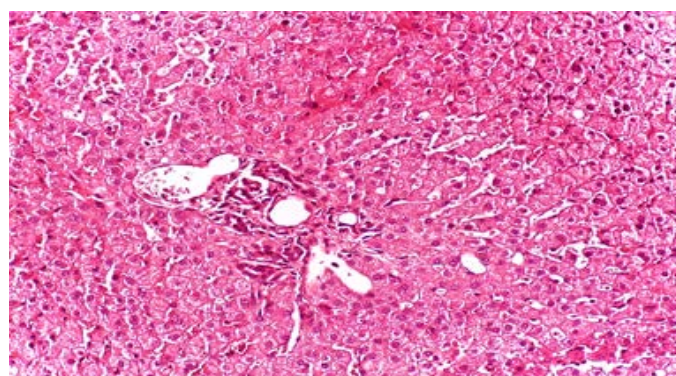


Figure 1: chronic viral hepatitis

## DISCUSSION

The mean age in our study was 51.7 years. Our results were similar to several African series. Assi, et al. in Côte d'Ivoire in 2015, Kenfack, et al. in Cameroon in 2019, Onyekwere, et al. in 2013 in Nigeria had found average ages of respectively 52.9 years, 51, 9 years old and 51.2 years old [2-4]. On the other hand in the EtienneW, et al. in 2018 in France, Adler, et al. in 2013 in Germany reported higher average ages of 67 years and 64.5 years respectively [5,6]. This could be explained in part by the distribution of the sub-Saharan population, which is rela-

tively younger compared to the West. In addition, according to the last census of Côte d'Ivoire in 2018, more than 70% of the population was young. The main indications found in our study were abdominal pain (25%), rectal bleeding (20.8%) and transit disorders (11%). This was consistent with the data in the literature. In Côte d'Ivoire, in 2015 Okon, et al. found rectal bleeding (25.4%), abdominal pain (22.9%) and transit disorders such as constipation (14.3%) as the main indications % [7]. Likewise for Assi, et al. abdominal pain (32.6%), transit changes (24.2%) and rectal bleeding (22.2%) were predominantly represented [2]. In Nigeria, Onyekwere, et al. reported 24.2% lower gastrointestinal bleeding, 9.2% transit disorder and 9.1% abdominal pain [4]. In the United States, for Lieberman, et al. Low digestive bleeding (33.6%) and symptoms suggestive of irritable bowel syndrome (23.8%) were the main indications [8]. Rectal bleeding is one of the main indications in the majority of studies, certainly because of the alarming nature of this sign for both the clinician and the patient. This is one of the most frequent circumstances in which CRC is discovered as a major issue in colonoscopy. Screening for CRC in our series represented only 10.7% (n=118) of all of our indications. This low prevalence was superimposed on most African studies [7,9]. Similarly for Rehman, et al. in Pakistan in 2015, screening for CRC represented 14.1% (n=71) [10]. On the other hand, in the West, Barclay, et al. found a higher rate of 26.04% (n=2053) [11]. This discrepancy could be explained by the absence of a national program set up in Cote d'Ivoire for the systematic screening of the population presenting an average risk factor for CRC. The quality of the preparation is an obvious factor in the diagnostic and therapeutic effectiveness of colonoscopy. In our series, the data relating to the colonic preparation were specified in 94.17% of the cases and was considered "good" in 82% of the cases. These rates were similar to the series by Okon, et al. and Onyekwere, et al. in which the preparation was qualified as good in 81% and 81% respectively [4,7]. This rate was lower than that of Assi, et al. where the colonic preparation was considered good or excellent in 95% of cases [2]. On the other hand, our rate was higher than the series of Ennaifer, et al. in Tunisia where it was good in 24% of cases [12]. Due to the subjective nature of this qualitative assessment, it is difficult to be able to explain so much discrepancy. But, it is described in the literature that the diet without residues the day before and the fractional intake of the preparation would optimize the colonic preparation. Poor preparation can lead to missed lesions, leading to the risk of prolonging the duration of the examination and the performance of repeated colonoscopies at shorter intervals [6,13]. In the present study, poor colonic preparation was found in 6% of cases. International standards currently recommend a more objective qualification of colonic preparation by the quantitative Boston score with an adequate colonic preparation rate (Boston  $\geq 6$ )  $\geq 90\%$ . In our series, only 25 colonoscopies (2.25%) were assessed by Boston and 80% had adequate colonic preparation. In previous African series this Boston score was not specified. On the other hand, we observed a greater use of Boston in the Western series. In France, there was a significant increase in its use, which rose from 18.8% in 2014 to 54.3% in 2016 and 86.4% in 2018 [5]. In our series, colonoscopy was normal in 22.8% of patients. The yield for this exam was 77.2%. This result was close to that of the series of Olokoba, et al. in 2013 and Akere, et al. in 2016 in Nigeria

[7,14,15] which had reported rates of return as high respectively of 79.1%; 79.6% and 74%. In our population, the main organic lesions were colorectal polyps 173 cases (18.11%) followed by hemorrhoidal disease 162 cases (17%) and colonic diverticulosis 110 cases (11.51%). Our results were similar to a similar study carried out in 2016 in Tunisia on a population of 859 colonoscopies with 21% polyps [12]. Akere, et al. found polyps (23.32%), hemorrhoids (20.8%) and colonic diverticulosis (14.8%) as frequent lesions [15]. In the series by Rehman, et al. colorectal polyps represented the second organic lesion (11.3%) after hemorrhoids [10]. Okon, et al. found a polyp detection rate of 11.4% (n=132) after inflammatory colonic lesions 22.5% [7,10]. In the West there was a higher polyp detection rate. Etienne in France, on an observation made during the first 3 semesters of 2014; 2016 and 2018 found higher prevalence, respectively 37.5%; 36.6% and 36.8% [5]. Armstrong, et al. in Canada had reported a proportion of 41.2% [16]. Gavin et al in a national audit on colonoscopies in the UK had found 32.1% [13]. In our series, the adenoma was the most frequent histological type (85%), a result comparable to data in the literature indicating that two thirds of colon polyps are adenomas [17]. Due to the difficulty in relating endoscopic data to histologic results, several previous African series [2,4,9,12] did not mention the proportion of adenoma on the resected polyps. The low prevalence of colorectal cancer (23 cases or 4.1%) in our population was superimposed on several African studies [2,3,7,9] unlike in the West where the prevalence of CRC was much higher [5]. This confirms the data in the literature, in particular on the epidemiology of CCR in Africa in general and in Côte d'Ivoire in particular [18]. Completeness of the examination was achieved 99.3% of the time, which was in line with recommendations for a minimum of 90%. Our results were in line with those of Etienne, et al. in France with 91.7%, Adler, et al. and in Germany with 98%, Gavin, et al. in England with 92.3%, Assi, et al. with 97.9% Ferreira, et al. in Portugal with 92% [5,6,9,13,19]. Factors related to failure in the literature were poor colonic preparation, absence of sedation, colonic diverticulosis, impassable strictures [13,20]. The overall ADD in our study was 10.6%, well below the current quality threshold of 25% set by digestive endoscopy learned societies for screening colonoscopies. This result was discordant with that of Etienne, et al who had obtained a higher overall ADR of 24.3% in 2014; 26.9% in 2016 and 28.7% in 2018 [5]. Ferreira, et al. reported an ADD of 36% [19]. This difference could be explained by the fact that the vast majority (83%) of the indications for their colonoscopies were for FIT (Fecal Occult Blood Immunological Test) positive. In our series, there was a significant inter-endoscopist variation in the rate of detection of adenomas from 3.9% to 16.12%. Kaminski, et al. also found in 186 endoscopists a variation of ADD: 43% of the operators had a rate  $<11\%$ ; 24.7% an ADD between 11%-14.9%; 18.3% an ADD between 15%-19.9% and only 14% an ADD  $\geq 20\%$  [21]. In our series, we found 06 villous contingent adenomas, 02 of high grade and 17 (27.4%) of size  $\geq 10$  mm. However, due to the variations in histopathological interpretations of the villous component and the degree of dysplasia, we considered the parameter size of adenomas  $\geq 10$  mm more reliable for the advanced character, ie an ADHD of 2.91%. Ferreira et al reported an ADD of 19% [19]. This could be explained by our low sampling of adenomas. In multivariate analysis, the only factors



independently associated with an adequate colonic preparation were the absence of associated pathologies: the absence of previous digestive surgery (OR: 6.02; 95% CI: 2.17-16.70; p: 0.001), absence of diabetes (OR: 17.37; 95% CI: 6.50-46.38; p: 0.001), absence of hypertension (OR: 3.38; 95% CI: 1.56-7.30; p: 0.02). Our results were similar to those of Gimeno-Garcia, et al. in Spain in 2017 on a cohort of 667 patients, who also found that the comorbidities (OR: 3.35; 95% CI: 2.16-5.18), a history of abdominal/pelvic surgery was predictive of inadequate bowel preparation [22]. In addition, two recent meta-analyses comprising 67 and 24 studies with more than 75,000 and 50,000 participants, respectively, assessed the risk factors independently identified up to 2016 [23,24]. Clinical conditions such as diabetes, hypertension blood pressure have been identified as predictors of colonic preparation failure; however, they failed to identify a history of abdominal surgery as a predictor. In multivariate analysis, the factors independently associated with the detection of polyps were good colonic preparation (OR: 1.95; 95% CI: 1.12-3.40; p: 0.017) and age  $\geq$  40 years (OR: 2.19; 95% CI: 1.10-5.38; p: 0.04). Our results were superimposable on those of Ennaifer, et al. in Tunisia [12] who found that the age greater than 47 years (p: 0.04; OR: 3.5; 95% CI: 2-5.9) and Adequate preparation quality (p: 0.001; OR: 5; 95% CI: 2.7-9.6) were significantly associated with the rate of polyps detection. Harewood, et al. (OR: 1.2; 95% CI: 1.16-1.25), Froehlich, et al. (OR: 1.46; 95% CI: 1.1-1.9) and Shaukat, et al. (OR: 2.26; 95% CI: 1.64-3.12) found that the detection of polyps significantly increased in the event of adequate colonic preparation [23,25,26]. In univariate analysis, the only predictable variable associated with the detection of adenomatous polyps was age  $\geq$  40 years (p: 0.01; OR: 10.08; 95% CI: 1.2-82.6). Indeed, the link between increasing age and the occurrence of adenomas has long been published in several studies [27]. In addition, it is without ignoring the existence of confounding variables linked to age but not taken into account in our series due to the type of recruitment; among these we can cite overweight which, according to a recent meta-analysis, is a risk factor for colorectal neoplasia, especially in men and for proximal locations [28]. The majority of hospital series and meta-analyses such as those by Gupka, et al. in 2016 and Clark B, et al. in 2014 attest that an adequate colonic preparation improves the detection of adenomas (p=0.001) [29,30]. The same is true in our series where we observed an increase in the detection of adenomas in subjects with an adequate colonic preparation although it was not significant (p=0.82).

## CONCLUSION

The quality of colonoscopy is still suboptimal compared to the required international standards. Advanced age, the absence of co-morbidities and adequate colonic preparation are factors associated with indicators of colonoscopy quality.

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## CONFLICT OF INTEREST

None

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