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Appropriateness of Colonoscopy in Young Adults Under 40 years Old with Hematochezia at Brazzaville, Republic of the Congo

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ABSTRACT

Introduction: *Given the high incidence of colorectal cancer in people aged 50 and older, colonoscopy is strongly recommended for individuals in this age group who experience hematochezia. We aimed to determine, in light of the increasing cases of cancer among young adults, whether the indication for colonoscopy is warranted in individuals under 40 who present with hematochezia.*

Methods: *We conducted a retrospective, observational study involving patients aged 18 to 39 who underwent colonoscopy between January 1, 2020, and December 31, 2024 across three gastrointestinal endoscopy centers in Brazzaville. Patients were categorized into two groups: those who underwent colonoscopy for hematochezia (Group 1) and those who underwent colonoscopy for other indications (Group 2). In both groups, we assessed sociodemographic characteristics, the frequencies and location of cancers and polyps. Additionally, we evaluated the frequencies of other causes of hematochezia in Group 1. Fisher's exact test was used to compare the frequencies of selected lesions between the two groups*

Results: *During the study period, 352 patients aged 18 to 39 years underwent total colonoscopy, including 80 for hematochezia (Group 1) and 272 for other indications (Group 2). In Group 1, the mean age was 31.5 ± 5.1 years, with 56% of patients being male. Hemorrhoids were the most prevalent cause of hematochezia. In Group 2, the mean age was 32 ± 5.6 years, with males constituting the 55.2% of the cohort. There prevalence of colorectal cancer was 10% in Group 1 and 4% in Group 2 (p=0.058). Cancers were predominantly located in the distal colon for both groups. The prevalence of polyps in Groups 1 and 2 was 5% and 2.5%, respectively.*

Conclusion: *The prevalence of colorectal cancer was higher among patients who underwent colonoscopy for rectal bleeding compare to those with other indications. Although the majority of cancers were located in the distal colon, the presence—albeit rare—of cancer localized to the right side highlights the necessity of performing complete colonoscopies in order to avoid missing proximal malignancies.*

Keywords

Young adult, Hematochezia, Colonoscopy, Appropriateness, Brazzaville.

Introduction

Colorectal cancer is a major public health issue in the field of oncology. It is the second leading cause of cancer-related deaths and the third most common cancer worldwide [1]. Hematochezia

is one of its most common clinical manifestations [2]. In patients with hematochezia, its prevalence is significantly higher than in asymptomatic patients, even in younger age groups [3-5]

Historically colorectal cancer has been perceived as a condition predominantly affecting individuals aged 50 years and above. However, over the past two decades, there has been an epidemiological shift characterized by a decrease among those over 50 and a rise among younger adults [6,7] Furthermore some studies have documented a substantial proportion of isolated proximal colon lesions in this age group [8,9]

In light of this epidemiological transition, the recommended age for initial screening has been revised from 50 to 45 years in some countries [10-12]. Medical societies now advocate for total colonoscopy in patients with hematochezia, including those under 45 years of age, due to the increasing incidence of cases in individuals younger than 50 [13,14].

Given that total colonoscopy is expensive and is accessible only at a limited number of healthcare facilities in the Republic of the Congo, coupled with the fact that the etiologies of hematochezia in younger patients are predominantly benign [15], we aimed to assess whether the existing recommendation for colonoscopy in all cases of bloody stool is justified for adult under 40 residing in Brazzaville, or if a sigmoidoscopy would suffice.

To address this inquiry, we sought to evaluate the frequency and anatomical locations of colorectal cancer lesions in young adults who underwent total colonoscopy for hematochezia in Brazzaville.

Methods

We conducted a retrospective study covering a five-year period, from January 1, 2020, to December 31, 2024, at three gastrointestinal endoscopy centers in Brazzaville, including one public hospital and two private clinics. All colonoscopies were performed by experienced gastroenterologists.

The study included patients aged 18 to 39 who underwent colonoscopy. Patients with inadequate bowel preparation, as assessed by the Boston bowel preparation scale, and those whose procedures were incomplete due to technical issues (e.g., irreducible bowel loops, patient intolerance due to pain, or suboptimal bowel preparation) were excluded. Additionally, among patients referred for colonoscopy due to hematochezia, those presenting with massive upper gastrointestinal bleeding were also excluded from the analysis.

Data were systematically extracted from the patients' colonoscopy reports. Collected data included sociodemographic information (age, sex), the type of lesions identified during colonoscopy, and their anatomical locations. Lesions were classified based on their proximity to the splenic flexure, distinguishing between proximal and distal lesions.

The study cohort was divided into two groups: Group 1 consisted of patients undergoing colonoscopy for hematochezia, while Group 2 included patients undergoing the procedure for other indications.

Statistical Analysis

Continuous variables were presented as means with standard deviations, while categorical variables were expressed as frequencies. Fisher's exact test was employed to analyze categorical data.

Statistical analyses were conducted using IBM SPSS version 20 (SPSS, Chicago, IL, USA), with a significance level set at $p < 0.05$.

Results

During the study period, a total of 1,920 patients of all ages underwent total colonoscopy, among which 352 were aged 18 to 39. Within this younger cohort, 80 patients (22.7% underwent the procedure due to hematochezia.

The mean age of the young adults who had presented with hematochezia (Group 1) was 31.1 ± 5.1 years, while the mean age of those without hematochezia (Group 2) was 32 ± 5.65 years. Males predominated in both groups; in Group 1, there were 56 men (70%) and 24 women (30%), whereas in Group 2, 150 out of 272 (55.2%) were male.

Among the patients in Group 1 who presented with hematochezia, 18 (22.5%) had a normal colonoscopy. Hemorrhoidal disease was the most frequently observed conditins, identified in 42 patients (52.5%). Colorectal cancer was diagnosed in 8 patients (10%) and polyps were noted in 4 patients (5%).

In Group 2, there were 11 cases of cancer (4.1%) and 7 cases of polyps (2.5%). Although the proportion of patients with cancer was higher in Group 1 compared to Group 2, this difference did not reach statistical significance (OR = 2.6; 95% CI: 0.8–7.5; p=0.058).

Similarly, the prevalence of polyps was not significantly different between the two groups, with 5% in Group 1 and 2.5% in Group 2 (OR: 1.9; 95% CI: 0.4–7.4; p=0.27).

Demographic characteristics of patients in both groups as well as the lesions observed during colonoscopy in those who presented with hematochezia are detailed in Tables 1 and 2.

Table 1 : Demographic characteristics.

	With hematochezia (N=80)		**Without hematochezia** (N=272)	
	n	%	n	%
Sex				
Male	56	70	150	55.2
Female	24	30	122	44.8
Age (years)				
Mean age	31.5+/-5.1		32.0+/-5.6	
18-29	26	32.5	82	30.2
30-39	54	67.5	190	69.8

Table 2: Colonoscopy findings in patients with haematochezia.

Findings	Number (n)	Frequencies (%)
Normal	18	22.5
Hemorrhoids	42	52.5
Malignancies	8	10
Polyps	4	5
Crohn disease	3	3.7
Ulcerated colitis	1	1.3
Other colitis	4	5
Diverticula	4	5

Regarding the location of the lesions, cancerous lesions situated distal to the splenic flexure was identified in 7 patients who presented with hematochezia (Group 1), accounting for 87.5% of the cases. The most frequent site of cancer were the rectum (n=3; 37.5%) and the sigmoid colon (n=3; 37.5%) (Table 3).

Table3: Malignancies and polyps in the two groups of patients.

	With haematochezia		Without haematochezia		p-value
	n	%	n	%	
Malignancies	8	10	11	4	0.058
Location related to splenic flexure					
Distal	7	87.5	9	81.8	
Proximal	1	12.5	2	18.2	
Polyps	4	5	7	2.5	0.27
Location related ti splenic flexure					
Distal	4	100	5	71.4	
Proximal	-	-	2	28.6	

In Group 2, as in Group 1, the majority of cancers were located distally comprising 81.8% of cases. The most common sites of cancer in this group were the rectum (n=2; 28.6%) and the left colon (n=2; 28.6%) (Table 4).

Table 4 : Sites of malignant lesions.

Site of malignant lesions	With hematochezia (N=8)		Without hematochezia (N=11)	
	n	%	n	%
Anal canal	-	-	1	9.1
Rectum	3	37.5	1	9.1
Sigmoid	-	-	1	9.1
Rectum and sigmoids	3	37.5	2	18.2
Left colon	-	-	4	36.4
Sigmoid and left colon	1	12.5	-	-
Transverse colon	-	-	-	-
Right colon	-	-	2	18.2
Caecum	1	12.5		-

Regarding polyps, all identified in patients presenting with hematochezia (Group 1) were found distal to the splenic flexure. Conversely, in Group 2, which included patients without hematochezia, the prevalence of distal polyps was 71.4% (Table 5).

Table 5: Site of polyps.

Site of polyp	Patients with hematochezia (N=4)		Patients without hematochezia (N=7)	
	n	%	n	%
Anal canal	-	-		
Rectum	3	75	2	28.6
Sigmoid	-	-	1	14.3
Rectum and sigmoids				
Left colon	1	25	2	28.6
Sigmoid and left colon			-	-
Transverse colon	-	-	1	14.3
Right colon	-	-		
Caecum			1	14.3

Discussion

In this study, we aimed to determine whether, among adult patients under the age of 40 living in Brazzaville who presented with hematochezia, the nature, frequency, and location of lesions observed during colonoscopy justified the performance of this procedure as recommended by Western medical societies, or whether sigmoidoscopy was sufficient.

Hemorrhoids were the most prevalent lesion identified in patients with hematochezia, a finding consistent with numerous studies that have established hemorrhoidal disease as the leading cause of lower gastrointestinal bleeding in young adults [16-21].

The prevalence of cancer in this patient group was 10%. In contrast, studies conducted on individuals under 40 in other regions report significantly lower cancer prevalence rates. In Singapore, among 494 patients under 40 years of age who presented with hematochezia, Tang et al. reported only one case of colorectal cancer [22]

In Doha (Qatar), Obeidat et al. found a 1.1% of colorectal cancer cases in patients aged 18 to 40 years [23].

Even when examining studies that encompass a broader age range, such as those involving patients aged 50 or younger, the prevalence of colorectal cancer remains lower than the findings of our work. Koh et al. reported two cases (0.5%) among 361 patients aged 18 to 50 presenting with bloody stools in Singapore [24].

Futhermore, colorectal cancer prevalence among adults presenting with hematochezia in western populations is also low, ranging from 1.3% to 3% [25].

In a study conducted in Erbil, Iraq, Haweizy identified 13 cases of colorectal cancer among 214 subjects under 45, yielding a frequency of 6.1%, which while lower than our findings, is significantly higher than those reported in the aforementioned

studies [26]. Oluyemi's research in Lagos, Nigeria revealed an prevalence of 8.5% of colorectal cancer among patients under 50 with hematochezia which is more aligned with our results [16].

When we compare cancer rates between patients who experienced hematochezia and those of the same age who did not, we observed a higher cancer rate in the hematochezia group (10% vs. 4%).

These findings are corroborated by Kavalukas et al. who demonstrated that the presence of hematochezia significantly increases the likelihood of detecting colorectal cancer in individuals under 50, with an increased risk of 8.1 during colonoscopy [27].

The higher rate of cancer in our study compared to those conducted on other continents is supported by literature indicating a younger mean age at diagnosis and a higher proportion of young adults with colorectal cancer in specific African populations compared to Western counterparts [28-30]. This underscores the necessity of considering cancer screening in young individuals presenting with hematochezia, aligning with the recommendations of professional societies in Europe and the United States, which advocate for colonoscopy in such cases [13,14].

The recognized causes of colorectal cancer in people under 50 cited in the literature are primarily environmental and genetic [31]. Although these causes were not investigated in our study, we believe that environmental factors are among the possible explanations for the high prevalence of colorectal cancer observed in our study. In many African countries, a nutritional transition toward dietary habits increasingly similar to those in the West has been described [32,33]. These dietary habits, in turn, are thought to contribute to other risk factors such as obesity.

A WHO reports highlighted a sharp rise in obesity rates across the African continent, with prevalence among adults aged 18 and older increasing from 8.64% in 2010 to 12.08% in 2022 [34]. This trend is also evident among younger individuals, with Kerr et al. documenting an increase in obesity prevalence in sub-Saharian African from 1.3% to 3.6% and overweight status from 6.7% to 11.3% between 1990 and 2012 [35].

Investigating hereditary factors in our context poses challenges, often due to cultural perceptions of disease, which may render cancer a taboo subject linked to spiritual beliefs. Consequently, causes of death are not always disclosed and patients may lack awareness of their familial cancer history, complicating the identification of hereditary cancer syndromes [36,37].

With regard to the location of the cancers, they were predominantly distal to the splenic flexure. This was observed in both patients who had presented with bloody stools and those who had not, at 87.5% and 81.8%, respectively.

The literature supports this finding, indicating that colorectal cancers in young adults are predominantly distal [38]. Factors contributing to the left-sided predominance of these cancers include sedentary lifestyles, high-fat and high'sugar diets, the microbiome and genetic predispositions [39]. A sedentary lifestyle coupled with increased sugar intake can lead to hyperinsulinemia, which activates IGF-1 receptors concentrated in the rectum and distal colon, promoting cellular proliferation and inhibiting apoptosis. Furthermore, diets rich in fat and sugar can alter bile acid composition, leading to the production of pro-inflammatory secondary metabolites that damage the distal mucosa. The microbiota may also play a critical role in the development of distal cancers by fostering a microenvironment conductive to early cellular mutations particularly through bacteria that preferentially colonize rectal tissues.

The markedly high prevalence of distal cancers observed in this study (87.5% among patients presenting with hematochezia and 81.8% among those without) supports the recommendation for performing sigmoidoscopy in individuals under the age of 40. However, it remains challenging, within the African context, to accurately identify patients at risk for hereditary cancers compared to those who are not. Consequently, given that these neoplasms may also present proximally, it is prudent to conduct a total colonoscopy to avoid overlooking a potential proximal cancerous lesion.

In terms of polyps, the prevalence was significantly lower than that of cancer, with only four out 80 patients undergoing colonoscopy for hematochezia having a polyp (5%), all of which were located distally.

A low incidence of polyps in young populations has also been reported in a study from India, which analyzed 1,604 colonoscopies and found a prevalence of a 2.3% in patients under 30 years of age, 5.8% in those aged 30 to 40, and 23.8% in those aged 40 to 50 [40].

The predominance of left-sided polyps in our study is also consistent with existing literature, which indicates that 75% of colorectal polyps are distal in individuals under 50 [41].

However, our study had certain limitations. It was a retrospective analysis based on colonoscopy reports, limiting our ability to obtain critical data such as personal or family medical histories of cancer, dietary habits, and anthropometric measurements necessary for identifying cancer risk factors. Additionally, the relatively small size of the patient population presenting with hematochezia restricts the generalization of our findings to the broader population of Brazzaville.

Conclusion

In our study, which focused on patients under the age of 40 who presented with hematochezia, hemorrhoids emerged as the most prevalent etiology. Following this, colorectal cancer was identified, with the majority of cases localized to the distal colon. The occurrence of a case of proximal colorectal cancer highlights the necessity of considering both personal and familial medical histories when determining the appropriateness of total colonoscopy versus sigmoïdoscopy, even in younger adults.

In instances where it is challenging to accurately ascertain a patients's medical history, total colonoscopy should be prioritized to prevent the oversight of proximal cancers or lesions with significant potential for malignant transformation.

The notable prevalence of colorectal cancer among young adults in our cohort raises critical questions regarding the optimal age for initiating colorectal cancer screening in sub-saharan African populations.

Further research is warranted to establish tailored criteria for early colorectal cancer screening that are specific to these demographic groups.

References

1. Bray F, Laversanne M, Sung H, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2024; 74: 229-263.
2. Frazzoni L, Laterza L, La Marca M, et al. Clinical value of alarm features for colorectal cancer: a meta-analysis. Endoscopy. 2023; 55: 458-468.
3. Demb J, Kolb JM, Dourel J, et al. Red flags signs and symptoms for patients with early-onset colorectal cancer A systematic review and meta-analysis. Jama Netw Open. 2024; 7: 2413157.
4. Qu LS, Gubi MM. Clinical characteristics of colonoscopy in 448 patients in Zanzibar Archipelago: a cross-sectional study. Pan Afr Med J. 2022; 41: 310.
5. Demb J, Liu L, Murphy CC, et al. Young-onset colorectal cancer risk among individuals with iron-deficiency anaemia and haematochezia. Gut. 2021; 70: 1529-1537.
6. Vuik FE, Nieuwenburg SA, Bardou M, et al. Increasing incidence of colorectal cancer in young adults in Europe over the last 25 years. Gut. 2019; 68: 1820-1826.
7. He YF, Zhang L, Hu DZ, et al. Global Burden of Colorectal Cancer in Adolescents and Young Adults from 1990 to 2021: A Systematic Analysis of the Global Burden of Disease Study 2021. Health Sci Rep. 2025; 8: e71587.
8. Liu Z, Kong W, Lin Y, et al. Clinical and pathological characteristics of patients with colorectal cancer under age stratification. Front Oncol. 2026; 15: 1656277.
9. Topdagi O, Timuroglu A. Eighteen years' retrospective review of colorectal cancer cases in eastern population. Eurasian J Med. 2018; 50: 19.
10. Shaukat A, Kahi CJ, Burke CA, et al. ACG clinical guidelines: colorectal cancer screening 2021. Am J of Gastroenterol. 2021; 116: 458-479.
11. Davidson KW, Barry MJ, Mangiome CM, et al. Screening for colorectal cancer: US Preventive Services Task Force Recommendation Statement. JAMA. 2021; 325: 1987-1998.
12. Goulding M. Clinical practice guidelines for the prevention, early detection and management of colorectal cancer: population screening. Cancer Council Australia. 2023.
13. Triantafylou K, Gkolfakis P, Gralnek IM, et al. Diagnosis and management of acute gastrointestinal bleeding: European Society of Gastrointestinal Endoscopy (ESGE) Guideline. Endoscopy. 2021; 53: 850-868.
14. Oakland K, Chadwick G, East JE, et al. Diagnosis and management of acute lower gastrointestinal bleeding guidelines from the British Society of Gastroenterology. Gut. 2019; 68: 776-789.
15. Sabry AO, Goosenberg E, Dsouza R, et al. Rectal Bleeding. In: StatPearls. Treasure Island (FL): StatPearls Publishing. 2026.
16. Oluyemi A, Odeghe E, Adeniyi O. Colonoscopy findings in lower gastrointestinal bleeding in Lagos Acomparative study based on age. Niger J Clin Pract. 2020; 23: 1656-1659.
17. Paul J. Colonoscopic findings of patients with lower gastrointestinal bleeding at different age group in eastern part of India–An observational study. Prague Med Rep. 2020; 121: 25-34.
18. Gralnek IM, Ron-Tal Fisher O, Holub JL, et al. The role of colonoscopy in evaluating hematochezia: a population-based study in a large consortium of endoscopy practices. Gastrointest Endosc. 2013; 77: 410-418.
19. Jehangiri AU, Gul R, Hadayat R, et al. Causes Of Lower Gastrointestinal Bleeding On Colonoscopy. J Ayub Med Coll Abbottabad. 2017; 29: 468-471.
20. Irowa OO, Agbonrofo PI, Odigie VI. Colonoscopy findings in patients with haematochezia in Benin (South-South Nigeria): A 9-year prospective study. J West Afr Coll Surg. 2024; 14: 275-279.
21. Kpossou AR, Sokpon CN, Amou FJ, et al. Lower Gastrointestinal Bleeding in Adults in Cotonou from 2017 to 2022: Epidemiological, Diagnostic, Therapeutic, and Prognostic Aspects. West Afr J Med. 2023; 40: S16.
22. Tang MH, FOO FJ, Ng CH. Endoscopic findings in patients under the age of 40 years with hematochezia in Singapore. Clin Endosc. 2020; 53: 466-470.
23. Obeidat IM, Yahia Y, Chandra P, et al. Evaluating the necessity of colonoscopy in patients under 40 with rectal bleeding: insights from a large-scale retrospective analysis. Int J Colorectal Dis. 2024; 39: 202.
24. Koh FH, Seah A, Chan D, et al. Is colonoscopy indicated in young patients with haematochezia. Gastrointest Tumors. 2017; 4: 90-95.
25. Yourkin M, Kiely MX, Chen L, et al. Prevalence of colorectal cancer in young patients with isolated bright red blood per rectum (BRBPR). Am J Digest Dis. 2017; 4: 6-12.
26. Haweizy R, Qader FN. The value of colonoscopy in assessing rectal bleeding in patients referred from outpatients care units in Erbil, Iraq. Cureus. 2024; 16: e71911.
27. Kavalukas S, Jin A, Gaskins J, et al. Risks factors and indicators for Early Onset Colorectal Cancer: A Retrospective

Analysis, Scientific forum, American College of Surgeons (ACS) Clinical Congres. 2025. https://www.facs.org/media-center/press-releases/2025/rectal-bleeding-in-young-adults-linked-to-85-times-higher-risk-of-colorectal-cancer/

28. Alatise OI, Knapp GC, Sharma A, et al. Molecular and phenotypic profiling of colorectal cancer patients in West Africa reveals biological insights. Nat Commun. 2021; 12: 6821.
29. Saluja S, Alatise OI, Adewale A, et al. A Comparison of Colorectal Cancer in West African and North American Patients: Is the Cancer Biology Different? Surgery. 2014; 156: 305-310.
30. Matovu N, Coleman HG, Mesa-Eguiagaray I, et al. The descriptive epidemiology of age at colorectal cancer diagnosis in Africa: a systematic review and meta-analysis. EclinicalMedicine 2025; 88: 1-20.
31. Darrius R, Denis B, Abdelghani MB. Cancer colorectal avant 50 ans: c'est comment qu'on freine?. Hépato-Gastro Oncol. Dig. 2023; 30: 180-194.
32. Voster HH, Kruger A, Margetts BM. The nutrition transition in Africa: can it be steered into a more positive direction? Nutrients. 2011; 3: 429-441.
33. Steyn NP, McHiza ZJ. Obesity and the nutrition transition in Sub-Saharan Africa. Ann N Y Acad Sci 2014; 1311: 88-101.
34. World Health Organization. Regional Office for Africa. Alarming Rise: Obesity Statistics Reveal an Urgent Health Crisis in Africa. Executive Summary. Brazzaville: OMS; 2024. https://files.aho.afro.who.int/afahobckpcontainer/production/files/Regional_Obesity_factsheet_June24-FR.pdf
35. Kerr JA, Patton GC, Cini KI, et al. Global, regional, and national prevalence of child and adolescent overweight and obesity, 1990-2021, with forecasts to 2050: a forecasting study for the global burden of disease study 2021. Lancet. 2025; 405: 785-812.
36. Jegede AS. Culture and genetic screening in Africa. Dev World Bioeth. 2009; 9: 128-137.
37. Sathiyaseelan G, Hashim SM, Nawi AM. Sociocultural factors influencing women's adherence to colorectal, breast, and cervical cancer screening: a systematic review. BMX Public Health. 2025; 25: 2034.
38. Kyrochristou ID, Lianos GD, Kyrochristou GD, et al. Early-onset colorectal cancer in patients younger than 50 years: a systematic review of the literature. Ann Gastroenterol. 2025; 38: 364-379.
39. Hofseth LJ, Hebert JR, Chanda A, et al. Early-onset colorectal cancer: initial clues and current views. Nat Rev Gastroenterol Hepatol. 2020; 17: 352-364.
40. Jayadevan R, Anithadevi TS, Sabu S, et al. Prevalence of colorectal polyps: A Retrspective study to determine the cut-off age for screening. Gastroenterol Pancreatol liver Disorder. 2016; 3:1-5.
41. Yam ST, Mclauchian J, McCombie A, et al. Colorectal polyp distribution in relation to age: meta-analysis. BJS open. 2025; 9.