MEDDOCS Open Access Publisher

ISSN: 2637-4501

Annals of Gastroenterology and the Digestive System

Open Access | Research Article

Lower Gastrointestinal Disease Pattern in Sudan

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Received: Nov 15, 2021

Accepted: Dec 20, 2021

Published Online: Dec 24, 2021

Journal: Annals of Gastroenterology and the Digestive System

Publisher: MedDocs Publishers LLC

Online edition: http://meddocsonline.org/

Keywords: Colonoscopy; Flexible sigmoidoscopy; Pattern of lower gastrointestinal disease; Lower GI bleeding; Colorectal cancer; Sudan.

Abstract

Objectives: Data on lower Gastrointestinal (GI) disease are generally sparse. In addition, the pattern of GI disease is changing over time.

The objectives of this study were to identify the main indications and associated endoscopic findings in patients presenting for elective lower GI endoscopy at a major teaching hospital, thus provide database and identify the current pattern of lower GI disease in our community.

Methods: This is a descriptive analytic study. We analyzed data collected prospectively over a period of 12 years (2007-2019). These included demographic data of patients, symptoms and endoscopic findings.

Results: The study included 1086 patients. Diagnostic endoscopies (colonoscopy and sigmoidoscopy) were done for 989 patients (95.5%) and therapeutic procedures for 48 patients (4.5%). The most common symptoms were rectal bleeding (51.3%), followed by change in bowel habits (12.6%), abdominal pain (7.7%), perianal pain (6.7%) and anemia (4.1%). We further analyzed these symptoms regarding the endoscopic findings.

Endoscopic findings showed prevalence of diseases once thought to be rare or non-existing. Colorectal tumors accounted for (10.1%) of the patients, most of which (80%) had rectal tumors and (34.5%) of these patients were below the age of 50.

Conclusion: This study shows the current pattern of lower GI disease. There are trends of 'westernization' of disease and rectal cancers in younger patients than classically reported. These findings would have a strong socio-economic impact on individual, society, and country as a whole. It provides important endoscopic database to policymakers, clinicians and researchers. It highlights the importance of endoscopy services, and focuses on areas needing further studies.

Cite this article: Shallaly GEHA, AB Ibrahim B, MI Elhajahmed M, ME Salih M, FE Mohammed M, et al. Lower Gastrointestinal Disease Pattern in Sudan. Ann Gastroenterol Dig Syst. 2021; 4(2): 1053.

Introduction

Data on lower Gastrointestinal (GI) disease patterns, particularly from developing countries, are sparse. Over the years, there have been changes in population demography, feeding habits, and pathology.

Modern video-endoscopies are now available as well as expertise. Data build up helps identifying the pattern of GI disease in the community. This could provide benchmarks for endoscopic practice and highlight areas of community needed research.

The objectives of this study were to identify the most common presenting symptoms (indications) and the endoscopic findings in patients presenting for routine lower Gastrointestinal Tract (GIT) endoscopy at Khartoum North Teaching Hospital (KNTH), Sudan. This knowledge would draw a picture of the current pattern of gastrointestinal disease and buildup database for the benefit of endoscopic units and health providers. It would allow us to compare and identify changes of disease pattern over time. It would highlight areas for future research and also allow making comparisons with regional and international data.

As far as we know, this is the largest data collection in a Sudanese study for decades.

Patients and methods

Ethical approval was obtained from the research and ethics committee at the Ministry of Health and KNTH. Informed consents were obtained from patients for the endoscopy and participation in the study.

We analyzed data collected prospectively on consecutive patients, who underwent lower GI endoscopies at KNTH over a period of 12 years (from February 2007 to November 2019). KNTH is one of the 3 major governmental teaching hospitals in the capital Khartoum (Sudan). Its catchment area includes over 2 million inhabitants and is increasing. It has a busy endoscopy unit where 3 experienced endoscopists (2 surgeons and one internist) do diagnostic and therapeutic procedures. A pro-forma was designed to collect patient's biodata, which included: Age, gender. In addition data on the type of GIT endoscopy -(Upper/Lower/Diagnostic/Therapeutic)-, the main presenting symptoms/ indication(s), as well as the endoscopic findings.

Statistical analysis of the data was done using IBM SPSS Statistics for Windows, version 25 (IBM Corp., Armonk, N.Y., USA).

The video-endoscopes used were Olympus (Q150L) and Pentax (Pentax EPKi digital video processor and Pentax video colonoscope)

Pre endoscope preparation involved bowel preparation for either one day if polyethylene glycol (coloclean) was available, or 2 days-prep using bisacodyl 5 mg (12 tablets): 2 tablets/8 hours for 2 days. Phosphate enemas are taken on the night before and again on the morning of the endoscopy in both methods. The patient is kept over fluid diet the day before the endoscopy and is fasted overnight. We request viral screening blood tests for hepatitis B and C, as well as for HIV, so that standard precaution measures are taken. All patients were consented. Those who refused the procedure or participation in the study were excluded. Patients prepared for diagnostic sigmoidoscopy received per rectal local anesthesia with xylocaine gel (2%). Those for colonoscopy or therapeutic interventions received-in addition-intravenous sedation with pethidine (50 mg) and either midazolam (2.5 - 3 mg) or diazepam (5 mg) when midazolam was not available. Patients were assessed for sedation individually. All patients were monitored during the procedure using a standard operating room monitor, and remained under supervision for an hour in a recovery ward before they were allowed home. We had no mortality. One patient had perforation of the colon for which he was taken immediately to the operating theatre. Generally, the procedure was stopped if the patient was uncomfortable despite adequate sedation or in case of technical problems, such as excessive looping.

Results

A total of 1086 patients were included in the study. Diagnostic procedures were done in 989 patients (91.1%), and therapeutic procedures in 48 patients (4.4%). The procedures failed or were not completed in 49 patients (4.5%). The total negative findings rate was (30.5%).

The mean age was 47.4 years (sd = 17). More than half of our patients (54.5%) were under the age of 50 years.

There was a significant predominance of male (70.4%), giving a M: F ratio of 2.3:1.

The most common presenting symptoms were: Rectal bleeding (hematochezia) (51.3%) followed by change in bowel habits (defined as diarrhea, constipation or alternating) (12.6%), perianal pain (6.9%), abdominal pain (6.8%) and anemia (4.1%), (Table 1).

Table 1: The presenting symptoms (indications) for lower GI endoscopy.

Indication	No. of Patients	Percent %
Rectal bleeding (Hematochezia)	532	51.3
Bowel habits	131	12.6
Perianal pain	80	7.7
Abdominal pain	69	6.7
Anemia	43	4.1
Deep rectal pain	38	3.7
Suspicious of tumor	25	2.4
Abdominal mass	22	2.1
Anal discharge	19	1.8
Prolapse	13	1.3
Perianal swelling	12	1.2
Weight loss	10	1.0
Others	42	4.0
Total	**1037**	**100.0**

Note: Procedure failed in 49 patients (4.5%) of the total N=1086.

We further analyzed the endoscopic findings of the commonest symptoms:

- The most common causes of rectal bleeding were hemorrhoids 304 patients (57.1%), followed by Colorectal Cancer (CRC)/ Colorectal (CR) tumors 35 patients (8.5%), and polyps 44 patients (8.3%). Tumor distribution was as follows: The rectum (7.3%), the colon (0.8%) and the anal canal (0.4%). There were 21 patients of Protocolitis (3.9%), 18 patients with diverticular disease (3.4%). No cause of bleeding was found in 13.5% of cases (Table 2).

Table 2: The endoscopic findings in cases of rectal bleeding/ hematochezia (N=532).

Pathology	Frequency	Percent %
Hemorrhoids	304	57.10%
Polyps	44	8.30%
Rectal tumor	39	7.30%
Protocolitis	21	3.90%
Diverticulum	18	3.40%
Anal fissure	13	2.40%
IBD	10	1.90%
Anal fistula	3	0.60%
Colon tumor	4	0.80%
Anal tumor	2	0.40%
Others	2	0.40%
Normal	72	13.50%
Total	532	100.00%

- One hundred and twenty seven patients (127) presented with change in bowel habits. The commonest causes were CR tumors (14.2%). These were distributed as follows: the rectum 14 patients (10.7%), colon 2 (2.3%), and anal 1 (0.8%). The next common causes were hemorrhoids 9 patients (7%), and polyps 8 patients (6.1%). These were followed by Protocolitis including inflammatory bowel disease (5.3%), and diverticular disease (3.8%) No cause was found in (62.2%) of cases.

- Eighty patients (80) presented with perianal pain. The most common causes of perianal pain were complicated hemorrhoids 22 patients (27.5%), anal fissures and fistula, each 13 patients (16.3%). These 3 pathologies accounted for (60.1%) of cases. There was a case of anorectal tumor (1.3%). Almost one third of cases (31.3%) had negative findings.

- Sixty-nine patients (69) presented with abdominal pain. The most common causes of abdominal pain were polyps 10 patients (14.5%), CR tumors 9 patients (13%), Protocolitis and inflammatory bowel disease 9 patients (13%), and diverticular disease 2 patients (3%). No cause was detected in 36 patients (52%)

- Forty-three patients (43) presented with anemia. The commonest causes of anemia were colorectal tumors and polyps; together accounting for (27.8%) of anemia cases. These are distributed as follows: rectal tumors 8 patients (18.6%), colonic tumors 2 patients (4.6%), polyps 2 patients (4.6%). Ten patients had hemorrhoids accounting for (23.3%) of cases. Three patients had diverticular disease (7%). In 18 patients (41.9%), no endoscopic finding of significance was found.

Generally

Out of the 1086 patients, 316 patients had a 'normal' report, giving a negative finding rate of 30.5%. This leaves us with the remaining 721 patients with positive findings. The main sites of diagnosed pathology were ano-rectal area (78.7%) followed by the colon (19.7%) and combined sites (1.6%).

The most common findings (pathologies) were hemorrhoids (36.4%) followed by rectal tumors (8.1%), colorectal polyps (7.2%), colonic tumors (1.6%) and anal tumors (0.4%). Diverticular disease (3.2%) was the fifth common disease together with anal fissures. The total proportions of Protocolitis (7.2%), and inflammatory bowel disease (1.6%) together with diverticular disease (3.2%) amounted to 12%. Despite the lack of data, these diseases were not commonly known in Sudan about 3 decades ago (Table 3).

Table 3: The endoscopic findings (macroscopic Pathology) in 1037 patients.

	No. of Patients	% of the Total (N=1037)	% of Positive Pathology Excluding Normal Findings (N= 721)
Hemorrhoids	377	36.4	52.3
Rectal Tumor	84	8.1	11.7
Polyps	75	7.2	10.4
Protocolitis	38	3.7	5.3
Diverticulum	33	3.2	4.6
Anal Fissure	33	3.2	4.6
Anal Fistula	31	3	4.3
IBD	17	1.6	2.35
Colon Tumor	17	1.6	2.35
Anal Tumor	4	0.4	0.5
Others	12	1.2	1.6
Normal	316	30.5	-
Total	**1037**	**100%**	**100%**

Of all lower GI tumors (105 patients): Rectal tumors accounted for (80%), anal tumors (3.8%), and the rest (16.2%) were colonic.

It was also alarming that (34.5%) of patients with rectal carcinoma were below the age of 50 and (7.2%) below 30 years (Figure 1). Colonic tumors were found in 17 patients (1.6%). Of those 5% were below the age of 50 years and 1% below 30 years.

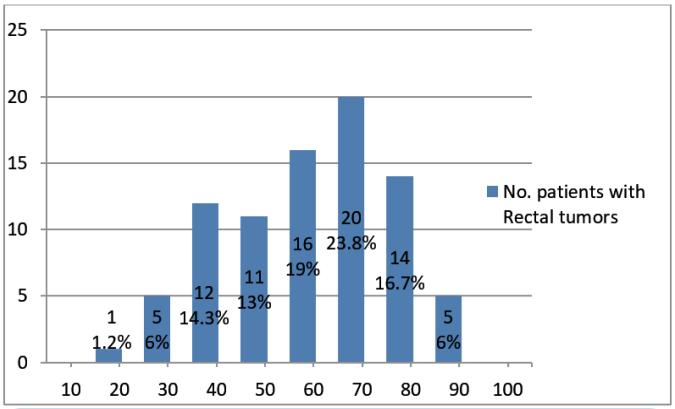

Figure 1: The age distribution of patients with Rectal Cancer.

Note: 29patients (34.5%) were below the age of 50 years and 6 patients (7.2%) below 30 years

Discussion

This is the largest study, regarding the number of patients, of the pattern of lower GI disease as revealed by endoscopic evaluation of the lower GI in this country.

The age distribution of our patients showed that the majority are below the age of 50 years (and 50% below 40 years). The prevalence of GI disease in this young sector of the community would have adverse socio-economic effects on the individual, community, and country as a whole.

The male predominance must be explained cautiously. Lower GI symptoms, particularly rectal bleeding, is quite common in the community but only a fraction of patients reports to medical services [1,2]. In advanced countries this fraction is estimated to be between 30-50% [3,4,5]. In developing countries, the problem of presentation for medical advice is expected to be even larger. Though there are no available data, the lack or remote location of medical services, as well as the social stigma or mere unawareness of the importance of lower GI symptoms hamper a large fraction of patients from reaching medical consultation.

Most of our lower GI endoscopies were diagnostic. Therapeutic endoscopies accounted for less than 5% (4.4%) of cases. This was simply due to the lack of the required (and requested) intervention instruments such as loop diathermy and snares. Therapeutic endoscopies carried out in our unit were mostly injection sclerotherapy and banding of hemorrhoids, and less frequently snaring of polyps.

Unlike studies from advanced countries such as the USA, endoscopic screening and surveillance was not one of the indications for lower GI endoscopy [6]. However, the other indications are pretty much similar. In our study, the commonest presenting symptom or indication for endoscopy was rectal bleeding. This conforms to most reports globally [6,7]. The main endoscopic finding in patients presenting with rectal bleeding were hemorrhoids. These are followed by Colorectal (CRC) tumors and polyps. Rectal bleeding is, therefore, an important symptom that needs to be investigated by endoscopy.

Classically, rectal cancer is known to affect people above the age of 50 years. However, we found an alarming proportion (30%) of patients who were below the age of 50 and even below 30 years of age (7%). Interestingly, this trend was observed recently in many countries; advanced and developing. Examples are Siegel et al in the USA and Gado in Egypt [8,9].

This trend has also been observed in Sudan in most of the studies done in Sudan over the past 2 decades [10-14]. With the exception of only one study [13], the mean age ranged from (50-54) years, and the percentages of colorectal cancer patients under the age of 50 years ranged from (34.5% - 44%), and those below 30 years from (7-17%), (Table 4).

Table 4: Sudanese Studies: age, gender, and site trends of colorectal cancer over the past 2 decades.

Study (Duration)	Mean age (sd)	% of patients <50 years	M:F ratio	Commonest symptoms %	Commonest tumor % Figures
Abdalla et al (2000-2006) N=277	NA	34.5 (<40) 17.4 (<30)	1.5:1		Rectum 59 Sigmoid 14 Caecum 20
Taha et al (2010-2012) N=73	50 (14.5)	43.80%	1.02:1	PR bleeding 71 Change bh 66 Abdo pain 70	Rectum 40 Colon 60
Mohamed (2012-2014) N= 63	50.5 (11.7)	40	1:01	Altered bh 90 PR bleeding 84 Anaemia62	Rectum 57 Sigmoid 17
Amin et al (2014-2019) N=124	67 (2.4)	Not reported	1.3:1	Altered bh 52 PR bleeding 42	Rectum 49 Anal 13 Sigmoid 7
Mukhtar et al (2013-2014) N= 106 Tumor N=40)	52.4	34.2	1.7:1	NA	Rectum 84
El Shallaly et al (2007-2019) N=1086 Tumor N= 105	54.8 (16.7)	34.5 7 (<30)	3.2:1	PR bleeding 51 Change in bh 12	Rectum 80 Colon 16 Anal 4
Arabi : Acute LGBI 2013-2015 N=301					Rectum 54 Anal 11.5 Sigmoid 23 Colon 11.5

PR bleeding: Per Rectal Bleeding; Change in bh: Bowel Habits; NA: Not available.

Because of this globally observed trend of CRC in younger patients, many centers of excellence have changed its recommendation for screening. For example in the United States, the US Preventive Services Task Force (USPSTF) has changed its recommendation to screen the population from the age of 45 instead of 50 years [15]. National Institute for Health and Clinical Excellence (NICE) in the UK, advises urgent referral of patients aged over 40 with six weeks of rectal bleeding accompanied by diarrhea, and referral of patients aged 60 or more with rectal bleeding for six weeks without anal symptoms or diarrhea [16]. We propose that in developing countries we must be selective. According to our study, rectal bleeding in CRC is most commonly associated with change in bowel habits, abdominal pain and anemia.

Some of our young rectal cancer patients gave a history of protracted rectal bleeding and prolonged treatment with endless courses of anti-dysentery or anti-parasitic tablets. In a country where various types of dysentery are rife, this is a common medical mistake. One of those young patients even had a hemorrhoidectomy without being endoscoped at all to present

later with an advanced rectal tumor which was the real cause of the bleeding and most likely also the cause of the hemorrhoids.

Rectal cancer was the commonest cause of change in bowel habits. This was also observed by Ellis and Thompson in the UK who noticed that the prevalence of cancer increased 3 folds when rectal bleeding was associated with change in bowel habits [1]. Colorectal, especially rectal cancers were also the main cause of anemia and second common cause of abdominal pain (after polyps). Both clinicians and patients should be aware that rectal bleeding in combination with any of change in bowel habits, anemia, and/or abdominal pain warrants urgent lower GI endoscopy since it increases the suspicion of malignancy.

Changes in bowel habits in isolation of other symptoms, such as rectal bleeding, have a negative finding rate of (62.2%). With no yield in almost two thirds of cases and risk of complications (though very small), colonoscopy in that case would not be cost-effective. It would, therefore, be more prudent to investigate using barium enema or CT-enema scan first, and do endoscopy if a suspicious lesion was found.

Our study showed that the most common site of pathology was the anorectal area. It is the site of (78.8 %) of all pathology and (83.8%) of lower GI tumors. A simple rigid sigmoidoscopy (35 cm long) can thus discover and diagnose over 80% of lower GI pathology including tumors. We recommend rigid sigmoidoscopy training to all doctors and specialized nurses. We also encourage policy makers and health service director to supply sigmoidoscopies to outpatient offices in hospitals and in health centers.

Our data also showed that diverticular disease existed as a cause of rectal bleeding in elective cases. DD is the main cause of excessive rectal bleeding presenting as emergency [17]. A comparison of the causes of rectal bleeding in emergency and elective situations was done (Table 5). It confirms the change of the pattern of colorectal disease in this country since DD was not diagnosed as frequently as today.

Table 5: Comparison between causes of rectal bleeding in emergency and elective situations in Khartoum.

Study	Piles	Colorectal cancers	Polyps	Diverticular diseases	IBD	Procto-colitis	Normal
Arabi (2013-2015) acute bleeding N=301	13.30%	8.30%	2%	15.60%	5.40%	1.40% Total colitis (6.80%)	49.80%
Our study2019 KNTH Elective N=532	57.10%	8.50%	8.30%	3.40%	1.90%	3.90% (5.80%)	13.50%

We searched for past data on the pattern of lower GI disease in Sudan, but couldn't find a comprehensive study. In our study, the total proportions of Protocolitis (7.2%), inflammatory bowel disease (1.6%) together with diverticular disease (3.2%) amounts to 12%. Despite the lack of data, these so called 'Western diseases', were not known to be common in the past. It seems that there has been a change of disease picture, which in turn could be due to change in environment and feeding habits. This suggestion requires further research.

We hope that our study provides database that can help future studies and comparisons. We also hope that our data shed the light on important issues for policy makers and the health providers in general who are concerned with prevention and early detection of disease, particularly cancer in the young. Our study has pointed out important areas for further studies and research.

Limitations of the study

This is a one-centre study, which may limit the diversity of the sample. Nevertheless, the large number of the sample and the time spread of the study, in addition to the central location of this secondary referral centre and teaching hospital minimize this limitation. Lack of financial and technical support has always been a problem causing the endoscopy service to slow down or stop at times. Data were entered manually in a log-book because our service is not computerized. Manual entry of information was some of the time not followed strictly by all endoscopists. Biopsies are expensive to handle in labs and patients had to pay for them.

Conclusions

This study shows the current pattern of lower GI disease and endoscopic practice in our country.

Most our patients are in the young, economically productive age. Consequently, this will be reflected negatively on the socioeconomic status of the community unless serious steps are taken in the areas of prevention, early detection (screening) and treatment.

The pattern of lower GI disease is showing evidence of increasing prevalence of "Western" diseases, such as diverticular disease, and inflammatory bowel diseases. This may be due to the changes into "Westernized diet" with less fibers and more fat.

The study confirms the global alarming trend of CRC, particularly rectal cancer, affecting younger people. This trend has been observed for the past 2 decades but no action has been taken. We suggest that this is an area that needs urgent and extensive epidemiological research as well as health education to both patients and doctors on the importance of endoscopy and initiating screening programs.

The study provides important endoscopic database to policymakers, clinicians and researchers. It also highlights the importance of establishing a computer-based data network system and databank to collect and document the information obtained from all the endoscopic units in the country.

Declarations

Acknowledgement: We are grateful to the sisters, nurses, and staff of the endoscopy unit at Khartoum North Teaching hospital for their dedication and great work they have provided and still providing our patients. Their sfforts are invaluable in keeping the flow of the service and keeping the scopes and the atmosphere of work in almost perfect condition despite the great challenges we are facing.

The authors declare that this manuscript is an original contribution. It has not been previously published and is not under consideration for publication elsewhere.

Conflict of interest: The authors declare that they have no conflict of interest

Guarantor of the article: Professor Gamal EHA El Shallaly, who is also the corresponding author.

Ethical approval: The study was approved by the ethical committee at KNTH and the AAU. Informed consent was obtained from all individual participants included in the study.

"All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

Financial support: Nothing to declare. This study was self-funded. We have no intention of gaining financial benefits from this work or its publication.

Author's contribution: El Shallaly: Conceiving the idea, planning and drafting the manuscript; Babiker A. B. Ibrahim: Conducting the study, collection of data, statistical analysis, tables and figures; Mohamed M. I. Elhajahmed: Conducting the study, collection of data, statistical analysis, tables and figures; Modather M. E. Salih: Conducting the study, collection of data, statistical analysis, tables and figures; Mohammed F. E. Mohammed: Conducting the study, collection of data, statistical analysis, tables and figures; All authors have reviewed and approved the final draft submitted.

Study highlights:

What is known?

- Data on lower GI disease are sparse
- Developing countries have high fiber diet protection
- Colorectal cancer affects patients over 50 years of age

What is new here?

- Establishing database on lower GI disease pattern
- Higher prevalence of "Western" style lower GI diseases
- Higher prevalence of rectal cancers in patients below 50 years than reported globally

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