Surgery in Africa - Monthly Review

Lower Gastrointestinal Hemorrhage – a review for African surgeons

1. Introduction

Bleeding from the gastrointestinal tract is a common problem for physicians and a sign of serious underlying abnormality. Lower gastrointestinal hemorrhage, defined as bleeding below the ligament of Treitz, while neither as common nor as lethal as upper gastrointestinal hemorrhage, remains a challenge. It has a wide spectrum of disease from occult GI bleeding through intermittent hematochezia to life-threatening hemorrhage. Its characteristics, at least in the West, are advancing age of the patient, the tendency of the bleeding to stop spontaneously in 80% of cases and yet recur in as many as 25%.(1) While significant advances in diagnostic modalities have occurred recently in wealthy countries; endoscopic facilities, especially colonoscopy, remain poorly developed in low-income countries. In these countries an entirely different spectrum of disease presents itself. A number of excellent reviews of lower gastro-intestinal bleeding (LGIB) have recently been published.(1-5) This Review attempts to summarize that information for the African surgeon.

2. Epidemiology and Etiology

In the United States the incidence of LGIB hospitalization is 20-30/100,000/yr and may account for up to 1% of all hospitalizations. (6) Upper gastrointestinal hemorrhage is 5 times more common than LGIB. (7) Male patients predominate. The risk of LGIB increases dramatically with increasing age. Reasonably low mortality rates of about 2-5% have been reported in recent studies, with risk of persistent hemorrhage or re-bleeding in about 10-15% of patients each. The differential diagnosis of LGIB is listed in **Table 1**. (8)

Table 1 Causes of Lower GI Bleeding

Etiology	Frequency (%)
Diverticulosis	20-55
Arteriovenous malformation	3-40
Angiodysplasia	
Neoplasms	8-26
Benign	
Leiomyoma	
Polyps	
Malignant	
Adenocarcinoma	
Lymphoma	
Carcinoid	
Metastatic tumor	
Colitis	6-22
IBD	
Radiation-induced	
Ischemic	
Infectious	
Vasculitis	
Unknown etiology	
Anorectal	9-10
Hemorrhoids	
Fissures	
Idiopathic rectal ulcers	
Others	3-14
Postpolypectomy	
Aortocolonic fistula	
Stercoral ulcer	
Anastomotic bleeding	
Fecal impaction	
Endometriosis	
Unknown	1-25

Reproduced from Lee (8)

2.1 Colonic sources

Colonic causes constitute a fairly large majority of cases of LGIB in which diagnosis is established – over 90% when colonoscopy makes the diagnosis, but only 60% when angiography is required. (4) This is presumably a result of selection. Amalgamating 5 studies including 900 patients, Lingenfelser reports 33% of cases to be due to diverticulosis, 18% to various forms of colitis (including ischemia), 11% to neoplasia, 6% to angiodysplasia, 6% to benign rectal lesions, 9% to miscellaneous (including post-polypectomy bleeds) and 18% undiagnosed (a significant percentage of these have a small bowel source). (4) Other reports show variability on these themes. (1;9) The relative frequency of diagnoses changes with age as well as geographical location. In adults younger than 60 years diverticulosis, colitis and neoplasia are the most frequent. Over 60 years, angiodysplasia, diverticulosis and neoplasia predominate. (3)

2.2. Small bowel sources

In general, small bowel sources of LGIB are more common in younger patients. Meckel's diverticulum, inflammatory bowel disease including Crohn's disease and polyps predominate here. In his study of small bowel hemorrhage, Lewis considers vascular lesions to be the most common followed by tumors. (10) However, small bowel tumors are rare. (11) There are an estimated 14 stomach and 46 colon

tumors for every small bowel tumor. The majority of these are stromal cell tumors; ½ of which are malignant. A list of small bowel sources is contained in **Table 2**. (12)

Table 2: Causes of small bowel bleeding

Angiodysplasia
Dieulafoy's lesions
Erosions/ulcers
Crohn's disease
Small bowel varices
Tumors
NSAID enteropathy
Radiation enteritis
Small bowel diverticulosis
Small bowel polyps
Aortoenteric fistula
Meckel's diverticulum

From Carey, (12)

2.3. African and tropical experience

Sadly little information is available concerning the epidemiology and etiology of lower GI hemorrhage in sub-Saharan Africa. A search of the Medline database from 1950 to 2009 reveals 14632 citations for gastrointestinal hemorrhage associated with intestinal diseases. Combining this search with the 128102 citations linked to Africa or developing countries yields 29 citations, 13 of which were felt to be relevant to this review. Many were unavailable online or lacking an abstract. Despite this paucity of information the author's impression is that lower gastrointestinal hemorrhage is a distinct clinical entity in Africa, not as common as upper GI hemorrhage and with a different spectrum of etiologies in comparison to that in the West. Given the relative infrequency of colonic diverticulosis and neoplasia and the lower age groups in the sub-Saharan population, it is my impression that small bowel and infectious causes are more significant than in the Western experience. In children, intussusceptions and infectious diarrhea are the two most likely causes. Diverticulosis in the African is felt to be more commonly right sided and to present more often with hemorrhage. (13)

Anand et al. published an 11 year review of 3 Armed Forces hospitals in India. (14) Ninety-one patients were seen with a mean age of 38.9 years. 68% were male. A diagnosis was made in all but 5 cases. The most common diagnoses were non-specific ulcers, ileal tuberculosis, NSAID enteropathy, enteric fever, Meckel's diverticulum, followed by the more common diagnoses found in the West.

3. Diagnostic modalities

Despite the wide array of modalities available for the diagnosis of LGIB, the condition remains a significant diagnostic challenge. In one Canadian study, despite the use of multiple modalities, a diagnosis was made in only 65% of cases. (15) Some of these tools are useful only if there is active bleeding. Others will have both diagnostic and therapeutic capability. Many will not be readily in resource-constrained settings.

3.1. Endoscopy

3.1.1. Colonoscopy

Colonoscopy is the first investigative tool in the assessment of LGIB. It is effective in making a

diagnosis in about 72-86% of cases and is the only tool required in 90%. (1) A rapid bowel preparation can be carried out with polyethylene glycol (PEG) based solutions, which, in extreme situations, can be delivered via an NG tube. The cecum can be intubated by experienced operators in 95% of cases. An attempt to intubate the terminal ileum should be made if no lesion is found in the colon. (16;17) Major complications including perforation are low at about 0.1%. Unstable patients should be resuscitated prior to endoscopy. There is controversy about its use in ongoing massive LGIB. (3)

Colonoscopy has therapeutic value in about 20% of cases of LGIB. (8) These include polypectomy for adenomatous polyps and heater probe and electro-cautery or injection therapy with epinephrine for bleeding from visible vessels with colonic diverticulosis or angiodysplasia. (18)

3.1.2. Enteroscopy

Bleeding from the small bowel is notorious for its difficulty in diagnosis. **Push enteroscopy** with pediatric colonoscopes is probably the most widely available endoscopic method of examining the small bowel. (12) The technique is difficult and only the proximal small bowel can be examined. A **double-balloon enteroscope** was introduced in 2001 and has the capability to examine the entire small bowel. (12) **Intra-operative enteroscopy** with per-oral intubation passage through the small bowel guided by surgeon is still considered the gold standard of examination of the small bowel for bleeding. Another new, highly technical tool is **capsule enteroscopy**. (19) The patient swallows a battery-powered pill-sized camera which sends wireless images to a data recorder as it traverses the bowel. It certainly is superior to small bowel radiographs (20) and probably also to push enteroscopy. Entrapment of the capsule may occur in up to 5% of cases, although usually at the site of pathology. While probably being the most effective diagnostic modality for obscure LGIB, capsule endoscopy is likely to be unavailable outside of the most advanced centers.

3.2. Barium studies

While readily available in most institutions, barium examination of the small bowel and colon has not been found to be especially useful in the investigation of LGIB, at least not in the West. Small bowel enteroclysis (delivery of contrast via per-oral intubation of the small bowel) gives a more accurate exam than barium swallow. (21) The problem lies both in the inability of the examination to detect active bleeding and also that many bleeding lesions are primarily mucosal in character and cannot be identified on barium exam. Plain abdominal films should be taken prior to endoscopic intervention if intestinal obstruction or perforation is suspected. Thumb printing of the colon wall is diagnostic of ischemia. Barium studies are most useful to supplement colonoscopy in non-urgent situations.

3.3. CT colonography

CT colonography is a developing technique which is being used as an alternative to colonoscopy for screening for colon tumors. When contrast enhanced it has also been used for LGIB. (22) It requires bowel preparation.

3.4. Nuclear medicine

Nuclear medicine is a fairly sensitive, if not specific, indicator of active gastrointestinal hemorrhage. (23) It is more sensitive than angiography and can detect bleeding at rates of 0.1-0.5ml/min. Facilities are limited in low-income countries. 99Technetium labeled red blood cells require pretreatment with patients' blood, but is preferred over 99Technetium labeled sulfur colloid, which is cleared more quickly from the circulation. The test is positive only if the patient is actively bleeding during imaging. The duration of scanning is usually 1-2 hours. Prolonged scanning is controversial. When positive, the test localizes colonic bleeding better than small bowel, due to the colon's fixed peritoneal attachments. If properly coordinated, positive scintigraphy within 2 minutes of injection accurately predicts angiographic detection. If there is a suspicion of a Meckel's diverticulum, 99Tc pertechnetate can be used to check for ectopic gastric mucosa. Institutional protocols are more likely to result in patient

benefit. Rapid and coordinated access to scanning is likely to be a problem outside most advanced centers in Africa.

3.5. Angiography

If available, angiography is an important investigational tool in cases of massive bleeding. Patients must be actively bleeding at rates greater than 0.5ml/min for angiographic detection. (1) As a result detection rates in most studies have varied between 40-80% depending on selection. (3) That said, angiography plays a role in the West in patients with massive bleeding and hemodynamic instability when colonoscopy can not be carried out for pre-operative site localization or to obviate surgery. Selective mesenteric angiography is used following an infrarenal aortogram with the selection of either the superior or inferior mesenteric artery based on clinical suspicion. (24) Extravasation is seen most commonly in bleeding colonic diverticulae. Angiography also can diagnose angiodysplastic lesions, characterized by tortuous vessels on the antimesenteric border showing early filling and delayed emptying. (3) If facilities allow, bleeding vessels may be treated with microcoil embolization or vasopressin infusion. (24) Provocative testing has also been used in patients with intermittent bleeding from obscure causes. The American College of Radiology has published criteria for appropriate investigation for GI hemorrhage.
http://www.acr.org/SecondaryMainMenuCategories/quality_safety/app_criteria/pdf/ExpertPanelonInterv

4. Management of clinical syndromes

Lower GI bleeding presents as a number of discrete clinical syndromes which are classified by the rate of bleeding and by their anatomic sources. These syndromes can be divided into acute and chronic bleeding. (7) The pace of investigation and management is determined by the severity and acuity of the bleeding.

4.1. General principles

The main components of management are: 1) initial hemodynamic stabilization 2) localization of bleeding site 3) site specific therapy. Resuscitation and stabilization depend primarily on the rate of bleeding and proceed along established lines of therapy that include: adequate intravenous access; infusion of crystalloid to maintain adequate blood pressure; transfusion if Hb<7.0gm/L or if rapidly bleeding; monitoring for ongoing losses.

An adequate history includes the nature and duration of bleeding, colour and frequency of stools, associated GI complaints including: abdominal pain, weight loss, anorexia, changes in bowel habits, fever, urgency or tenesmus. The patient should be asked about any previous episodes, trauma, surgery, GI conditions including inflammatory bowel disease (IBD) or peptic ulcer disease (PUD), abdominal or pelvic irradiation or coagulation disorders. Medication use, specifically NSAIDs or anticoagulants, should be determined.

Physical examination includes postural vital signs. A 10mm drop in blood pressure or 10beats/min increase in pulse on standing indicates a loss of $\geqslant$ 15% of blood volume. Grade IV shock with depressed mental status indicates $\geqslant$30% loss. A complete abdominal examination including digital rectal exam and anoscopy should be carried out.

In the case of bright red rectal bleeding and shock, a NG tube should be passed to help rule out upper GI hemorrhage. While the lack of blood does not rule out an upper GI source, its presence or clear bile-stained fluid, are helpful indicators. Blood should be drawn for Hb, platelet count, coagulation profile and cross match.

4.2. Occult Fecal Blood

By definition, GI bleeding manifesting as stools positive for occult blood (OB) is a syndrome of chronic bleeding where the patient is unaware of blood loss. Depending on the duration and severity of bleeding anemia, particularly hypochromic microcytic anemia associated with iron deficiency, may or may not be present. This syndrome is characteristic of bleeding from colonic neoplasms such as polyps and cancers. Routine testing of stool for occult blood forms an important method of screening for these conditions. In the West, colonoscopy is the first line of investigation in these cases. See: SIA Reviews May 2008 Colon Cancer, http://www.ptolemy.ca/members/archives/2008/ColonC/index.htm and July 2008 Rectal Cancer, http://www.ptolemy.ca/members/archives/2008/Rectalca/index.htm . The cause of iron deficiency in Africa and developing countries is most likely to be nutritional. (25) When associated with positive stools for OB there is likely to be parasitic infestation. (26;27)

4.3. Melena

Melena, or the passage tarry stools, is generally felt to indicate an upper GI source. The black colour is a result of oxidation of hemoglobin, which generally requires about 14 hours of transit in the bowel to occur. Since blood is a cathartic, melena usually means that the source of bleeding is high. Depending on clinical status, a nasogatric tube may be passed. The first modality of investigation should be an upper GI endoscopy. In the absence of positive findings, however a small bowel source should be considered.

4.4. Intermittent hematochezia

Hematochezia is the appearance of bright red blood in the stool and is pathognomonic of lower GI hemorrhage. In patients with a history of intermittent hematochezia, especially if young and healthy, in the absence of anemia and if blood is found on the tissue or in the toilet bowel (if used), an anorectal source should be suspected. Visualization of the anus, digital exam, followed by anoscopy and sigmoidoscopy may be all that is necessary to diagnose fissures, hemorrhoids, fistulae or other anorectal source. See SIA review: http://www.ptolemy.ca/members/archives/2007/anorectal/index.html .

However, the presence of such lesions alone should not preclude a full examination of the colon in those over 50 years old. Studies such as that of Allen et al. (28) proved the cost-effectiveness of colonoscopy in such settings especially in patients over 45. This is in a practice setting where the prevalence of neoplastic lesions was 7%.

Passage of maroon coloured stools suggests a source higher in the bowel – distal ileum or proximal colon. Here again colonoscopy is the first line of investigation. If a complete colonoscopy is negative and the patient is still actively bleeding a nuclear medicine scan may be of value.

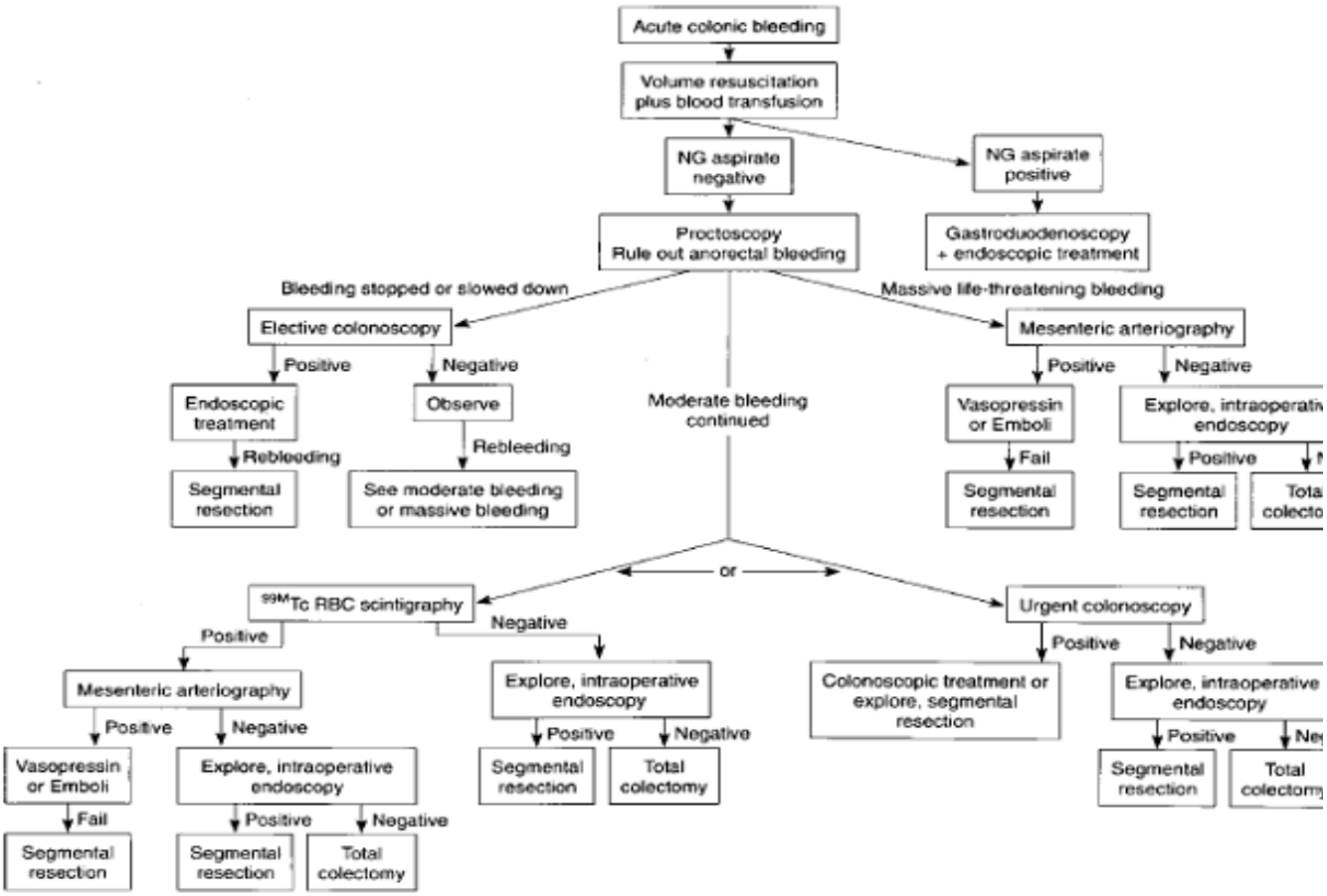
Intermittent hematochezia, melena or occult blood may be part of a syndrome of obscure GI hemorrhage, where bleeding is subacute or chronic and goes undiagnosed despite upper and lower GI endoscopy. The source is usually in the small bowel and further investigations include: small bowel follow though, often with enteroclysis, enteroscopy and the new capsule enteroscopy. (10) Ray et al. have published a typical series from India with a mean history of 2.5 years. They were finally able to make a diagnosis in all but 12.5% of patients, using multiple modalities. Small bowel and colonic angiodysplasias were the most common diagnosis followed by ileal Crohn's.

4.5. Severe acute bleeding

Acute severe bleeding associated with hemodynamic instability is the most serious manifestation of LGIB and is associated with the greatest mortality. It should be noted that colonic neoplasms seldom present in this fashion. **Figure 1** gives a management algorithm. After or as part of resuscitation, LGIB needs to be distinguished from an upper GI source, by passage of NG tube. The presence of blood indicates that the source is above the ligament of Treitz. The presence of bile in an actively bleeding patient indicates that the source is likely to be below the ligament of Treitz. Many routinely include

upper GI endoscopy as part of the initial investigation in this setting, especially if colonoscopy is negative.

Algorithm for Management of massive lower GI hemorrhage



Reprinted from AlQhatani (15)

In a hemodynamically stable patient the first investigation should be colonoscopy after rapid colon prep with PEG. This can be administered via an NG tube at the rate of 1 L/30-45minutes – until feces have been evacuated. The diagnostic yield for such studies is between 50-90%. (7) If a lesion is seen, management may be either endoscopic or surgical. Vascular malformations particularly are amenable to endoscopic therapy with cautery or injection of vasoconstrictors. Localization of the lesion with India ink or methylene blue is appropriate. If a complete colonoscopy and upper GI endoscopy fail to reveal a lesion and bleeding is ongoing then it is likely in the small bowel.

If colonoscopy is incomplete or cannot be carried out because of excess bleeding, selective mesenteric angiography should be attempted. The most successful use of angiography is in the actively bleeding patient. The lesion is usually diagnosed by extravasation of contrast. It may be amenable to vasopressin infusion at 0.4U/min and if controlled followed by 0.2U/min.Transcatheter embolization is an alternative therapy for bleeding control where available. (24)

The issue of surgical intervention arises when bleeding continues, recurs or is uncontrolled. The criteria are: greater than 4 units of blood in 24 hours required to achieve hemodynamic stability; continued

bleeding for >72 hours or rebleeding within the first week. If the site of bleeding has been identified a segmental resection can be carried out. Since the majority of these cases in the West are caused by mucosal lesions, intra-operative diagnosis has proven difficult. If pre-operative diagnosis has been impossible, intra-operative endoscopy is recommended, through oral, rectal or enteroscopic intubation. If still unsuccessful and since the majority of lesions arise in the colon, subtotal colectomy is carried out. However since the results of this procedure are poor (mortality rates of 5-33%), every attempt should be made to arrive at a precise pre-operative diagnosis. This principle may or may not be as important in the low-income country setting, where the majority of such bleeds arise from ulcerative lesions in the small bowel or colon from typhoid or tuberculosis (see **5.7.2.** and **5.7.3.** below) whose pathology is more likely to be recognizable at operation.

5. Intussusception

The specific causes of LGIB are numerous and vary with the presenting clinical syndrome as well as the geographic setting and age of the patient. In children, Meckel's diverticulum, intussesception and infectious causes, including pigbel disease (29) are likely to be the most common. In the elderly colonic diverticulosis, angiodysplasias, tumours and ischemia are more likely. (30)

5.1. Diverticulosis

Left-sided colonic diverticulosis is widespread throughout the adult population in the West and is therefore a common cause of LGIB. The most common presentation of the condition is peridiverticulitis resulting from obstruction of a diverticulum. The disease results from a lack of bulk in the diet and is uncommon in developing countries. (31) The pathology of diverticulosis, its predilection for the left colon and association with high intra-colonic pressures are all well-known. (32) Bleeding may result from erosion into penetrating vessels or from mucosal ulceration. However the mere presence of diverticulosis does not mean it is the cause of the bleeding. Colonoscopy examination is usually successful and if active bleeding is occurring, injection or coagulation therapy may be temporally successful. (33) However rebleeding is common and elective resection is indicated after the second bleed. Colonic diverticulosis in Africans may represent a different spectrum of disease entirely with a tendency to occur in the right colon. (13)

5.2. Arteriovenous malformations

A wide variety of primary conditions of intestinal blood vessels result in LGIB. Angiodysplasias are degenerative lesions of the submucosal venules; are more common in the elderly and account for up to 30% of LGIB in some settings. (34) The bleeding is typically chronic, fairly slow and intermittent. They are more common in the right colon and bleeding lesions may respond to endoscopic thermocoagulation. (5) A particular form of vascular abnormality which can cause bleeding throughout the GI tract is the Dieulafoy lesion. (35) This is bleeding from the rupture of an exposed submucosal artery. It results in massive GI hemorrhage which may be difficult to diagnose, in the small bowel particularly. Angiography and embolization may play a role here. In the colon it responds to injection therapy, thermocoagulation and also application of clips or bands. Varices may occur in any part of the GI tract in a patient with portal hypertension. Varices, particularly in the anorectal region, may result in hematochezia. Medical control of portal hypertension as well as local hemostatic techniques may be required. Mesenteric varices can also occur at sites of adhesions if there has been prior surgery. (36)

5.3. Anorectal sources

Hemorrhoids need to be mentioned here because they are the most common cause of LGIB – usually bright red, chronic intermittent, associated with a bowel movement and staining of the toilet bowel. They are best diagnosed via anoscopy, but retroflexion of the flexible sigmoidoscope may show a bleeding source as well. While this appearance often results, at least in the West, in the patient seeking a medical opinion, hemorrhoids are seldom a cause of anemia. Furthermore their presence should not prevent a more thorough examination of the lower GI tract, especially in the elderly. Other anorectal

sources may cause significant bleeding such as radiation proctitis or solitary rectal ulcer. (1) See SIA review: http://www.ptolemy.ca/members/archives/2007/anorectal/index.html

5.4. Neoplasms

GI hemorrhage is common with colonic cancers and premalignant polyps, but is usually chronic and occult, unless in the rectum. These are dealt elsewhere in this series. See: SIA Reviews May 2008 Colon Cancer, http://www.ptolemy.ca/members/archives/2008/ColonC/index.htm . A significant and growing source of serious LGIB is postpolypectomy bleeding occurring after endoscopic removal of polyps. Bleeding occurs in 1-6% of polypectomies. (1) Bleeding may occur immediately after polypectomy or be postponed for 2 weeks resulting from sloughing of cauterized mucosa. Endoscopic techniques of control usually suffice. Small bowel tumors cause symptoms by bleeding and obstruction. (11) Smooth muscle tumors and carcinoids predominate and require surgical excision.

5.5. Colon ischemia

Colon ischemia is not uncommon in the elderly and presents as bloody diarrhea and abdominal pain. (34) Endoscopy will show evidence of mucosal edema, submucosal hemorrhage, ulceration with a sharp line of demarcation with normal bowel. Support with bowel rest and antibiotics are usually all that is required. Surgery is necessary in cases of transmural infarction.

5.6. Inflammatory bowel disease

While patients with chronic inflammatory bowel disease, ulcerative colitis and Crohn's disease often suffer from bouts of bloody diarrhea, severe bleeding may supervene uncommonly. (5) It often leads to emergency resection. Most patients will stop spontaneously but bleeding recurs. Infliximab may avoid surgery in Crohn's patients. (5)

5.7. Infectious causes

The following infectious causes of LGIB are probably the most important entities the African surgeon will experience.

5.7.1. Infectious gastroenteritis

E.coli, shigella and salmonella enterica sp. are all recognized causes of infectious gastroenteritis producing dysentery or bloody diarrhea, particularly in children. (1) The diagnosis is usually straight forward with fever and diarrhea predominating and endoscopy is usually not necessary, but may be valuable if clostridia dificile colitis is suspected. Epidemics of enterohemorrhagic E. coli can occur. (37) Amoebic colitis also causes dysentery. (38) Bleeding can also occur in Dengue fever and is associated with hematologic abnormalities like thrombocytopenia. (39) In a prospective review of 132 outpatients with bloody diarrhoea in Malawi, 34% had parasitic infection, most with schistosoma mansoni. (26) Bacterial cultures were positive in 26%, half of which were shigella. Agent specific antimicrobial therapy is indicated.

5.7.2. Typhoid fever

Ulceration of the small bowel in typhoid fever can give rise to massive LGIB. Such a case was the author's introduction to international surgery in Thailand in 1992 and exemplified the profound difference from the surgical experience in Canada. See October 2006 Review: www.ptolemy.ca/members/archives/2006/typhoid_fever.htm . Multiple punched out ulcers may be seen on colonoscopy sometimes in the proximal colon or if the ileum is intubated. (40) The usual diagnostic features of typhoid fever should assist in the diagnosis. The treatment is surgical resection.

5.7.3. Tuberculosis

Intestinal tuberculosis is a well-recognized cause of LGIB. (41-43) Intestinal tuberculosis also causes

perforations, obstructions and fistulae. (44) The source is usually in the ileocecal area. Mesenteric pseudoaneurysms can be the source of bleeding. (45) The treatment is usually surgical resection.

5.7.4. Parasitic infection
Sharma et al. reported 5 cases of hookworm or roundworm infestation in adults which presented as significant LGIB. (27)

5.7.5. HIV/AIDS
The causes of LGIB in patients with LGIB are unique. (5) Gastrointestinal manifestations occur often in HIV/AIDS. (46) Cytomegalovirus colitis is the most common cause of LGIB, followed by lymphoma and non-specific colitis. These are especially common in patients with CD4 counts<200/mm3. Recurrent bleeding is common and the 30 day mortality rate is 14%. Endoscopic control should be attempted since the mortality with surgery is high. Hemorrhoids and fissures may cause significant bleeding if there is thrombocytopenia. (47) Histoplasmosis, tuberculosis and Kaposi sarcoma are other causes.

5.8 NSAID enteropathy
Non-steroidal anti-inflammatory agents (NSAID) are widely consumed throughout the world as a source of pain relief and their associated effects on the upper GI tract causing intestinal bleeding are well known. They also have significant adverse effects on the lower GI tract including ulceration, bleeding and perforation. (48)

6. Conclusions
Lower gastrointestinal bleeding is a common condition, caused by a wide variety of pathologies. It expresses itself through 4 discrete clinical syndromes: occult bleeding, melena, hematochezia and acute severe bleeding. Each of these syndromes is caused by specific pathologies and requires different approaches to diagnosis. The most common pathologies in each group vary widely with age and geographic setting.

7. Recommendations

1. **Every hospital which undertakes surgical care of the patient with LGIB should be equipped to perform upper and lower GI endoscopy with trained operators.**
2. **Therapeutic colonoscopy should be added once diagnostic colonoscopy is routine.**
3. **Hemodynamically stable patients with hematochezia or positive stools for occult blood should have colonoscopy as their first investigation.**
4. **Hemodynamically unstable patients with active LGIB should have emergency angiography if available.**
5. **Pre-operative localization of bleeding site lowers mortality and should be attempted in all but the most unstable patients.**
6. **Patients with active LGIB who cannot be stabilized, who require more than 4 units in 24 hours, have bleeding >72 hours or rebleeding, should be offered surgical intervention. If the bleeding site is not clear on abdominal exploration, intra-operative endoscopy should be attempted. In the extreme situation, lacking site localization, a blind subtotal colectomy should be performed.**

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