



## Bleeding Jejunal Diverticula: Case Report and Literature Review

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### Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

### Article Information

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Case Report

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### ABSTRACT

Jejunal diverticulosis is an asymptomatic condition that is sporadically seen during radiological studies or laparotomy. Complications such as diverticulitis, intestinal obstruction or abscess formation are documented; on the other hand, bleeding from jejunal diverticula is rarely reported, albeit it should be considered in all cases of lower gastrointestinal bleeding with non-conclusive upper and lower gastrointestinal endoscopy. Herein, we report a case of a 65 year old man presenting with massive lower gastrointestinal bleeding. Computed tomography (C.T.) scan, selective coeliac, superior mesenteric and inferior mesenteric angiography, and upper and lower endoscopy could not reveal the bleeding source. It was disclosed only during laparotomy, and surgical resection of the involved jejunal segment was performed. The objectives of this study are to highlight jejunal diverticula as the occult source of lower gastrointestinal bleeding and to review literature data concerning this complicated uncommon disorder.

**Keywords:** Jejunal diverticula; lower gastrointestinal bleeding; scintigraphy; laparotomy; upper and lower endoscopy.

## 1. INTRODUCTION

Jejunal diverticulosis is a rare disorder with an incidence less than 0.5% in upper gastrointestinal radiograph [1]. It is usually asymptomatic and its rarity makes the diagnosis delayed [1,2,3]; moreover, it is frequently discovered as incidental finding on imaging studies or during laparotomies [4,5]. Jejunal diverticulosis is a challenging disorder that becomes relevant only after exacerbation [1,6]. Occult gastrointestinal bleeding frequently frustrates the clinician's attempts to locate the source. Jejunal diverticulosis should be considered in the differential diagnosis of lower gastrointestinal bleeding associated with non-diagnostic upper and lower gastrointestinal endoscopy [7,8]. The jejunal diverticular source is often located only during laparotomy. In this study we would like to draw attention to the uncommon condition of jejunal diverticula, with reference to bleeding as a serious complication.

## 2. CASE REPORT

A 65 year old man presented to the emergency room with bleeding per rectum and bouts of melena starting 4 days before coming to the hospital; he did not give history of previous abdominal complaints nor of any medical disorders or current medications. During the initial assessment, vital signs were stable; blood pressure (B.P.) was 109/69, and pulse rate 94 beats/min. Abdomen was lax with no tenderness or palpable organomegaly. Digital per rectal examination showed large hemorrhoids and fresh blood in the rectum. Urgent upper endoscopy was performed, showing only a polypoid lesion in the duodenum with histopathologic evidence of mixed inflammatory cells. Colonoscopy could not visualize properly, as blood coated the whole colon, but the possibility of diverticulum at 55 cm from the anal verge was suggested.

C.T. angiography showed no definitive active contrast extravasation in the arterial or portovenous phases, as well as no clear intramural or intraluminal hematoma. A low suspicious area was in the caecum, most likely not representing the cause of bleeding. Selective coeliac, superior mesenteric and inferior mesenteric angiographies showed normal vascular distribution with no evidence of active bleeding.

Three days later, the patient condition and his vital signs became unstable; systolic B.P.

dropped to 80 mmHg, with associated tachycardia (140 beats/min). Hb dropped to 4 gr/dl, WBC were 16000/dl and platelets 180000, INR:1; thus the patient was subjected to blood transfusion (6 units of packed RBCs, 6 units of FFP, and 2 units of platelets throughout the whole hospital stay), and treated with inotropes and elective intubation. He was immediately transferred to the operating theater, where urgent laparotomy was performed. A long jejunal segment about 30 cm in length, 50 cm from the duodeno-jejunal flexure, was found, with multiple large diverticula at the mesenteric border, filled with blood. The largest size was 7.5 X 3.5 cm, while the smallest was 0.5 X 2 cm. No other diverticula were found in the small or large intestine. Segmental resection was performed with side to side anastomosis.

Postoperatively he made uneventful recovery and was transferred to the general ward. His condition and vital signs were markedly improved, with Hb values was gradually rising. Oral feeding was resumed on the 4<sup>th</sup> postoperative day, resulting well tolerated; then, normal diet was commenced. Histopathology report showed marked thinning of muscularis propria, other areas with no muscular layer, and no evidence of active or chronic inflammation or ulceration, findings consistent with jejunal diverticula. Patient was discharged home and he was reviewed in the outpatient clinic, with no more bleeding.

## 3. DISCUSSION

Jejunal diverticulosis is a rare entity, and bleeding jejunal diverticula is an extremely rare condition [9,10]. There have been less than 60 case reports in the English literature describing massive hemorrhage from jejunal diverticula [10]. It was first described by Sommering in 1794, later by Astely Cooper in 1807, while the early resection of jejunal diverticula due to obstruction was done by Gordinier and Shil in 1906 [4,7,10].

### 3.1 Incidence

Jejunal diverticula are less common than colonic diverticula [11], and duodenal diverticula are approximately 5 times more frequent than jejunoileal diverticula [11,12]. The reported incidence of small bowel diverticula is 0.5% of upper gastrointestinal radiograph [1,11], a percentage increasing by using enteroclysis study up to 2.3% [4,12]. Some authors, as Hamid et al. [13], believed that small bowel diverticula

have an incidence of 1-2% in general population; 80% of small bowel diverticula occur in the jejunum, while 15% in ileum and 5% in both [7,14]. Relevantly, about 30-60% of colonic diverticula have jejunoileal diverticula as well, while 22% of duodenal diverticula were reported to have additional jejunoileal diverticula [7].

### 3.2 Prevalence

Despite the equal distribution of duodenal diverticula among both genders, jejunoileal diverticulosis has male preponderance, especially in the 6<sup>th</sup>, 7<sup>th</sup> decades [7,10,12]; it is rare below the age of 40 years [15], and has no racial predilection [4,11], aspects substantially fitted to this patient.

### 3.3 Pathological Pictures

Jejunoileal diverticulosis is described as variable number of discrete out-pouching from the bowel wall [16], more frequently seen in the jejunum and terminal ileum, probably due to large size of vasa recta in these areas [14]. The solitary diverticulum can be found in the ileum [5,10]. The size of small bowel diverticula varies from millimeters up to more than 3 cm. The size and number of diverticula decrease distally [4,5,15]. Limited number of cases were defined as giant diverticula in literature [14]; while no objective measures of giant diverticuli were described, our case can be considered as a case of giant diverticulum, as the largest one measured 7.5 x 3.5 cm in diameter. The largest diverticulum reported in the literature measured 26 cm in a young patient with diverticulosis complicated by peritonitis [3].

### 3.4 Types

Small bowel diverticula can be classified into congenital type, (Meckel's diverticulum), or acquired diverticula as jejunal diverticula, which are also called false diverticula due to lack of muscular coat [10]. Some authors called them pulsion-type, since they result from increased intraluminal pressure with weakened focal areas [1,10].

### 3.5 Pathogenesis

The exact cause of jejunal diverticula is still unclear, however, it is commonly believed that intestinal diverticula develop as a result of abnormalities in peristalsis, intestinal dyskinesia

and high segmental intraluminal pressure [1,2,5]. These factors result in herniation of mucosa and submucosa through weak areas of the muscularis, where the blood vessels penetrate into the bowel wall, thus explaining why the common site of these diverticula is at the mesenteric side [1,10]. Irregular intestinal contractions generate segmental intraluminal pressure favoring diverticula formation through those weak points [17]. Intestinal dyskinesia may be due to smooth muscle or myenteric plexus abnormalities [4,18]. Abnormalities in smooth muscle or in myenteric plexus were demonstrated early by microscopic findings in the jejunal diverticula, e.g fibrosis, sclerosis, degenerated smooth muscle cells and neuronal axonal degeneration, leading to visceral neuropathy [5]. A connection between diverticulosis and rare neuromuscular disorders such as Cronckhite-Canada syndrome and Fabry's disease also has been described [19,20].

### 3.6 Clinical Picture

Jejunal diverticula are usually asymptomatic [2]; nevertheless, vague nonspecific abdominal symptoms such as post-prandial abdominal pain in epigastrium or periumbelical regions [1], bloating or distension have also been observed frequently (flatulent dyspepsia) [4,7,14]. Iron deficiency or megaloblastic anaemia were also reported, commonly attributed to malabsorption, as well as steatorrhea and vitamin deficiency [14,15]. Malabsorption could be explained by the non-synchronous peristaltic movement of bowel, dilation of diverticula and stasis of intestinal contents within the diverticulum which favor bacterial overgrowth, resulting in diarrhea and malabsorption in about 10% of cases [14], thus explaining why jejunal diverticula should be considered a possible cause of unexplained diarrhea [16].

### 3.7 Complications

Compared to duodenal diverticulosis, jejunoileal diverticulosis is a potential source of complications, which have been reported in about 10-30% of jejunal diverticula, with cases of diverticulitis, perforation, abscess formation, fistulas, mechanical or pseudo-obstruction, volvulus, intussusception, and bleeding [1,10,11,13]. Bleeding is a sequence of acute erosive diverticulitis and mucosal ulceration, which compromise the mesenteric blood supply causing hemorrhage. Jejunal diverticulosis presents mainly with massive hemorrhage [7]; it

represents an uncommon, not rare cause of massive lower gastrointestinal bleeding according to the study by Speigel et al. [8], although Bahsi et al. consider it as a very rare condition [21]. Bleeding jejunal diverticula account for 2% of symptomatic cases in the study by Rodriguez et al. [22], increasing to 3-8% in the study by Yaqob et al. [10]. Most patients presenting with massive lower gastrointestinal bleeding usually do not show previous gastrointestinal symptoms.

### 3.8 Investigations

Jejunal diverticulosis constitutes a diagnostic dilemma [12]; it is difficult to diagnose, since patients are generally asymptomatic for long time in most cases. Diagnosis is made only when patients become symptomatic or complications occur [14]. Jejunal diverticulosis also presents with vague symptoms, that mimic some other gastrointestinal diseases [12]. The diagnosis is often missed or delayed and becomes challenging when it gets complicated by massive hemorrhage due to the difficulty to locate the source of bleeding.

In uncomplicated cases, manometric studies in patients with jejunoileal diverticulosis demonstrated dysmotility in 88% of cases examined [14]. Enteroclysis is a good diagnostic tool for uncomplicated cases of jejunal diverticulosis due to the positive pressure resulting from installation of barium and insufflation that makes the diverticula prominent [12]; therefore, barium studies and enteroclysis have limited role in emergency [14].

Wireless capsule endoscopy can detect small bowel diseases [1], predominantly used in cases of occult intestinal bleeding; however, large diverticulosis is a relative contraindication due to the possibility of the capsule entrapment into the diverticulum. Double balloon enteroscopy can offer a help in diagnosing non-complicated jejunal diverticulosis [14]. Bleeding jejunal diverticulosis is often impossible to be diagnosed endoscopically, although some reports showed success with capsule and double balloon enteroscopy [10].

In complicated cases, the diagnosis work up starts with plain abdominal radiograph which can easily detect pneumoperitonium, multiple air-fluid levels or small bowel distension [1,14]. Nobel et al. described a characteristic clinical and radiological triad in diagnosing jejunoileal

diverticulosis, namely abdominal pain, anemia and segmental bowel dilatation at epigastrium or left upper abdomen [23]. Barium follow through is more specific, and jejunal diverticulosis appears as rounded, variable-sized barium filled out-pouching [16]. Computed tomography shows focal discrete, rounded, contrast filled structures outside the bowel wall at the mesenteric border of bowel which represent the jejunoileal diverticulosis; it also shows complications, such as thickened bowel loop due to inflammation, abscess formation and intra-peritoneal free air or fluid [1,14,16], and visualizes the coexisting colonic diverticula [24]. Multi-slice C.T. seems to be promising in diagnosing jejunal diverticulosis and appears more specific than enteroclysis [25]. In lower gastrointestinal bleeding, upper and lower endoscopy cannot disclose the site of hemorrhage [26], that was clearly documented in our study; however, endoscopic evaluation should be performed in all cases of lower gastrointestinal bleeding to exclude other causes of hemorrhage [10,14].

C.T. angiography is used as an accurate, fast, and non-invasive modality, that can detect the bleeding site and depict active extravasation of contrast material into the intestinal lumen through its arterial phase [10]. Selective mesenteric angiography is the gold standard investigation in diagnosing active bleeding jejunal diverticulosis since it can localize the source of bleeding [26], but it was not helpful in our case. Bleeding jejunal diverticulosis can be located with high sensitivity and specificity by Tc-99 labeled erythrocytes scintigraphy, albeit it has false localization rate (about 22%) that limits its diagnostic value [27].

Laparoscopy has many advantages as a valid diagnostic approach for complicated cases. Indeed, it enables an accurate conclusive diagnosis [1], and can be rapidly converted to laparotomy, with clear pinpoint at the area of complication, guiding the surgeon to the ideal incision site on the abdominal wall and minimizing the operative time and postoperative pain. It also reduces the morbidity of large exploratory incision [14]. A total laparoscopic treatment of sizable jejunal diverticulum has been recently reported [28]; the definitive diagnosis of this case was made only by exploratory laparotomy, as these investigations were exhausted without reaching a conclusive diagnosis. The utility of most of these investigatory tools are however limited in emergency situations [6].

### 3.9 Treatment

Asymptomatic jejunoileal diverticulosis does not need surgical treatment, which should be reserved only for complicated cases [7,14]. Management of jejunoileal diverticulosis depends on the presenting symptoms. It is advised to leave the asymptomatic, non-complicated diverticula incidentally found intra-operatively [12]; however, for chronic persistent symptoms refractory to conservative measures, surgery is still an option. Cases with perforated diverticulitis can respond successfully to the conservative treatment in the form of intravenous antibiotics and C.T. guided drainage of the abdominal abscess [1,24]. Surgical resection of the involved bowel with primary anastomosis is the treatment of choice in most of the complicated cases [10]; the extent of resection should be limited to the diseased segment only, to avoid short bowel syndrome. Bleeding jejunal diverticulosis mandates surgery to control the source of bleeding, and to avoid re-bleeding which has a quite high rate. Other surgical approaches such as invagination of diverticulum, primary closure of perforation with omental patch, or diverticulectomy, are not advised [14,12]. Jejunal diverticulosis can recur after segmental resection since the mechanism of formation is still existing [14]. Massive lower gastrointestinal bleeding, with no jejunal diverticulosis intra-operatively, is indication for subtotal colectomy. Angiographic embolization has been successful in some cases but it carries the risk of developing ischemia [10].

### 4. CONCLUSION

Jejunal diverticulosis is an uncommon condition, although it seems to be more common than reported. It affects usually elderly male patients. It is mainly asymptomatic, but may present with non-specific abdominal symptoms, or rarely may present with serious complication such as massive lower gastrointestinal bleeding. Investigations often do not localize the definitive source of hemorrhage, which can be visualized easily during laparotomy. Lower gastrointestinal bleeding with unrevealing upper and lower gastrointestinal endoscopy may rise suspicion of jejunal diverticulosis. Segmental resection of the involved bowel is the treatment of choice.

### CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

### ETHICAL APPROVAL

It is not applicable.

### COMPETING INTERESTS

Author has declared that no competing interests exist.

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