



Overview on Small Intestinal Diverticulosis

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Diverticulosis is a digestive system condition in which numerous sac-like protrusions form (diverticula). Diverticula in the small intestine are significantly less prevalent than diverticula in the colon. The aetiology of this illness is unknown. Peristalsis anomalies, intestinal dyskinesia, and high segmental intraluminal pressures are thought to cause it to develop. Small intestinal diverticula (SID) are incident is very low and rare, also they are usually asymptomatic. A nonspecific inflammatory condition might be the reason for the person's visit to the emergency room. In order to

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restrict the differential diagnosis and reveal a localized inflammatory lesion, ultrasound and computed tomography are frequently used. The objective of therapy is to reduce intestinal spasms, and the best way to do so is to consume a fiber-rich diet (vegetables, fruits, and cereals). Surgical treatment for diverticulosis is not required. Giant diverticula, on the other hand, need surgery since they are more prone to get infected and perforated. This review aims to overview the disease etiology, epidemiology, evaluation, and management.

Keywords: *Diverticulosis; small intestine; SID.*

1. INTRODUCTION

Diverticulosis in the small intestine is significantly less prevalent than diverticulosis in the colon. Diverticulum is the single form, whereas diverticula is the plural form. [1] Diverticulosis is a disorder in which the gastrointestinal system develops several sac-like protrusions (diverticula). Diverticula can form at weak places in the walls of either the small or large intestines, although the large intestine is where the bulk of them form (most commonly the sigmoid colon). Diverticulosis affects the majority of people without causing any symptoms. Symptomatic diverticulosis (e.g., diverticular bleeding); diverticulitis (e.g., acute or chronic inflammation that may or may not be complicated by abscess formation, fistula formation, bowel obstruction, or perforation); or associated segmental colitis (e.g., acute or chronic inflammation that may or may not be complicated by abscess formation, fistula formation, bowel obstruction, or perforation) are all symptoms of diver (e.g., inflammation in segments of the mucosal segments of the colon in between diverticula) [2].

Small bowel diverticula is a unique clinical phenomenon since it generally goes unnoticed. The entrance locations of the intestinal vascular supply through the mesentery are the location of protrusion. Because they are found in the mesenteric leaves, their anatomical predilection makes them tough to identify. The entering vessel may flow over the diverticulum dome in rare situations. The complication of bleeding caused by diverticula is caused by this intimate association. In postmortem investigations, duodenal diverticula are the most prevalent acquired diverticula in SB, with a 15 percent incidence rate. The majority of them are periampullary, protruding from the duodenum's medial wall. Rare consequences include biliary or pancreatic duct obstructions, haemorrhage, perforation, or blind loop syndrome [3-6].

Intraluminal and extraluminal diverticula are two types of diverticula. Extraluminal diverticula are

classified as duodenal, jejunal, ileal, or jejunoleal and can be found in a variety of anatomical locations. Extraluminal diverticula can be found at many anatomical sites and are referred to as duodenal, jejunal, ileal, or jejunoleal. Intraluminal and Meckel diverticula are congenital, whereas extraluminal diverticula can be found at many anatomical sites and are referred to as duodenal, jejunal, ileal, or jejunoleal. Diverticula in the duodenum are about five times more prevalent than diverticula in the jejunum. Because these injuries are frequently asymptomatic, the incidence of both categories is unclear. With the exception of Meckel diverticula, small intestine diverticula are typically asymptomatic, just as colon diverticula. [7] This review aims to summarize the disease etiology, epidemiology, evaluation, and management.

2. ETIOLOGY AND PATHOPHYSIOLOGY

The aetiology of this illness is unknown. Peristalsis anomalies, intestinal dyskinesis, and high segmental intraluminal pressures are thought to cause it to develop. Diverticula form on the mesenteric boundary. (ie, sites where mesenteric vessels penetrate the small bowel). True and false diverticula are the two types of diverticula. False diverticula are created when the mucosal and submucosal layers of the intestinal wall herniate, whereas true diverticula are formed when the mucosal and submucosal layers herniate [1].

Meckel's diverticulum should be given more attention because it is one of the most frequent congenital defects of the small bowel, affecting roughly 2% of the population. It is a rudiment of the omphalomesenteric duct found on the antimesenteric edge of the terminal ileum (45-60 cm proximal to the ileocecal valve) and is a pure diverticulum. Although it is generally discovered by chance, it is linked to a number of consequences, including bleeding, diverticulitis, bowel blockage, and even the creation of neoplasms. Intussusception, volvulus, or imprisonment in a Littré's

hernia can cause intestinal blockage. Although resection is the preferred therapy for a Meckel's diverticulum, the recommendations for adults are debatable. The common practise is to remove them as long as the patient's age and abdominal circumstances allow it [3].

A diet low in fibre and heavy in red meat has been linked to an increased incidence of diverticulosis in several studies, while a high-fiber diet will not alleviate the symptoms of simple diverticular illness. A high-fiber diet may help individuals with symptomatic complex diverticular disease (e.g., inflammation or bleeding) by reducing overall inflammation and modifying the intestinal microbiota in a positive way [2].

A thin wall comprising mucosal, submucosal, and serosal layers makes up the bulk of jejunal diverticula. These pseudodiverticula appear along the small bowel's mesenteric boundary, frequently buried within the mesentery's leaves. Although an irregularity in peristalsis, intestinal dyskinesia, and elevated intraluminal pressures are likely to play a role in the aetiology of these diverticula, the exact reason remains unknown [8].

2.1 Epidemiology

Small intestinal diverticula (SID) are seen in 0.5-2.3 percent of the population, and they are usually asymptomatic. Chronic diarrhoea and malabsorption occur when there is bacterial overgrowth in the small intestine. It produces pain and other symptoms reminiscent of inflammatory bowel disease when it is aggravated with diverticulitis. With the development of peritonitis, the inflammatory process may be followed by haemorrhage, invagination, intestinal obstruction, diverticulum abscess, and perforation [9].

In autopsy series, the presence of small intestinal diverticula varies from 0.1 to 1.5 percent. The bigger diameter of the penetrating jejunal arteries is responsible for the increased incidence of SBD in the jejunum compared to the ileum. Intestinal blockage, bleeding, inflammation, and perforation are among the acute consequences, with a rate of 15% in most trials. Their chronic clinical signs include obscure bleeding, malabsorption, enterolith development, and abdominal pain. the overall complication rate in one series is high at (53 percent) [3,10,11].

Before the age of 40, diverticula are uncommon, but after that, they are common. Everyone over the age of 90, in principle, has a lot of diverticula. Almost everyone with a diverticula does not have symptoms, but those who do may experience stomach cramping, diarrhoea, and other intestinal transit issues. Diverticulitis is caused by stool stuck in the diverticula, which can cause bleeding, inflammation, and infection [7].

Diverticulosis of the jejunum and ileum is a rare condition, with prevalence rates ranging from 0.3 percent to 1.9 percent on traditional barium tests and 0.3 percent to 1.3 percent at autopsy. They are most frequent in the duodenum, where they occur in around 5% of cases. In the ileum, they are less prevalent. Jejunal diverticula is most common among the elderly, especially in the sixth and seventh decades of life. Jejunal diverticulitis is a fairly uncommon condition that affects just 0.02% of the general population [8,12-15].

2.2 Evaluation

Diverticulosis is suspected based on clinical presentation (e.g., a history of painless rectal bleeding or unexplained stomach discomfort and cramping, changed bowel motions), and can be verified with a colonoscopy or an X-ray after a barium enema. However, if the patient has severe stomach discomfort, a CT scan of the abdomen is usually recommended to reduce the danger of intestinal rupture in the case of intestinal infection or inflammation. If blood is found in the stool, colonoscopy in a prepared colon remains the best test to determine the cause of bleeding. If a colonoscopy is inconclusive, such as in the case of acute or severe bleeding, angiography, CTA, or radionuclide scanning may be used to pinpoint the cause [2].

A nonspecific inflammatory condition might be the reason for the person's visit to the emergency room. In order to restrict the differential diagnosis and reveal a localised inflammatory lesion, ultrasound and computed tomography are frequently used. Depending on the severity of the imaging results, a definite diagnosis may not always be available. In certain situations, diagnostic laparoscopy with segmental enterectomy is necessary, whereas in others, symptomatic therapy may be sufficient [8].

The majority of people with minor bowel diverticula have no symptoms. Patients who acquire symptoms usually describe symptoms that are related to the issues they are experiencing. Nonspecific epigastric discomfort or bloating are the most prevalent symptoms. There have been reports of complication rates as high as 10%-12% for duodenal diverticulosis and 46% for jejunal diverticulosis [1].

Some of the most common complications include diverticulitis, gastrointestinal haemorrhage, gastrointestinal obstruction, acute perforation, pancreatic or biliary disease (in the case of duodenal diverticula), intestinal obstruction, intestinal perforation, localised abscess, malabsorption, anaemia, volvulus, and bacterial overgrowth. The patient's age, the type of the complications, and the time since the intervention have all affected mortality, and virtually all patients with diverticulitis require hospitalisation [7,16,17].

If a patient has acute diverticulitis, extra therapy may be required. Uncomplicated diverticulitis is treated non-operatively with antibiotics either intravenously (IV) or orally (PO). In addition to antibiotic therapy, severe diverticulitis (e.g., with an accompanying fistula, abscess, blockage, or perforation) may necessitate hospitalisation and/or surgery to address the related problem. Patients with sepsis, immunosuppression, advanced age, substantial comorbidities, high fever, considerable leukocytosis, difficulty to tolerate oral intake, non-compliance, or failed outpatient therapy may need to be admitted to the hospital for adequate treatment [2].

3. MANAGEMENT

The objective of therapy is to reduce intestinal spasms, and the best way to do so is to consume a fiber-rich diet (vegetables, fruits, and cereals). Surgical treatment for diverticulosis is not required. Giant diverticula, on the other hand, need surgery since they are more prone to get infected and perforated. Diverticulitis in males under the age of 50 necessitates surgery at a three-fold greater rate than in females. Women require surgery three times more than males when they reach the age of 70. Spontaneous abdominal discomfort, pain upon clinical examination (typically in the lower left region of the abdomen), and fever are the first signs of diverticulitis. An inflammatory intestine might be injured or perforated by an X-ray with barium enema to confirm the diagnosis or research the

disease; hence, these examinations are normally postponed for a few weeks [7,18].

There is no need to treat abdominal discomfort unless there is clinical evidence of diverticulitis or intestinal blockage. Bulk-forming agents, such as fibre, bran, and cellulose products, are beneficial to patients. Intractable discomfort along with anaemia and a dilatation of the jejunal loop on radiograph should raise suspicions of jejunal diverticulosis. When diverticula are caused by small intestinal dysmotility, no special treatment is required, with the exception of surgery if problems emerge [19,20].

Because preoperative identification of small intestinal diverticulitis is difficult, individuals with diverticulitis frequently require hospitalisation. The following are some of the first interventions:

- Rest in bed
- nasogastric suctioning
- intravenous fluid
- Antibiotics with a broad spectrum of action
- Surgical consultation: Unless a perforation, abscess, or tumour is detected, urgent surgery is rarely necessary [1].

In the occurrence of perforated jejunal diverticular disease, bleeding, or abscess development after a short course of bowel rest and antibiotics fails, resection of the affected region with primary jejunoojejunostomy is the surgical option of choice [8,21].

4. DISCUSSION

Perforated tumour, foreign body perforation, small-bowel ulcers from nonsteroidal anti-inflammatory medication usage, Crohn's disease, and diverticulitis are among the differential diagnoses. It might be difficult to tell the difference between perforated neoplasms and jejunal diverticulitis. Lymphoma is the most probable neoplasm to perforate. Lymphoma, on the other hand, usually appears on CT as a segmental region of abnormalities rather than a localised lesion. Small-bowel diverticulitis is suspected based on the discovery of a gas-containing mass near a diverticulum [8].

this illness has been related to various environmental and lifestyle risk factors. A diet low in fibre and heavy in red meat has been linked to an increased incidence of diverticulosis in

several studies, while a high-fiber diet will not alleviate the symptoms of simple diverticular illness. A high-fiber diet may help individuals with symptomatic complex diverticular disease (e.g., inflammation or bleeding) by reducing overall inflammation and modifying the intestinal microbiota in a positive way. Patients with obesity or a bigger waist circumference have a higher risk of diverticulitis and bleeding. Smokers have been linked to an increased risk of developing a diverticular abscess or perforation. Nonsteroidal anti-inflammatory medicines, opiates, and steroids have all been linked to an increased incidence of diverticular bleeding or diverticulitis [2,22,23].

The majority of foreign body perforations are caused by swallowed fish bones or other foreign objects. On CT, a thin linear or curvilinear density indicating the foreign body is frequently seen at the location of the hole. Nonsteroidal anti-inflammatory medication usage causes small bowel ulcers, which mainly develop in the stomach or ileum but can occur elsewhere in the small intestine. Although Crohn's disease mainly affects the terminal ileum, it can also affect the jejunum in exceptional cases. The process is usually segmental rather than focal, with fibrofatty growth, significant vasa recta, and skip regions [8,24,25].

5. CONCLUSION

Diverticulosis in the small intestine is a rare disease yet requires more attention because it's rather asymptomatic and go unnoticed in most cases. Accurate diagnoses can be done by CT, or ultrasound. Management in most cases can just focus on managing symptoms and using non-pharmacological approaches like high fiber diet. However, if the case is severe medical intervention can be done that may requires in some cases even surgery.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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