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Review Article

Intestinal Tract Volvulus: A Surgical Approach

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Abstract

Volvulus develops when a loop of intestine spirals around itself and the mesentery that assists it, creating a digestive tract impediment. Indicators feature bloating, discomfort, vomiting, bowel complications, and bloody feces. The beginning of symptoms might be swift or steady. The mesentery becomes thus snugly twisted where the blood source is removed, resulting in an ischemic digestive tract. Fever and pain may be notable. Volvulus's risk factors comprise of intestinal malrotation, Hirschsprung illness, pregnancy, and unusual adhesions. A higher fiber diet plan and persistent bowel problems also enhance the threat of developing it. In grownups, both the sigmoid colon and cecum are the most impacted. In children, the small bowel, as well as stomach, are a lot more typically included. Medical diagnosis is normally produced along with clinical image resolution such as simple X-rays, CT scans, or even a GI biopsy.

Aim: In this inclusive review, we look into intestinal tract volvulus and the surgical approaches for volvulus treatment.

Methodology: This review is a comprehensive research article using PUBMED from 1999 to 2015.

Keywords: *Volvulus; Malrotation; Small Bowel; Colonic Volvulus; Surgical Treatment*

Introduction

When it comes to colonic volvulus, the term pertains to the twisting of bowel, usually the sigmoid, in a method causing obstruction, potentially causing anemia and gangrene. The cecum, as well as transverse bowel, may additionally be affected. This ailment has been described for hundreds of years, as have basic therapies. The Papyrus Ebers, ca. 1550 BC, described the natural course of volvulus to be a

casual reduction or even "decomposing" of the intestinal tracts. In Hippocrates' Affections, therapy for volvulus included infusing a large amount of pressure into the intestines by means of the anus. Additionally, In the Conditions, Hippocrates promoted the installation of a suppository 22 centimeters long. Modern proctoscopy decompression needs a comparable instrument span. Modern Western therapy began to develop with Gay's publication of trans anal volvulus decrease on the deceased of an individual along with sigmoid volvulus. In 1883, Atherton explained medical laparotomy and also the procedure of volvulus. Ultimately, 3 medical strategies were used for the therapy of volvulus featuring detorsion and plication of the mesentery, colonic resection, and primary anastomosis, and finally, the Hartmann method. Surgical control was the mainstay of treatment through the mid-20th century [1].

Anatomy and pathophysiology

Digestive tract growth during the course of embryogenesis is an intricate and consecutive method, where the cecum turns counterclockwise from the left edge of the mid-section to its own location in the right lower abdomen. Individuals with insufficient intestinal tract rotation normally cultivate insufficient appropriate colon fixation associated with the capacity for cecal volvulus formation. Cecal flexibility for volvulus as well as bascule development is found in 11% and 25% of adults, specifically [2].

It has been reported that 23% - 53% of people with cecal volvulus possess a history of prior abdominal surgery, as well as located on this association, previous stomach surgical treatment has actually been determined as an essential factor in cecal volvulus formation. It is postulated that postoperative attachments cause the buildup of turning points and pivots for the right colon helping volvulus growth. Additional conditions such as those seen throughout late-term pregnancy, a dynamic ileus, severe irregularity, and remote colon blockage have likewise been linked to cecal volvulus development in anatomically susceptible people, probably by means of cecal variation, hyperperistalsis, as well as colonic distension [3].

Etiology

Volvulus is linked with digestive tract malrotation, an enlarged colon, a long mesentery, Hirschsprung's disease, maternity, and severe bowel irregularity. In grownups, the sigmoid colon is very often the most impacted, along with the cecum being 2nd most common. In children, the small bowel is typically included [4].

Epidemiology

Sigmoid and cecal volvulus usually occurs between the ages of 30 and 70. Volvulus happens even more regularly in middle-aged and older males. Volvulus occurs as an unusual difficulty in clients with a repetitive colon, a normal anatomic variant causing extra-colonic loops. Sigmoid volvulus is accountable for 8% of all intestinal obstructions. Sigmoid volvulus is particularly typical in constipated as well as older individuals. Individuals experience distension, pain, and constipation. Cecal volvulus isn't as common as sigmoid volvulus and is related to discomfort and small bowel blockage. Midgut volvulus usually happens in infants that are predisposed given that of hereditary intestinal malrotation. Segmental volvulus takes place in folks of all ages, typically along with a tendency due to the fact that of abnormal digestive contents or even attachments. Volvulus of the cecum, transverse bowel, or sigmoid colon generally happens in adults with small predisposing elements such as redundant intestinal tract tissue and irregular bowel movements [5].

Pathophysiology

Volvulus is typically due to 2 reasons: chronic constipation and a high-fiber diet regimen. In both cases, the sigmoid bowel ends up being dilated making it prone to twist. The persistent swelling results in the buildup of connections that draw the sigmoid colon into a place with the twisted position. In cecal volvulus, the primary signs and symptom is small digestive tract impediment (nausea or vomiting, vomiting, as well as the absence of flatulence), given that the impeding point joins the small intestines. In sigmoid volvulus, although pain might appear, bowel irregularity might be more prominent. Volvulus is known to cause serious pain with a buildup of gas and liquid in the portion of the digestive tract impeded which causes acidosis, as well as death in severe cases. This is referred to as a closed-loop

obstruction. Intense volvulus demands prompt medical interference to untwist the affected portion of the bowel. Volvulus might happen in individuals along with Duchenne muscular dystrophy as a result of refining muscle disorder [6].

Physical evaluation and history

Individuals along with volvulus are often crippled and bedridden. Many of these individuals have a past history of neuropsychiatry problems, where a full patient history is usually unavailable. Symptoms and signs of volvulus feature ache, bloating, vomiting, bowel complications, fatty stool, fever, and substantial ache when the abdominal area is palpated. Depending upon the timeframe of the condition, there might be indicators of peritonitis and blood in the stool. The severe abdominal distension can easily compromise respiration in some patients [7].

Evaluation

Clinical diagnosis is made through taking an in-depth record and through a physical examination; it is actually validated by radiographic imaging. The diagnosis of colonic volvulus normally is consisted of the differential diagnosis which likewise features digestive tract blockage, mesenteric ischemia, and cancer. Abdominal plain x-rays may be confirmatory for a volvulus, specifically if a "coffee bean" sign is seen. A barium injection is used to display a "bird's beak" at the position where the section of the proximal digestive tract, as well as the distal digestive tract, turn to constitute the impairing volvulus. This location is going to show an alert tapering that has the appeal of a bird's beak. If a perforation is suspected, barium becomes a contraindication because of its likely deadly results when circulated throughout the totally free intraperitoneal cavity. In approximately 80% of colonic impediments, a carcinoma invading the wall structure of the intestine is found to become the reason for the obstruction. This is often effortlessly diagnosed with CT scan and endoscopic examinations [8].

Laboratory evaluation

Laboratory examinations are not sensitive for the diagnosis of cecal volvulus, as the laboratory values are common in patients with recurring signs and symptoms and early acute obstruction. Whereas, in individuals with advanced impediment, the white cell count and serum biochemical irregularities are certainly not valuable for diagnosis however demonstrate electrolyte insufficiencies, and infectious or even inflammatory clues associated with the disease.

Diagnostic imaging

As the majority of patients with acute cecal volvulus with clinical images suggestive of digestive tract blockage, abdominal radiography is regularly acquired as the preliminary diagnostic imaging. It has been stated that radiological problems are recognizable in almost all people with cecal volvulus, with cecal dilatation (98 - 100%), singular air-fluid level (72% - 88%), and small bowel dilatation (42% - 55%) mentioned as the best typically imagined irregularities. Nevertheless, provided the non-specific nature of these radiological results for the uncommon occurrence of cecal volvulus, a number of individuals are mistakenly offered the diagnoses of small bowel obstruction. Numerous extra radiological findings have been disclosed to improve the analysis of abdominal radiography, and these include the existence of dilated small bowel loops localized to the side of the dilated cecum [3].

As the medical, laboratory and abdominal radiological results are often non-specific, definitive diagnoses in the majority of patients are hardly developed based upon the first analysis. In most patients, these first results assist to exclude the uncertainty of cecal volvulus, which leads to subsequentially confirmation by barium injection, computed tomography (CT), colonoscopy, or prolegomenous celiotomy. Barium injection has been the image resolution modality generally looked for in cecal volvulus verification, with a reported diagnostic accuracy of 88% for volvulus. Additionally, occasional effective volvulus decline has been reported after barium injection management. The "beak sign" is the best usual confirmatory sign during a barium enema. An added value of barium enema is in the visual images of the distal digestive tract and the cecal volvulus formation. As a result, barium enema is generally not recommended for the evaluation of critically ill people with advanced impediments, suspected perforation, and also gangrenous digestive tract [9].

Unlike barium enema evaluations in the setup of obstruction, this diagnostic technique provides restricted results in patients with recurring signs connected to cecal volvulus. In these patients without continuous intestinal tract blockage, radiological medical diagnosis counts on the visual images of cecal axial rotation and/or excessive cecal range of motion. In this setting, some investigations have actually proposed the use of stomach squeezing during the course of barium enema exams to assist in visual images of cecal mobility [10].

Abdominal CT is being significantly used for the assessment of acute stomach discomfort, and because of this, CT is changing barium enema as the ideal imaging modality for the medical diagnosis of severe cecal volvulus in numerous settings. The "coffee bean", "bird beak", and "whirl" indicators are actually 3 of the popular CT findings for related to acute cecal volvulus. The "coffee bean" sign commonly describes an axial view of a dilated cecum packed with air and liquid that may be envisioned anywhere within the abdominal cavity. The "bird beak" are pictures correlating with the progressively tapering afferent and efferent bowel loops ending at the site of torsion. The "whirl indicator" is a description administered to the CT picture of a smooth tissue mass having swirling strands of soft tissue as well as body fat reduction. In the setup of sharp cecal volvulus, the attempt is composed of a spiraled loophole of the flattened cecum, along with low attenuating fatty mesentery and engorged mesenteric vessels. Aside from the above illustrated pathognomonic CT indications, visual images of a gas-filled appendix have been defined as a looking for affiliated with cecal dilatation coming from cecal volvulus [9].

Colonoscopy

Sigmoidoscopy is typically executed for the confirmation and initial management of sigmoid volvulus, nonetheless, the effectiveness of endoscopic treatment in intense cecal volvulus diagnosis and therapy is generally minimal, as the results rate of colonoscopy reduction of cecal volvulus was about 30%. Offered the small price, the ability for colonic opening, as well as potential obstacles in treatment connected with ineffective reduction, colonoscopy is normally not highly recommended in the initial treatment of cecal volvulus [4].

Small bowel volvulus

It is specified as the torsion of the little bowel around the center of the mesentery. This can easily lead to bowel obstruction, infarction, and anemia. Typically, SBV is believed to be a medical diagnosis in newborn babies, since one-in- 500 childbirths possess intestinal tract malrotation and roughly 80% of these patients will present with the very first month of life. Therefore, it is very prevalent in kids and young people. What is less valued is that adults can also present with small digestive tract volvulus secondary to attachments, growths or even Meckel's diverticula. Researchers suggest that the annual incidence is 1.7 - 5.7 per 100,000 grownups in Western nations, as well as 24 - 60 every 100,000 grownups in Africa, the Middle East, as well as Asia. The higher prevalence in the second area has been linked with serotonin-rich and fiber-rich diet plans, in addition to starting a fast. But, as a result of its rarity, relatively little is learned about the public health, presentation, as well as administration of short bowel volvulus in Western adults; our understanding is exclusively based upon case files as well as single-institution cases that is no much larger than 129 people. Therefore, it is assumed that a nationwide data bank concern would offer higher understanding right into these inquiries utilizing a population-based analysis [11].

Colonic volvulus

Worldwide, colonic volvulus is the 3rd leading reason for huge digestive tract obstruction. Populaces most affected the stay in the "Volvulus Waistband" of Africa, the Middle East, India, and Russia. In these areas, the typical age is much younger than Western nations, varying coming from 40 to 50 years old and generally better health and wellness. In the USA, colonic volvulus makes up 10 to 15% of all colon blockages, rating behind cancer as well as diverticulitis, and in between 1 to 20% of all intestinal obstructions. It happens when a mobile part of the digestive tract twists around a fixed center, impairing a sector of the digestive tract at the aspect of maximal torsion. Essentially, it is a closed-loop blockage. In a study of 546 situations of colonic volvulus, it is most often discovered in the sigmoid (60.9%), complied with due to the cecum (34.5%), the transverse tract (3.6%), and also splenic flexure (1%). It is typically found in the elderly, in clients with neuropsychiatric conditions, and those in nursing care locations. Predisposing variables feature previous episodes of volvulus, previous stomach functions, institutionalization, megacolon, and chronic irregular bowel movements [12].

Treatment

It is typically conceded that people with cecal volvulus profit from the operative intervention for the adjustment of the digestive tract obstruction. Contemporary surgical choices consist of hand-operated detorsion, cacoepy, cecostomy, as well as colectomy by laparoscopic or even open approaches. Given the unique attribute of the ailment, there are no potential procedure tests to assist management selections in these patients. It concurred that when digestive tract gangrenous modifications, as well as openings, are encountered, the nonviable bowels ought to be resected; however, the appropriate degree of the operative treatment in patients without these conditions has stayed undetermined [4].

Initial treatment for sigmoid volvulus is sigmoidoscopy or even a barium injection. As a result of a high reoccurrence cost, a bowel resection within 2 days is suggested. In a cecal volvulus, a component of the digestive tract frequently needs to be cleared away. Therapy for sigmoid volvulus consists of sigmoidoscopy. The patient ought to then be considered to surgical repair procedure. If a surgical procedure is certainly not performed, there is a high probability of the reappearance of volvulus as well as an obstruction. For patients with indicators of sepsis or even an acute abdominal pain, quick surgical operation and resection are advised. In a cecal volvulus, the cecum might come back to a usual position as well as at that point sutured in position employing a treatment understood as cacoepy. Resection with a colostomy or an ileostomy is necessary if the bowel is ischemic. For many years many medical techniques have been cultivated to deal with sigmoid and cecal volvulus. Overall, conservative procedures where the bowel has attached to stitches are often linked along with greater recurrences contrasted to treatments that entail resection of the digestive tract. Whether to accomplish the surgical procedure employing an accessible or laparoscopic procedure relies on surgeon preference as well as expertise. Aged people might take advantage of minimally invasive methods [13].

Since the overview of endoscopic detorsion in the 1940s, this approach, in addition to subsequentially resection, has come to be the major curative method. Detorsion may be carried out via barium injection, proctoscopy, flexible sigmoidoscopy, or colonoscopy. Some records uncover much better results with a flexible strategy. It has been stated that 24% of sigmoidoscopic methods will not find the site of twist, motivating the use of colonoscopy. In general, decompression has been located to become prosperous in 70 to 80% of situations. The patient needs to be taken for appearing expedition as well as resection if the gangrenous digestive tract is seen. If detorsion succeeds as well as no anemia or even gangrenous digestive tract has come across, a rectal tube is left and elective resection is booked. Treatment needs to be tolerated in the variety of patients for endoscopic detorsion. Patients with symptoms of sepsis, fever, leukocytosis, as well as peritonitis must be taken directly to the operating room (OR) for surgery [14].

An anal tube could be placed to avoid reoccurrence as well as keep it in position. The patient should then be resuscitated, as a lot will certainly be dehydrated and also possibly have electrolyte abnormalities. A professional colonoscopy should be conducted to eliminate malignancy, as well as the patients that are candidates for resection. Although some sigmoid volvuli will certainly not repeat after decompression, as was found in 75% of individuals in a small set, individuals may be dealt with effectively with various decompressions. Most documentation recommends reoccurrence which is typical as well as takes place in as much as 90% of clients after endoscopic detorsion [15].

The common medical practice has been explored, with resection of the sigmoid digestive tract. But provided the comorbidities of the older affected populace, resection has been looked at as extremely risky. That pointed out, with innovations in anesthetic as well as crucial treatment technology, resection has ended up being safe as well as viable. At the same time, other less-invasive techniques have been illustrated. Endoscopic rectopexy, extraperitonealization of the whole sigmoid colon, laparoscopic rectopexy, as well as mesosigmoidoplasty have been revealed to become reliable methods in both intense and also aesthetic conditions. Laparoscopic approaches to resection have been effectively taken advantage of. Liang found that individuals with sigmoid volvulus as well as detorsion and digestive tract obstruction were addressed effectively with laparoscopic sigmoid resections. In this case, the cost versus traditional laparotomy was discovered

to become greater. An additional little series by Cartwright-Terry also found a laparoscopic strategy to sigmoid volvulus to become secure after detorsion [16].

People who fall short of endoscopic decompression, have gangrenous bowel determined on endoscopy, or that display indication and signs of sepsis should be emergently referred to surgical treatment. The patient should be started on broad-spectrum antibiotics. If the patient is hemodynamically unstable, no additional image resolution or exams ought to be bought as well as the patient ought to most likely be referred to the OR. Surgery ought to be executed in a midline opening. When the volvulus is identified, it ought to be examined for stability. It can be minimized and the above-mentioned medical alternatives can be taken into consideration if the digestive tract looks healthy or simply slightly compromised. If resection is shown, the selection to make the main anastomosis must be located on general surgical concepts: the client's dietary standing, the competence of blood source, visibility of strain, visibility of undigested or purulent peritonitis, and hemodynamic standing. If any sort of aspect may endanger the stability of the main anastomosis, a Hartmann technique should be carried out. In emerging scenarios, the common preoperative evaluation for stoma placement can not be carried out, yet attention should be paid to the area of the stoma, as in elderly individuals the probability is that the stoma is going to be permanent. The specialist may additionally encounter inflated bowel, demanding a bigger laceration. These patients may possess a more significant likelihood of parastomal hernias. In chosen people, the main resection along with anastomosis may be better with a Hartmann technique [17].

Seeming procedures for colonic volvulus have notable morbidity and mortality. In an analysis of 106 individuals who were required to the OR without decompression or bowel prepare, the total mortality was 6.6%, and in the existence of a gangrenous digestive tract boosted to 11%. In a research of patients at Veterans Affairs (VA) health centers, the mortality rate was 24% for those undertaking emergency procedures for sigmoid volvulus, versus 6% for elective procedures with antecedent decompression. Mortality was connected with an emergent surgical procedure ($p < 0.01$) and ischemic colon ($p < 0.05$). Overall mortality rates for patients presenting with sigmoid volvulus was 15.8%. In clients with gangrenous bowel, they located a comparable mortality rate with the main anastomosis versus the Hartmann treatment of 21.6% versus 19.2%, specifically [18].

Conclusion

Individuals with volvulus are commonly found in the emergency department. While the medical diagnosis is easy, the monitoring is certainly not always easy. Thereby it is necessary to include a multidisciplinary group that consists of the emergency physicians, nurses, general surgeons, gastroenterologists, and internists. Sigmoid volvulus is treated with decompression yet as a result of higher recurrence rates, surgery is advised. Cecal volvulus is typically handled with surgical treatment. Over the years several operative approaches have been built to treat cecal as well as sigmoid volvulus. Typically, conservative techniques where the digestive tract has sutures are frequently linked with greater recurrence rates matched up to methods that entail resection of the bowel. Whether to carry out the surgery using a laparoscopic or a different available strategy should depend on the patient's specific case and upon surgeon preference and expertise.

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