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Large Bowel Obstruction in the Emergency Department: Clinical Assessment and Rapid Intervention

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Abstract

Background: Large bowel obstruction (LBO) is a critical surgical emergency often complicated by sepsis, dehydration, and hemodynamic instability. Its etiology is diverse, with colorectal carcinoma being the most common cause in adults, especially as the initial presentation of cancer. A competent ileocecal valve can lead to a closed-loop obstruction, escalating the risk of cecal perforation.

Aim: This review aims to outline the comprehensive clinical assessment, diagnostic evaluation, and principles of rapid intervention for LBO in the emergency setting, emphasizing evidence-based management and the importance of a multidisciplinary approach.

Methods: A synthesis of current literature and clinical guidelines is presented, covering the pathophysiology, epidemiology, and systematic evaluation of LBO. Diagnostic modalities, including plain radiography and computed tomography (CT), and the application of clinical decision rules are discussed. Management strategies from initial resuscitation to definitive surgical and endoscopic interventions are detailed.

Results: Initial management prioritizes aggressive fluid resuscitation and correction of electrolyte imbalances. CT imaging is the cornerstone for diagnosis and determining etiology. Treatment is etiology-specific: self-expanding metal stenting serves as an effective bridge to surgery for left-sided malignant obstructions, while sigmoid volvulus often requires endoscopic decompression. Surgical resection remains definitive for many cases, especially in right-sided obstructions or when perforation or ischemia is present.

Conclusion: Successful management of LBO requires prompt recognition, systematic resuscitation, and accurate imaging to guide timely intervention. The choice between endoscopic, surgical, or conservative strategies must be individualized based on etiology, patient physiology, and available expertise. Outcomes are optimized through coordinated, interprofessional care.

Keywords: Large bowel obstruction, Colorectal cancer, Emergency surgery, Colonic stent, Volvulus, Computed tomography.

Introduction

Large bowel obstruction constitutes a true surgical and medical emergency, frequently associated with significant physiological derangement, including sepsis, volume depletion, and varying degrees of hemodynamic instability. The underlying cause may be structural, such as a mechanical blockage, or functional, as in cases of colonic pseudo-obstruction in which motility is impaired without a discrete mechanical lesion. In patients with an anatomically and functionally competent ileocecal valve, the obstruction can evolve into a closed-loop phenomenon, leading to rapid cecal distension, compromised bowel perfusion, and a markedly toxic clinical presentation. Such patients may arrive in extremis, with advanced metabolic disturbances and impending perforation. Symptom onset can be insidious or preceded by a prodrome of altered bowel habits, abdominal discomfort, or weight loss, depending largely on the etiology and anatomical site of the obstruction. Early recognition of the cardinal manifestations—progressive abdominal distension, pain, constipation or obstipation, and vomiting—together with systemic indicators of sepsis or shock, is essential to initiate prompt fluid resuscitation, hemodynamic stabilization, and timely diagnostic evaluation in order to mitigate morbidity and improve short- and long-term outcomes.[1][2][3] From an oncological perspective, large bowel obstruction is particularly important as it may represent the initial clinical manifestation of colorectal carcinoma, especially when the tumor is located in the left colon where the lumen is narrower and the stool is more solid. It is

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estimated that up to one-quarter of colorectal carcinomas present with large bowel obstruction as a dominant feature.[4][5] Furthermore, approximately 8% to 13% of patients with colorectal cancer are already obstructed at the time the diagnosis is first established, highlighting a persistent delay in detection and the aggressive nature of some tumors. A substantial proportion of emergency hospital admissions related to colorectal malignancy are precipitated by large bowel obstruction, underscoring the condition's central role in emergent colorectal surgery and acute care oncology.[6] Of increasing concern is the rising incidence of colorectal carcinoma among young adults, a demographic shift that has been documented in multiple populations and that often presents dramatically as acute large bowel obstruction rather than through routine screening pathways.[5] This epidemiological trend reinforces the need for heightened clinical vigilance, earlier consideration of neoplastic causes in younger patients with obstructive symptoms, and the integration of rapid diagnostic and therapeutic strategies within emergency and colorectal services to optimize patient prognosis.

Etiology

Large bowel obstruction encompasses a heterogeneous group of pathologies that may arise from intrinsic disease of the colon or from extrinsic processes involving surrounding structures. The predominant etiologic categories include neoplastic, neurogenic, inflammatory, and mechanical causes affecting the colonic wall and lumen, but extra-colonic factors such as compression by adjacent masses or diffuse peritoneal pathology also contribute significantly to the overall burden of disease. Among adults, the single most frequent cause is colorectal carcinoma, which may narrow or occlude the lumen directly, invade the bowel wall, or create an irregular stenotic segment that compromises fecal transit. Obstructing malignancies may also manifest atypically; for example, a primary colonic tumor can serve as a lead point for intussusception, a phenomenon in which one segment of bowel telescopes into another. Similar intussusceptive mechanisms may arise from other intraluminal lesions, including adenomatous polyps, lymphomas, lipomas, or even compacted stool masses. Approximately 40% of colorectal cancers present as clinical emergencies, with large bowel obstruction constituting the most prevalent emergent manifestation of this malignancy.[7][8] Nonmalignant, intrinsic lesions of the colon also play a substantial role in the pathogenesis of large bowel obstruction. Benign causes include inflammatory strictures, obstructing foreign bodies or impacted food boluses, and torsion of the bowel, particularly sigmoid volvulus, which is a well-recognized entity in older or debilitated individuals.[8] Chronic inflammatory conditions such as diverticulitis and inflammatory bowel disease can lead to fibrosis, muscular hypertrophy, and luminal narrowing, culminating in fixed strictures that impede colonic transit. Anastomotic strictures following colorectal surgery, ischemic colitis with subsequent scarring, and long-term sequelae of pelvic or abdominal radiotherapy may similarly produce progressive stenosis. Infectious etiologies, including intestinal tuberculosis, and traumatic injuries to the colon may further contribute to cicatricial narrowing. Food impaction tends to be more prevalent in elderly populations, especially in the context of poor dentition, dysphagia, or motility disorders, whereas drug packets ("body packers") and other ingested foreign objects pose a dual risk of obstruction and perforation. Rarely, the sigmoid colon may become incarcerated within a hernia sac, most often in a left inguinal hernia, leading to a mechanically obstructed and potentially strangulated segment of large bowel. Extrinsic compression of the colon arises from a spectrum of pathologies such as gynecologic cancers, peritoneal carcinomatosis, and bulky lymphadenopathy associated with malignancy or chronic inflammatory conditions, including pancreatitis, all of which can encroach upon and constrict the colonic lumen.[9][10]

Endometriosis represents a distinctive cause of large bowel obstruction, capable of producing both intrinsic narrowing through transmural implants and extrinsic compression via fibrotic endometriotic nodules involving the serosa or mesentery. Another infrequent but important contributor is retroperitoneal fibrosis, a disorder characterized by chronic inflammation and excessive deposition of fibrous tissue, particularly around major vascular structures and adjacent retroperitoneal organs. This fibro-inflammatory process may reflect a localized reaction to atherosclerosis, prior infection, or malignancy, or it may be triggered by certain medications or previous radiotherapy.[8][11][12] Additional rare mechanisms include congenital peritoneal bands that constrict the colon, migration or perforation by medical devices such as intrauterine devices that enter the bowel lumen or press upon it externally, and large gallstones that enter the colon through cholecystoenteric fistulas and become impacted. Exceptional case reports further illustrate the breadth of possible etiologies; for instance, an acute large bowel obstruction has been described secondary to a pharmacobezoar composed of multivitamin tablets in a patient with chronic constipation, a redundant sigmoid colon, and dementia, highlighting how altered bowel anatomy and motility can interact with intraluminal material to precipitate acute obstruction.[13] In addition to true mechanical obstruction, colonic pseudo-obstruction must be recognized as a distinct pathophysiologic entity within the etiologic spectrum. Pseudo-obstruction reflects a functional impairment of colonic motility caused by disruption of autonomic innervation or smooth muscle activity rather than by a discrete

structural blockage. This dysmotility can be precipitated by a wide variety of clinical scenarios, including major trauma, recent surgery, pregnancy, systemic or localized inflammation, and severe infections. Chronic metabolic derangements, such as electrolyte abnormalities or endocrine disorders, neurogenic conditions affecting the enteric or central nervous system, and the use of certain medications—particularly opioids, anticholinergics, and psychotropic drugs—are also strongly implicated. Long-standing alcohol misuse may further compromise neuromuscular function of the gut and predispose susceptible individuals to pseudo-obstruction.[14] Collectively, these etiologies emphasize the importance of a comprehensive clinical assessment that considers both mechanical and functional causes when evaluating patients with suspected large bowel obstruction.

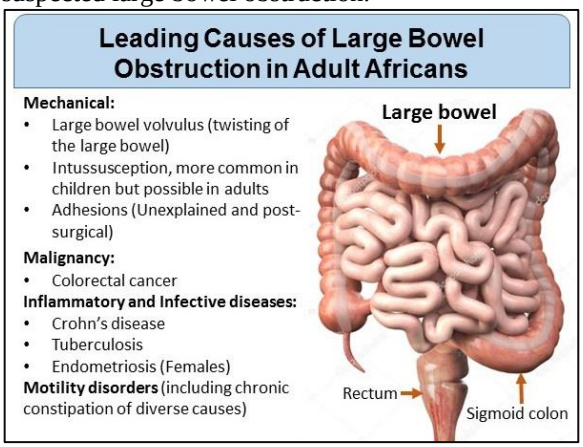

Fig. 1: Etiology of Large bowel obstruction.

Epidemiology

The epidemiology of large bowel obstruction has evolved substantially over the last century, reflecting broader changes in disease patterns, healthcare access, and screening practices. At the beginning of the 20th century, volvulus was documented as the leading cause of large bowel obstruction in many series, particularly in regions with high prevalence of a redundant colon and chronic constipation.[15] Over the subsequent decades, however, the epidemiologic landscape shifted, and malignant disease emerged as the dominant etiology. Today, colorectal carcinoma is recognized as the most frequent underlying cause of malignant large bowel obstruction, with an estimated lifetime risk of approximately 6% for developing a malignant obstruction of the large bowel.[15] This transition mirrors both the rising global burden of colorectal cancer and improvements in the management and prevention of benign obstructive conditions. Historically, obstructive colorectal malignancy was most often identified in patients in their fifth decade of life, corresponding to a pattern in which cancer incidence increased in middle age and beyond.[16] In many developed nations, the introduction and expansion of colorectal cancer screening programs, together with public health measures targeting modifiable risk factors, have led to a relative decline in obstructing tumors in this traditional age group. However, this improvement has been offset by a worrisome rise in colorectal cancer among individuals younger than 50 years.[16][17] A significant proportion of these younger patients have not undergone any form of screening, resulting in delayed diagnosis and a higher likelihood of presenting with aggressive, locally advanced, or metastatic disease. Consequently, acute large bowel obstruction has become an increasingly prominent mode of presentation in this younger demographic, often necessitating emergency surgical or endoscopic intervention.[16][17]

Detailed contemporary epidemiologic data underscore the complexity and heterogeneity of large bowel obstruction in clinical practice. Kwaan et al. analyzed 31,277 patients admitted with large bowel obstruction between 2010 and 2015, providing important insights into demographic patterns and etiologic distribution.[18] In this large cohort, 54% of patients were women, 69% identified as White, 12% as Black, and 12% as other races, with a median age of 66 years.[18] Colon cancer was diagnosed in 20% of cases, while 15.6% were found to have a malignancy originating outside the colon. The remaining 64.7% were attributed to benign causes, including diverticulitis, ischemic colitis, inflammatory bowel disease, and other nonmalignant conditions.[18] Notably, women with large bowel obstruction in this study tended to be older at presentation, had fewer comorbidities, and were more likely to have both extra-colonic malignancies and benign causes of obstruction. By contrast, Black patients, on average, were younger than their White counterparts, had a greater burden of comorbid disease, and were more likely to harbor an obstructing colonic carcinoma, highlighting potential disparities in access to screening, early diagnosis, and preventive care.[18] Within the population of individuals with colorectal cancer, large bowel obstruction represents the predominant emergency presentation, accounting for approximately 80% of acute events, while perforation constitutes roughly 20%.[1] A 2017 study reported that malignant obstruction most frequently occurs distal to the splenic flexure, consistent with the higher likelihood of luminal compromise in the left colon where the stool is more solid and the lumen narrower.[1] Perforations related to malignant obstruction typically arise at the tumor site itself, although a subset occurs proximally due to pressure-related ischemia and overdistension.[1] Contemporary observations further suggest that younger patients, men, and individuals with obstructing lesions in the ascending colon are now more likely than in previous decades to require emergency treatment for colonic obstruction.[5] This trend may reflect shifting

patterns in tumor biology, population demographics, and variations in screening uptake, and it emphasizes the need for heightened clinical suspicion across a broader age and sex spectrum.

Functional obstruction in the form of colonic pseudo-obstruction also exhibits distinct epidemiologic features. Pseudo-obstruction is more commonly seen in men older than 60 years, many of whom are critically ill or hospitalized for other serious conditions, with a reported incidence of approximately 0.1% among inpatient admissions in the United States.[14] The condition carries a substantial risk of adverse outcomes when colonic distension is prolonged. If pseudo-obstruction progresses to bowel ischemia or perforation, mortality rates can reach as high as 44%.[14] Among patients diagnosed with pseudo-obstruction, the risk of cecal perforation has been estimated at 15%, and when perforation occurs, associated mortality may be as high as 50%.[19] The duration and degree of colonic distension correlate closely with the likelihood of perforation, emphasizing the importance of early recognition and timely decompression.[19] Age-related patterns are also evident among patients with volvulus, a classic mechanical cause of large bowel obstruction. The mean age for sigmoid volvulus is approximately 70 years, reflecting its association with chronic constipation, institutionalization, and redundant sigmoid colon in older adults, whereas cecal volvulus tends to present earlier, typically in the fifth decade of life.[14] These age distributions, together with the demographic and etiologic trends described above, reinforce that large bowel obstruction is not a uniform entity but rather a syndrome with diverse causes and risk profiles that vary by age, sex, race, comorbidity burden, and underlying pathology.

Pathophysiology

The pathophysiology of large bowel obstruction reflects a complex interplay of mechanical forces, vascular compromise, microbial activity, and altered neuromuscular function. When the obstruction occurs in the presence of a competent ileocecal valve, the affected colonic segment becomes effectively isolated, permitting neither retrograde decompression into the small intestine nor antegrade passage of luminal contents. This closed-loop configuration predisposes the bowel to progressive intraluminal pressure elevation as secretions accumulate and gas production continues, largely driven by the activity of anaerobic and gas-forming bacteria. As luminal pressure rises, the earliest vascular consequence is impairment of venous outflow, which leads to mucosal and mural edema that further narrows the lumen and accelerates the cycle of distension. As the distension intensifies, arterial inflow becomes compromised, producing tissue hypoxia that transitions from reversible ischemia to irreversible infarction and necrosis when pressures exceed critical thresholds. This process culminates full-thickness ischemic injury and ultimately perforation if not promptly relieved. Anatomically, the cecum is particularly vulnerable to perforation because it possesses the largest diameter and the thinnest wall of any colonic segment, making it the first point at which Laplace's law predicts mechanical failure under escalating intraluminal pressure.[1][12] Beyond mechanical and vascular factors, obstruction also profoundly disrupts normal colonic motility, promoting stasis and bacterial overgrowth. As intraluminal pressure rises, mucosal edema and ischemia impair epithelial integrity, compromising the mucosal barrier that normally restricts microbial translocation. The breakdown of this barrier allows bacteria and bacterial products to cross into the systemic circulation, predisposing patients to bacteremia, endotoxemia, and sepsis. In advanced obstruction, retrograde movement of colonic contents into the small intestine may occur, leading to so-called "fecalization" of the small bowel, an imaging hallmark that reflects severe stasis and microbial proliferation. This combination of vascular compromise, mucosal injury, and microbial translocation forms a pathophysiologic continuum in which localized obstruction evolves into a systemic inflammatory response and life-threatening sepsis if treatment is delayed.[1][12]

Colonic pseudo-obstruction, or Ogilvie's syndrome, represents a distinct but related pathophysiologic entity characterized not by mechanical blockage but by neuromuscular dysfunction of the large bowel. The prevailing hypothesis attributes pseudo-obstruction to excessive sympathetic stimulation combined with impaired parasympathetic activity. This autonomic imbalance leads to suppression of colonic peristalsis and progressive functional dilation. Mechanoreceptor activation in the distended bowel further perpetuates sympathetic dominance, inhibiting motility even more and creating a vicious cycle of dysmotility and distension. The condition commonly arises in settings of severe systemic illness, trauma, postoperative states, electrolyte disturbances, and pharmacologic influences such as opioids or anticholinergics, all of which perturb neural input to the enteric nervous system.[1][12][14] Volvulus, another important mechanical cause of large bowel obstruction, also arises from specific anatomic and motility-related vulnerabilities. Predisposing factors include inadequate peritoneal fixation of the colon, especially of the sigmoid or cecum, which allows an excessively mobile segment to twist around its mesenteric axis. A redundant colon or an elongated mesentery further increases rotational susceptibility, while chronic constipation, habitual laxative use, and neuromuscular dysfunction promote colonic distension that increases the likelihood of torsion. Once volvulus occurs, torsion impedes venous return before compromising arterial supply, paralleling the vascular cascade seen in other closed-loop

obstructions. If untreated, this leads to ischemia, necrosis, perforation, and the release of fecal contents and bacteria into the peritoneal cavity, rapidly escalating the risk of peritonitis and sepsis.[1][12][14][20] In summary, the pathophysiology of large bowel obstruction, whether mechanical or functional, is dominated by progressive distension, vascular compromise, loss of mucosal integrity, and microbial translocation. The interplay of these forces explains the rapid clinical deterioration seen in advanced obstruction and underscores the need for early recognition and intervention to prevent irreversible ischemia, perforation, and life-threatening systemic complications.

History and Physical

The clinical presentation of large bowel obstruction is shaped by both the underlying cause and the specific anatomical location of the blockage, producing a constellation of symptoms that often evolve over time. Most patients report a progressive onset of abdominal discomfort that varies in severity, quality, and distribution depending on the site of obstruction. Colicky or cramping abdominal pain is common early in the course, reflecting vigorous peristaltic activity as the colon attempts to overcome the obstruction. As the condition advances, the pain may become more constant and severe, particularly if ischemia or impending perforation develops. Abdominal distention is a hallmark feature and typically worsens as intraluminal pressure rises, gas accumulates, and motility becomes increasingly impaired. Many patients exhibit markedly reduced or absent passage of flatus and stool, and this obstipation is often a key historical clue pointing toward a mechanical obstruction rather than a functional motility disorder. The presence or absence of vomiting, as well as its timing, often correlates with the status of the ileocecal valve. In individuals with an incompetent ileocecal valve, the obstructed colon decompresses into the small intestine, leading to eventual vomiting that may become bilious or feculent as the obstruction progresses. By contrast, patients with a competent ileocecal valve cannot decompress proximally, resulting in a true closed-loop obstruction. These patients experience progressive colonic distention, which disproportionately affects the cecum due to its large diameter and relatively thin wall. This pattern may manifest clinically as worsening right iliac fossa pain, a critical and ominous sign that suggests rising intraluminal pressure and the risk of imminent cecal perforation. Such a scenario constitutes a surgical emergency requiring prompt recognition and intervention [20].

The physical examination provides additional important diagnostic information. Inspection often reveals significant abdominal distention, and auscultation may demonstrate high-pitched, tinkling bowel sounds early in the course that diminish as ischemia or perforation ensues. Palpation may elicit diffuse tenderness or localized pain over the affected segment, sometimes accompanied by guarding or rebound tenderness if peritoneal irritation has developed. A digital rectal examination is an essential component of the evaluation; it may reveal an empty rectal vault, suggesting a distal obstruction, or alternatively may identify a palpable mass, obstructed stool, or the presence of blood, each of which offers valuable clues regarding the underlying pathology.[21] Overall, a careful and thorough history and physical examination remain indispensable in the early identification of large bowel obstruction. Recognizing symptom patterns, assessing for red flags such as right iliac fossa pain or signs of sepsis, and correlating these findings with physiological and anatomical principles allow clinicians to prioritize timely imaging and intervention, ultimately reducing the risk of ischemia, perforation, and other life-threatening complications [20][21].

Clinical Features of Colorectal Malignancy–Associated Obstruction

Large bowel obstruction resulting from colorectal malignancy displays a constellation of characteristic clinical features shaped by both the anatomical location of the tumor and the progressive nature of neoplastic narrowing. Obstructing cancers most frequently arise in the descending colon, sigmoid colon, or rectum, where the lumen is comparatively narrow and stool consistency is firmer, creating physiologic conditions that favor luminal occlusion as the tumor enlarges. In many cases, the development of obstruction is preceded by a subtle but progressive alteration in bowel habits. Patients may report an intermittent pattern of constipation and diarrhea, the latter reflecting the ability of only liquid stool to pass through a stenotic segment. These evolving symptoms, often accompanied by rectal bleeding, unintentional weight loss, or a sense of incomplete evacuation, can persist for weeks or months before culminating in an acute obstructive presentation. Despite these warning signs, a considerable proportion of individuals experience a sudden onset of obstruction without a prodromal period, emphasizing the diverse natural history of malignancy-associated obstruction. The presence or absence of a family history of colorectal cancer does not reliably predict which patients will develop an obstructing lesion, as both hereditary and sporadic cases may progress silently until the lumen becomes critically compromised.[21][22]

Clinical Features of Volvulus-Associated Obstruction

Volvulus, particularly of the sigmoid colon, represents a distinct and often dramatic subtype of large bowel obstruction. Sigmoid volvulus tends to occur in individuals with reduced mobility, chronic

constipation, or institutionalization, such as those living in long-term care facilities or recovering from prolonged illness. These patients commonly present with sudden, severe abdominal pain accompanied by marked distension and an abrupt cessation of flatus and stool. On physical examination, the abdomen is frequently tense and highly tympanitic, and in advanced cases, guarding and rebound tenderness may suggest developing ischemia or impending perforation.[23] Cecal volvulus may mimic small bowel obstruction and demonstrates greater variability in symptom duration, ranging from acute and severe pain to more subacute presentations. Rarely, volvulus may manifest with intermittent symptoms when the twist partially resolves, or with hemodynamic collapse when vascular compromise progresses rapidly.[14] Differentiating volvulus from pseudo-obstruction can be challenging, as pseudo-obstruction may initially appear similar but often features less pronounced pain. Patients with pseudo-obstruction may continue to pass gas or small amounts of stool while exhibiting progressive distension, and associated bowel habit changes may include constipation, diarrhea, or both.[14][19]

Clinical Features of Other Etiology-Associated Obstruction

A wide range of additional pathologies can produce large bowel obstruction, each with characteristic clinical profiles. Diverticular disease may lead to obstruction through inflammatory stricturing, typically presenting with localized abdominal pain, fever, leukocytosis, and sometimes a palpable mass. Hernia-related obstructions may be identified by the presence of a reducible or irreducible mass, sometimes with skin discoloration or tenderness when strangulation is present. Sites capable of causing large bowel obstruction include spigelian, inguinal, diaphragmatic, lumbar, and intermesenteric hernias. Endometriosis involving the colon produces symptoms that often mirror its gynecologic manifestations, including chronic pelvic pain, dysmenorrhea, dyspareunia, rectal discomfort, or pain during defecation. Patients with concurrent gynecologic conditions such as uterine fibroids or pelvic malignancies may provide a history of irregular menses or pelvic pressure that supports the diagnosis. Stool impaction constitutes another important cause, particularly in elderly individuals or those with chronic constipation, neurologic impairment, reduced mobility, psychiatric illness, or medications that diminish colonic motility. Such patients typically present with distension, abdominal discomfort, fecal incontinence, and in severe cases, a stercoral ulcer that may perforate. A digital rectal examination frequently reveals a firm stool mass obstructing the rectum. Retroperitoneal fibrosis, although less common, may produce obstructive symptoms accompanied by back or flank pain, constitutional symptoms such as fever, fatigue, and unintended weight loss. Intussusception in adults, often associated with a malignant lead point, presents with nonspecific symptoms including abdominal pain, altered bowel habits, nausea, vomiting, hematochezia, and occasionally a mass detected through imaging.[8][21] When obstruction progresses to perforation, patients usually exhibit signs of peritonitis, characterized by diffuse rebound tenderness, guarding, severe physiologic instability, tachycardia, and hypotension. The pain may be sharp, radiate to the epigastrium, pelvis, or chest, and is often accompanied by fever, chills, nausea, and vomiting, signaling a life-threatening intra-abdominal catastrophe requiring immediate intervention.[24]

Evaluation

The evaluation of a suspected large bowel obstruction requires a systematic and integrated approach that combines a careful clinical assessment with targeted laboratory investigations and appropriate imaging modalities. The initial step centers on obtaining a comprehensive history and performing a meticulous physical examination, with attention to the onset, duration, and progression of symptoms such as abdominal distension, pain, alteration in bowel habits, vomiting, and systemic features including fever or hemodynamic instability. Concurrently, early laboratory testing is essential, both to refine the differential diagnosis and to guide resuscitative measures. Baseline blood work typically includes a complete blood count to evaluate for anemia and leukocytosis, which may indicate chronic blood loss or acute infection, respectively, as well as serum electrolytes, renal function indices, and markers of acid-base status.[25][26][27] These investigations are critical in assessing the degree of dehydration, renal impairment, and metabolic derangements that often accompany an obstructive process, and they inform decisions regarding fluid resuscitation, electrolyte replacement, and the safe administration of intravenous contrast for imaging. Leukocytosis and the presence of metabolic acidosis are particularly worrisome, as they may signal the development of bowel ischemia, necrosis, or impending perforation, all of which require urgent intervention.[25][26][27] Additional laboratory testing should include evaluation for Clostridium difficile infection in appropriate clinical contexts, particularly in patients with recent antibiotic exposure or healthcare-associated diarrhea, since this pathogen can cause toxic megacolon and may coexist with or mimic large bowel obstruction.[14] Identification and correction of electrolyte abnormalities, such as hypokalemia or hyponatremia, are equally important, as these can exacerbate ileus, impair colonic motility, and complicate both the underlying disease and its treatment.

Imaging plays a central role in confirming the diagnosis, characterizing the obstruction, and identifying its etiology. Plain radiography is often the initial modality because it is rapidly available and can provide immediate, clinically useful information.

Supine and upright or decubitus abdominal x-rays may reveal a markedly dilated colon with a clear transition zone corresponding to the site of obstruction and an absence of gas in the rectum or distal colon.[19][28][29] Air-fluid levels may be observed in the dilated segments, reflecting stasis and fluid accumulation. Importantly, plain films can also suggest serious complications such as ischemia or perforation. Radiographic signs of advanced disease include pneumoperitoneum, indicative of free intraperitoneal air from a perforated viscus, as well as gas within the bowel wall (pneumatosis intestinalis) or in the portal venous system, which may occur in the setting of transmural infarction.[19][28][29] Despite its value, plain radiography has limitations and must be interpreted in the context of the broader clinical picture. A key diagnostic challenge is differentiating true mechanical obstruction from ileus or colonic pseudo-obstruction. In ileus, which may result from recent surgery, severe systemic illness, metabolic derangements, or neurologic disorders, diffuse gaseous distension of both small and large bowel is often seen without a discrete transition point. In contrast, mechanical obstruction typically displays a more focal transition from dilated to decompressed bowel. Pseudo-obstruction may radiographically mimic mechanical obstruction but often lacks clear air-fluid levels and demonstrates gas extending to the rectum. When plain radiographs are inconclusive, the administration of water-soluble contrast via a rectal enema can be highly informative, as it helps distinguish true mechanical obstruction from pseudo-obstruction by delineating the lumen and identifying a fixed point of narrowing or a functional cutoff. Toxic megacolon, which can complicate inflammatory bowel disease or infectious colitis, may be suggested by diffuse colonic dilation accompanied by bowel wall thickening and loss of haustration. Imaging the patient in multiple positions enhances the assessment of gas distribution and fluid levels, further refining the differential diagnosis.

Given the limitations of plain films in defining the specific cause of colonic distension, computed tomography (CT) has become the cornerstone of diagnostic imaging for large bowel obstruction.[19] CT not only confirms the presence of obstruction and identifies the transition point but also provides detailed information about the underlying pathology, including occult hernias, masses, volvulus, inflammatory changes, and evidence of ischemia or perforation. Intravenous contrast is particularly valuable, as it enhances assessment of bowel wall perfusion, vascular compromise, and adjacent structures. By contrast, oral contrast is generally avoided in the setting of high-grade obstruction because it can delay imaging, exacerbate distension, and increase the risk of aspiration. In circumstances where additional anatomical clarification is required, especially to evaluate a suspected volvulus or intraluminal mass, water-soluble rectal contrast may be administered.

Fig. 2: Cecal Volvulus.

This can outline the colonic lumen, define the exact nature of the obstruction, and sometimes even assist in decompression or reduction, as in the case of volvulus.[19] Endoscopic and cross-sectional imaging techniques further complement CT in the evaluation of large bowel obstruction. Colonoscopy, when performed with minimal insufflation and in a carefully selected and resuscitated patient, can provide direct visualization of the mucosa, allow biopsy of suspicious lesions, and support the diagnosis of conditions such as malignancy or endometriosis when mucosal involvement is present.[8][19] In the context of suspected colorectal carcinoma, comprehensive assessment of the entire colon is strongly recommended due to the risk of synchronous neoplasms; however, a full colonoscopy may not always be feasible in the acute setting because of patient instability or technical difficulty.[5] In such cases, CT or positron emission tomography (PET) can provide noninvasive evaluation of the remaining colon and assess for metastatic disease.[5]

Volvulus often has characteristic radiologic appearances that facilitate diagnosis. On x-ray, sigmoid volvulus may display the classic “coffee bean” sign, with a massively dilated loop of sigmoid colon forming an inverted U that may project into the right upper quadrant or above the transverse colon. A “bird beak” tapering can sometimes be seen at the twisted mesenteric root. Cecal volvulus may present as a large, air-filled cecal loop displaced into the left upper quadrant or centrally, and the appendix may be visualized in an atypical location adjacent to the

distended cecum. Although volvulus classically involves the sigmoid or cecum, rare cases involving the transverse colon or splenic flexure have been reported. CT imaging is invaluable in precisely localizing the volvulus, demonstrating the twisted mesentery, and identifying any areas of bowel ischemia.[19] A water-soluble contrast enema can both outline the torsion and, in select cases, contribute to nonoperative decompression, particularly in sigmoid volvulus.[19] CT also provides nuanced differentiation of benign and malignant causes of obstruction. In diverticular obstruction, CT typically reveals long-segment, symmetric wall thickening with hyperemia, pericolic fat stranding, and sometimes associated abscess or free fluid at the root of the mesentery. Malignancy, by contrast, often appears as a shorter, more irregular segment of asymmetric thickening, frequently associated with pericolic lymphadenopathy or distant metastases. Intussusception caused by a colonic mass or benign lesion appears as a target or "sausage-shaped" lesion, with telescoping of bowel and trapped mesenteric fat visible within the thickened colonic segment. Inflammatory bowel disease produces segmental wall thickening and luminal narrowing at stricture sites, often with mucosal hyperenhancement in areas of active inflammation; fistulae and abscesses may also be present. Because chronic inflammation and neoplasia can coexist, malignancy must always be considered in areas of stricturing or longstanding disease activity.[19] In colonic pseudo-obstruction, imaging typically shows marked cecal and proximal colonic dilation with air extending distally to the rectum, in the absence of a discrete mechanical transition point.[19]

In recognition of situations where conventional colonoscopy is not possible or is incomplete, additional diagnostic tools have been endorsed by international societies. In 2020, the European Society of Gastrointestinal Endoscopy (ESGE) and the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) issued updated guidelines recommending CT colonography as a valuable alternative for diagnosing suspected colonic malignancy when standard colonoscopy is contraindicated, not tolerated, or technically unsuccessful.[30] CT colonography allows for three-dimensional evaluation of the colonic lumen and can detect masses and polyps with high sensitivity. Another endorsed alternative is colon capsule endoscopy, which involves ingestion of a camera-containing capsule that transmits images of the colonic mucosa. This technique can be particularly useful in selected patients for whom both optical colonoscopy and CT colonography are unsuitable.[30] Collectively, these diagnostic strategies underscore the importance of a tailored, multimodal approach to evaluating large bowel obstruction, enabling clinicians to define the etiology, assess disease severity, and plan timely, appropriate interventions.

Treatment / Management

The management of large bowel obstruction is multifaceted and begins with meticulous initial resuscitation before any definitive surgical or procedural intervention is considered. Early care focuses on stabilizing the patient hemodynamically, correcting fluid deficits, and addressing metabolic derangements, as these factors significantly influence perioperative risk and overall outcomes. Most patients present with varying degrees of hypovolemia due to inadequate oral intake, third-spacing of fluids into the bowel lumen and peritoneal cavity, and vomiting. Prompt intravenous fluid resuscitation, guided by clinical assessment and laboratory parameters, is therefore essential. Electrolyte abnormalities and acid-base disturbances must be identified and corrected, as they can adversely affect cardiac function, neuromuscular activity, and gut motility. In patients who have sustained significant cecal distension for several days, the risk of perforation is substantially increased, particularly when the cecal diameter approaches critical thresholds. These individuals warrant close surveillance with serial imaging to assess progressive distension and wall integrity, and they should be considered for timely decompressive measures. The presence of pneumatosis in the cecum or colon on imaging is a worrisome sign, often suggestive of advanced ischemia and potential impending perforation, and should prompt urgent escalation of care.[1][12] In patients with an incompetent ileocecal valve, insertion of a nasogastric tube can aid in proximal decompression by reducing gastric and small bowel distension, thereby lowering intraluminal pressure in the proximal gastrointestinal tract and improving patient comfort. For individuals who progress to perforation, the overarching priority is rapid and effective source control. Perforation proximal to an obstructing tumor frequently results in diffuse fecal peritonitis, severe sepsis, and septic shock. Management in such cases follows established principles of damage control resuscitation and sepsis management. After initial fluid resuscitation, efforts should be made within approximately six hours to achieve hemodynamic targets such as a central venous pressure between 8 and 12 mm Hg, a mean arterial pressure above 65 mm Hg, and a central venous oxygen saturation of at least 70%, often necessitating vasopressor support with agents such as norepinephrine or epinephrine as well as adjunctive therapies including alkalinizing agents in the setting of severe acidosis.[1] Antimicrobial therapy is another cornerstone of early management. For obstructed but nonperforated disease, antibiotic coverage should target anaerobic flora and gram-negative organisms to mitigate the risk of bacterial translocation associated with mucosal compromise. In the setting of frank perforation, broader-spectrum

agents are required to cover polymicrobial intra-abdominal infection. When localized collections such as abscesses are identified radiologically, image-guided percutaneous drainage plays a vital role in achieving source control and reducing the burden of infection in conjunction with surgical or endoscopic interventions.[1]

Once the patient is resuscitated and stabilized, attention turns to definitive management of the obstruction itself. Prompt intervention is imperative to prevent progression from reversible ischemia to infarction, perforation, and systemic decompensation. Clinical features mandating emergent intervention include signs of peritonitis, radiologic or biochemical evidence of ischemia, sepsis, and hemodynamic shock. Management strategies may involve emergent single-stage surgery, staged surgical procedures, or temporizing nonoperative interventions such as stenting or decompressive tubing, followed by delayed elective surgery. The choice of strategy depends on the patient's physiological status, comorbidities, the anatomical location of the obstruction, and the underlying etiology.[5] A critical conceptual distinction in treatment planning is that between left-sided and right-sided colonic obstruction, as these locations differ in technical considerations, options for stenting, and oncologic strategy.[5] Early decompression is a key principle irrespective of location. For many left-sided malignant obstructions, the placement of a self-expanding metal stent as a bridge to surgery has become an important strategy, allowing decompression of the colon, optimization of the patient's medical condition, and planning for a more controlled elective resection. In addition, stenting can decrease the proportion of patients requiring an emergency stoma. However, important variables must be weighed carefully, such as the presence of gross or microscopic perforation, which may facilitate tumor spread; patient-related factors like diabetes or cirrhosis that can accelerate clinical deterioration; and the well-documented higher morbidity and mortality associated with major emergency colorectal surgery compared with elective procedures.[5] The role of colonic stenting has evolved considerably over the past two decades. Emergency surgery in the setting of an obstructing colon cancer often necessitates stoma formation and carries higher rates of postoperative complications, including anastomotic leak and prolonged recovery. Bridging procedures using self-expandable metal stents can decompress the obstruction, permit bowel preparation and optimization, and then allow a single-stage resection with primary anastomosis in a more controlled setting. In malignancy, stenting may reduce operative time, hospital length of stay, postoperative complications, and the overall need for permanent stoma creation. Evidence suggests that stenting can lower short-term morbidity and reduce stoma formation in left-sided obstructing colon cancers and may also decrease postoperative complications and mortality in selected right-sided lesions.[4]

Earlier concerns regarding adverse oncologic outcomes led the 2014 ESGE guidelines to caution against the routine use of stenting as a bridge to surgery. More recent data, however, along with refined techniques and better patient selection, have prompted a more favorable reassessment. Stenting is now generally accepted as a viable alternative to emergency surgery in many settings.[6] Comparative studies between primary stoma creation and stenting for obstruction have demonstrated broadly similar overall efficacy in relieving obstruction, with the advantages of stenting including shorter hospitalization and fewer permanent colostomies.[5] Self-expandable metal stents are approved by the Food and Drug Administration for malignant large bowel obstruction; their use in benign disease remains off-label. Benign strictures are often longer, more inflamed, and biologically distinct from malignant lesions, conditions that predispose to stent migration, ingrowth, and perforation, leading clinicians to favor balloon dilation or selective off-label stenting in these cases.[31] Additional experimental endoscopic or percutaneous methods, such as combined decompressive and ablative techniques, may be considered in complex or refractory cases but are generally reserved for specialized centers and individualized decision-making.[8] Contemporary guidelines provide nuanced recommendations on indications for stenting. The 2020 ESGE update suggests that stenting as a bridge to surgery is appropriate in patients aged 70 years or older with an ASA class III who have potentially curable left-sided colon cancer, as well as in those requiring palliation for unresectable disease.[32] In malignant obstructions without evidence of perforation, the typical recommendation is to proceed to surgical resection within 5 to 10 days after successful stent deployment, thereby minimizing the duration of high intraluminal pressure and potential tumor manipulation. In contrast, for younger, fit patients (under 70 years) with good physiological reserve, Pavlidis et al. propose that emergency surgery with primary anastomosis, with or without proximal diversion, may be preferable to stenting to avoid potential oncologic disadvantages.[5] The American Society of Colon and Rectal Surgeons advocates for an individualized approach, recommending stenting based on patient condition, tumor characteristics, and availability of local expertise and equipment, with reported technical success rates for stent placement ranging between 77% and 81%.[33] Owing to concerns regarding cancer recurrence and the possibility of synchronous lesions, definitive oncologic surgery after stenting typically includes

segmental colectomy or subtotal colectomy, as appropriate for tumor location and colon quality.[33]

Technical aspects of stenting also influence outcomes. Stents are generally available as covered or uncovered devices, with diameters ranging from 10 to 25 mm and lengths from 12 to 60 mm. Uncovered metal stents are favored in malignant disease because they exhibit less migration, have better long-term patency, and can be deployed across longer segments, though they are susceptible to tumor ingrowth. Covered stents, while associated with less tissue ingrowth, have a higher tendency to migrate, which can limit their utility in colonic malignancy. Their off-label use in benign strictures has been described, but robust evidence supporting their routine application is lacking.[5][34] Stent deployment is performed endoscopically, typically via a colonoscope under fluoroscopic guidance. A guidewire is advanced across the obstructed segment, followed by placement and deployment of the stent under simultaneous radiographic and endoscopic visualization. Many stents feature radiopaque markers that facilitate accurate positioning. Postprocedurally, a plain abdominal radiograph is often obtained to confirm appropriate stent expansion and to exclude free intraperitoneal air suggestive of a perforation.[35] Despite the advantages, stenting is not without risks. Perforation, hemorrhage, migration, and re-obstruction are recognized complications. The potential for malignant dissemination has been a particular concern. A Japanese series of 202 patients treated with low axial force self-expanding metal stents demonstrated high technical and clinical success rates of 97.5% and 97%, respectively, without any perforations, suggesting that careful device selection and technique may mitigate some risks.[36] Nevertheless, some investigators have reported higher rates of perineural and lymphatic invasion in tumors treated with preoperative stenting, raising questions about whether this is attributable to direct mechanical effects or reflects the biology of more advanced disease. One study identified stenting as an independent risk factor for perineural invasion, apparently unrelated to the interval between stenting and surgery, and hypothesized that the severe obstruction itself—with associated high intraluminal pressure—facilitates local invasion rather than the stent alone.[37] A meta-analysis subsequently reported increased perineural and lymphatic invasion following stenting, which correlated with reduced overall survival.[37] Another meta-analysis observed higher recurrence rates in patients managed with stenting compared with emergent stoma creation, as well as lower 90-day mortality in the stoma group compared with those undergoing emergent colectomy or bridging stenting.[38] Economic analyses have shown higher short-term costs in the stent group, although more eventual anastomoses were achieved in patients initially managed with a stoma.[38] To address the theoretical risk of tumor dissemination, some recommendations include administering two cycles of systemic chemotherapy, typically with fluorouracil, leucovorin, and oxaliplatin, after stenting and before definitive surgery.[6]

Beyond stenting, several alternative or adjunctive strategies exist to bridge patients to surgery or provide palliation. Endoscopic balloon dilation is particularly useful for benign strictures, such as anastomotic or inflammatory narrowings. Using a guidewire, a balloon catheter is positioned across the stricture, inflated with saline to a diameter appropriate for the lumen, held briefly, and then deflated and withdrawn. The procedure may be repeated multiple times as necessary, often under fluoroscopic guidance with dilute contrast for improved visualization. Success rates of initial symptom relief of approximately 89% have been reported after a single dilation session, although up to half of patients experience recurrent obstruction within five years, underscoring the chronic nature of many benign stricturing diseases. Nasogastric or rectal decompression tubes can provide partial relief of pressure and symptoms, but comparative studies suggest that stenting generally results in better short-term outcomes, including quicker resolution of obstruction and earlier transition to definitive surgery.[5][35] Surgical intervention remains a central component of treatment, especially for malignant obstruction. The scope of surgery ranges from curative resections with primary anastomosis to multistage procedures involving diversion, delayed resection, and subsequent restoration of bowel continuity. The operative strategy is determined by tumor location, extent of disease, patient comorbidities, and the presence of complications such as perforation or peritonitis.[5] In patients with metastatic disease in whom cure is not achievable, palliative surgery—such as a defunctioning stoma—may be undertaken to relieve obstruction and improve quality of life while allowing timely initiation or continuation of systemic chemotherapy. In early-stage, nonmetastatic disease, resection with anastomosis is often the preferred approach, followed by adjuvant therapy based on pathologic staging. A two-stage strategy remains commonplace: an initial resection with temporary colostomy or a diverting colostomy to alleviate obstruction, followed later by reanastomosis once the patient has recovered. Laparoscopic approaches, when feasible, have been associated with fewer complications, shorter hospital stays, and improved three-year overall and disease-free survival, provided they are performed by experienced surgeons.[39][5] For select patients younger than 70 years, with ASA class I or II and limited comorbidities, a single-stage operation involving washout of the colon, oncologic resection, and primary anastomosis is recommended. However, not all data uniformly favor single-stage surgery. A study of 600 individuals with right-sided malignant

obstruction reported higher immediate complication and mortality rates after one-stage procedures compared with multistage surgery, although five-year overall and disease-free survival were similar between groups.[40] In older patients, particularly those above 75 years, primary resection for obstructed colon cancer has been associated with increased 90-day mortality, emphasizing the importance of careful preoperative risk stratification and individualized decision-making.[41]

International guidelines, including those from the World Journal of Emergency Surgery (WJES), provide further direction in complex scenarios such as perforated colon cancer. When perforation occurs at the tumor site and the patient is hemodynamically stable with no severe sepsis, resection with primary anastomosis may be appropriate for both right- and left-sided lesions. If perforation occurs proximal to a left-sided tumor, a subtotal colectomy is often recommended because the remaining colon proximal to the tumor is frequently compromised by distension and poor perfusion. In such cases, preserving a distal remnant above the peritoneal reflection can help limit postoperative diarrhea and incontinence. There are no high-quality randomized trials comparing primary anastomosis to diverting stoma in the context of perforated malignant disease, and reported leak rates overlap between emergent and elective settings, complicating direct comparisons. The WJES suggests that right-sided obstructing cancers are best managed with resection and anastomosis, while nonresectable tumors or palliative situations may be approached with internal bypass procedures or stenting. For right-sided obstruction, through-the-scope self-expanding stents represent an additional option in specialized centers. In locally advanced rectal cancer, neoadjuvant chemoradiotherapy remains the standard, and a transverse colostomy is often constructed to relieve obstruction and facilitate subsequent treatment. Notably, WJES guidelines indicate that the presence of stool in the colon does not significantly increase anastomotic leak rates, challenging some traditional assumptions about the necessity of full mechanical bowel preparation in emergent settings.[1] The optimal surgical strategy for malignant obstruction continues to be debated. Key areas of ongoing discussion include the merits of single- versus multistage operations for left-sided disease, the long-term impact of permanent and reversible stomas, and the role of minimally invasive techniques in emergent settings. Many temporary stomas are never reversed due to patient frailty, comorbidities, disease progression, or technical challenges, and reversal itself carries nontrivial morbidity and mortality. Decision-making must therefore weigh the immediate benefits of decompression and safety against long-term functional and oncologic considerations. The use of colonic tube decompression as a bridge to surgery for left-sided obstruction remains controversial, as some evidence suggests that palliative stenting may offer lower morbidity and mortality than colostomy. Studies comparing stenting and colostomy have reported similar overall morbidity but shorter recovery times in the stenting group, although stent-related complications such as migration and perforation, sometimes exacerbated by agents like bevacizumab, can significantly affect outcomes.[1] Stenting may facilitate subsequent laparoscopic tumor resection by decompressing the colon and improving visualization, yet concerns persist regarding its potential to promote tumor dissemination and regional lymph node involvement, with possible adverse effects on disease-free survival. Nonetheless, multiple studies and meta-analyses have reported no significant differences in recurrence rates or three- and five-year mortality when stenting is compared with emergency surgery in carefully selected patients.[1]

Beyond malignant disease, etiology-specific management strategies are essential. In sigmoid volvulus, endoscopic tube decompression via rigid or flexible sigmoidoscopy is the initial intervention of choice. Successful detorsion is typically followed by placement of a rectal tube to allow continued evacuation of gas and reduce the risk of early recurrence. Despite successful decompression, many patients ultimately require elective resection or fixation of the sigmoid colon to prevent recurrent volvulus. Those in whom endoscopic decompression fails, or who show signs of ischemia or perforation, require urgent operative management.[1][42][43] Cecal volvulus presents differently and more often necessitates prompt surgery due to the higher risk of necrosis and perforation. While cecopexy (fixation of the cecum) may be considered in selected cases with viable bowel, right hemicolectomy with primary anastomosis is frequently preferred given its low mortality and durable results. Cecostomy, although less invasive in principle, has been associated with higher morbidity and mortality and is usually reserved for patients in whom resection is not feasible due to extreme frailty or extensive comorbidities. Hernia-related obstructions require careful assessment for viability of the incarcerated bowel. A reducible hernia may be safely reduced with close observation, but the presence of persistent pain, systemic toxicity, or irreducibility raises concern for strangulation and necessitates urgent operative exploration.[14] Endometriosis causing colonic obstruction may be managed with resection or, in selected cases, stenting to relieve symptoms and allow planning for definitive gynecologic and colorectal surgery. Retroperitoneal fibrosis is often medically managed with steroids and immunosuppressive agents, but when dense fibrotic encasement causes fixed colonic obstruction, surgery

may be required. In any patient with a colonic stricture identified during evaluation for large bowel obstruction, malignancy must be excluded, through biopsy or resection, before committing to conservative or purely mechanical interventions.[8]

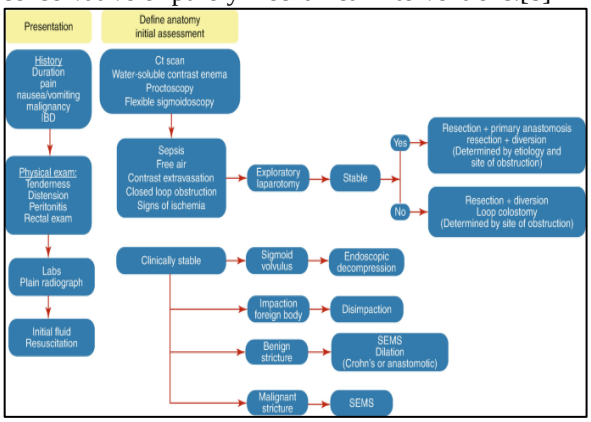

Fig. 3: Management Guidelines.

Management of colonic pseudo-obstruction centers on relieving functional dysmotility and preventing perforation. Pharmacologic therapy with neostigmine, an acetylcholinesterase inhibitor, is highly effective in many cases, resolving pseudo-obstruction in up to 94% of patients. The standard dose is 2.0 mg of intravenous neostigmine administered under continuous cardiac monitoring owing to the risk of bradycardia, which can generally be treated with atropine.[14] For patients who do not respond or have contraindications to neostigmine, mechanical decompression via colonoscopic decompression or percutaneous cecostomy may be necessary, though these carry increased risks in the setting of markedly distended and fragile bowel.[14][19] Impending perforation, signs of cecal ischemia, or fecal peritonitis mandate emergent surgical intervention. Depending on bowel viability, options may include cecostomy on viable intestine, tube cecostomy in stable but refractory cases, or right hemicolectomy or subtotal colectomy in the setting of ischemia or perforation.[14] These procedures can be performed through open, laparoscopic, or image-guided percutaneous approaches, tailored to patient stability and local expertise. Finally, various adjunctive and alternative interventions have been explored in select scenarios. Laser coagulation has been used to assist in the dilation of benign strictures, but definitive management must always include treatment of the underlying cause. For example, colonic obstruction due to tuberculosis requires anti-tuberculous pharmacotherapy in addition to any mechanical relief. In cases of stool impaction without perforation, manual disimpaction or enemas may successfully relieve obstruction, followed by a structured bowel regimen to prevent recurrence. The use of fibrin glue for colonic fistulae or limited perforations has been reported as a less invasive alternative to surgery, though recurrence rates remain high, and these techniques are generally considered adjunctive rather than definitive. Advanced endoscopic treatments, including through-the-scope and over-the-scope clips, endoscopic suturing, and tracking systems, have been employed in highly specialized settings for the management of complex defects, leaks, and fistulae, but they require careful patient selection and long-term follow-up.[35] In summary, the treatment and management of large bowel obstruction demand a nuanced, etiology-specific approach that integrates aggressive initial resuscitation, timely and appropriate imaging, optimal selection of interventional techniques, and careful consideration of the patient's overall oncologic and functional prognosis.

Differential Diagnosis

The differential diagnosis of large bowel obstruction is broad and encompasses both mechanical and functional disturbances of colonic function. Distinguishing true mechanical obstruction from other conditions that mimic its presentation is essential, as management strategies and urgency of intervention differ significantly. A careful synthesis of clinical history, examination findings, and imaging results is required to differentiate among inflammatory, neoplastic, infectious, vascular, and motility-related etiologies. Diverticulitis and colorectal malignancy are among the most important alternative considerations, as both can present with abdominal pain, altered bowel habits, and localized or generalized tenderness. Diverticulitis usually manifests with left lower quadrant pain, fever, and leukocytosis, and may be complicated by abscess formation or localized perforation rather than frank luminal obstruction. Malignancy, whether primary colonic cancer or metastatic carcinomatosis, may cause progressive narrowing of the lumen or external compression, but can also present more subtly with weight loss, anemia, or intermittent changes in bowel habits. Inflammatory bowel disease, including Crohn disease and ulcerative colitis, can lead to strictures and pseudo-obstruction, and in severe cases may progress to toxic megacolon, characterized by systemic toxicity, colonic dilation, and risk of perforation. Similarly, localized or systemic inflammatory processes such as appendicitis, pelvic inflammatory disease, or intra-abdominal abscesses can produce focal tenderness, sepsis, and ileus that mimic obstructive symptoms without a discrete mechanical blockage [35][36].

Functional disorders such as ileus and colonic pseudo-obstruction are critical to consider, particularly in postoperative, critically ill, or medically complex patients. Ileus typically follows surgery, metabolic derangements, medications, or systemic infection and is characterized by diffuse bowel dilation without an identifiable transition point. Colonic pseudo-obstruction presents with marked colonic distension, often of the cecum and right colon, but no mechanical lesion, and may be

associated with severe illness, neurologic disease, or pharmacologic factors.

Alternate diagnosis	*Clues*
Ascites	Acute liver failure, history of hepatitis or alcoholism
Medications (e.g., tricyclic antidepressants, narcotics)	Review of medications; diagnosis of exclusion
Mesenteric ischemia	History of peripheral vascular disease, hypercoagulable state, or postprandial abdominal angina; recent use of vasopressors
Perforated viscus/intra-abdominal sepsis	Fever, leukocytosis, acute abdomen, free air on imaging
Postoperative paralytic ileus	Recent abdominal surgery with no postoperative flatus or bowel movement
Pseudo-obstruction (Ogilvie syndrome)	Acutely dilated large intestine, history of intestinal dysmotility, diabetes mellitus, scleroderma

Fig. 4: Differential Diagnosis.

Toxic megacolon occupies a distinct place in the differential, representing an acute, life-threatening dilation of the colon due to severe colitis, often in the setting of inflammatory bowel disease or infectious colitis such as Clostridium difficile. Several other mechanical conditions must also be excluded. Small bowel obstruction can mimic large bowel obstruction clinically and may coexist, particularly when a closed-loop obstruction or competent ileocecal valve is present. Abdominal or groin hernias may incarcerate bowel segments and produce obstructive symptoms, while volvulus of the sigmoid or cecum causes torsion of the colon and presents with acute pain, distension, and radiographic features such as the coffee bean sign. Colonic intussusception, often driven by a lead point such as a polyp, tumor, or foreign body, can cause intermittent or acute obstruction, and may be accompanied by hematochezia. Ischemic colitis and mesenteric ischemia may produce abdominal pain, bloody diarrhea, and systemic instability; although primarily vascular in origin, severe ischemia can lead to ileus or secondary obstruction. Prior pelvic or abdominal radiation, anatomical variants of colonic fixation or redundancy, and retained foreign bodies may all result in structural narrowing or impaired motility. Finally, infectious processes involving the gastrointestinal tract can trigger localized inflammation and ileus, further complicating the clinical picture. A systematic evaluation that considers each of these entities ensures accurate diagnosis and guides appropriate, timely treatment [35][36].

Pertinent Studies and Ongoing Trials

Recent clinical and observational studies have substantially refined contemporary management strategies for large bowel obstruction, particularly in the context of malignancy. The Colorectal Endoscopic Stenting Trial (CReST), published in 2022, provides some of the strongest prospective data on the use of stents for left-sided malignant obstruction. In this trial, endoscopic stenting relieved obstruction in 82% of patients and significantly reduced the rate of emergent stoma formation, without increasing 30-day mortality or 3-year recurrence, thereby supporting stenting as a safe and effective bridge to surgery in appropriately selected individuals.[44] Parallel work by Kanaka et al. in 2022 extended these findings to right-sided colon cancers, demonstrating that stenting as a bridge to surgery is associated with fewer postoperative complications and lower mortality compared to immediate emergency resection, challenging the traditional bias toward primary surgery in right-sided lesions.[45] Beyond procedural strategies, large-scale retrospective cohorts are clarifying prognostic and diagnostic markers. A Chinese study of 1474 patients who underwent surgery for colonic obstruction identified several serum biomarkers associated with both diagnosis and prognosis, including carcinoembryonic antigen, CA 19-9, CA-125, neutrophil and lymphocyte counts, and liver-related enzymes such as alkaline phosphatase and gamma-glutamyl transpeptidase.[46] These parameters may eventually contribute to risk stratification models that integrate tumor biology with host inflammatory response. Timing of intervention has also been scrutinized. A Dutch study in 2021 evaluated patients with left-sided obstructing colon cancer managed with a bridge-to-surgery approach and compared outcomes in those undergoing elective surgery within versus after 4 weeks. Interestingly, patients with a longer interval to surgery (>4 weeks) exhibited improved overall survival, suggesting that the opportunity for thorough optimization and oncologic planning may outweigh theoretical concerns about delay.[47] In contrast, work by Kwaan et al. showed that performing colectomy, stoma, or stenting within 2 days of admission shortened hospital length of stay but did not significantly affect mortality, highlighting that “earlier” intervention does not always translate into improved survival and must be contextualized within patient status and disease characteristics.[18] Collectively, these studies underscore a shift toward individualized, evidence-based timing and modality of intervention in large bowel obstruction.

Prognosis

Prognosis in large bowel obstruction is shaped by a complex interaction of patient factors, disease etiology, timing of intervention, and the presence of systemic complications. In 2023, Eugene et al. proposed a predictive model for 30-day mortality following surgery for acute abdominal conditions, including colonic obstruction, based on 13 preoperative variables.[48] These factors—age, blood pressure, heart rate, respiratory history, biochemical markers, anticipated diagnosis of malignancy, predicted intraoperative contamination, ASA status, and surgical indication—were integrated

to generate individualized risk estimates. Such tools are intended not only to guide perioperative decision-making but also to facilitate transparent discussions with patients and families regarding treatment options and expected outcomes.[48] From an oncologic perspective, emergency surgery for malignant obstruction is consistently associated with poorer long-term survival than elective resection for non-obstructed disease.[6] Obstructed colorectal cancer carries higher operative risk and frequently reflects more advanced or biologically aggressive tumors. Reported mortality for emergency surgery in this context exceeds 11%, and several factors have been linked to worse outcomes, including age older than 70, right-sided obstruction, marked deviation from ideal body weight, sepsis, and elevated creatinine, all of which reflect diminished physiological reserve and greater systemic stress.[5] Chronic comorbid conditions such as chronic obstructive pulmonary disease and diabetes further compound risk by impairing cardiopulmonary function, wound healing, and immune response, thereby increasing susceptibility to postoperative complications and delayed recovery.[5] Interestingly, large-scale data also highlight that malignancy is not the sole determinant of poor prognosis. In a cohort of approximately 30,000 patients admitted with large bowel obstruction, those with benign etiologies actually had the highest inpatient mortality.[18] This paradox likely reflects the frailty and comorbidity burden of patients with benign conditions such as pseudo-obstruction, advanced diverticular disease, or severe inflammatory disorders, who often present late and may be less resilient to major interventions. Overall, early recognition, aggressive resuscitation, appropriate choice of definitive therapy, and meticulous management of comorbidities are central to improving both short- and long-term outcomes in patients with large bowel obstruction [18][48].

Complications

Large bowel obstruction is associated with a wide spectrum of potential complications arising from both the natural history of the obstruction and the interventions used to treat it. Prolonged intraluminal pressure can lead to progressive vascular compromise of the bowel wall, culminating in ischemia, transmural necrosis, and perforation. Perforation is a particularly catastrophic event, resulting in fecal contamination of the peritoneal cavity, diffuse peritonitis, septic shock, and a substantial increase in mortality. Perforation may occur spontaneously due to severe distension or secondarily during endoscopic or surgical manipulation.[35] When caused by instrumentation, the perforation risk reflects both the underlying fragility of the obstructed colon and the technical aspects of the procedure. Endoscopic stent placement, while often beneficial, is not without risk. The American Society of Colon and Rectal Surgeons reports that perforation associated with colonic stenting occurs in approximately 2% to 9% of cases.[33] In addition to overt perforations, micro-perforations may occur and remain occult on early imaging, yet still permit dissemination of malignant cells into the peritoneal cavity, potentially influencing long-term oncologic outcomes. Concerns about subclinical perforation and tumor spread contribute to ongoing debate regarding the oncologic safety of stents as a bridge to surgery in certain patient populations.[33][37] Surgical complications are also common. Emergency procedures for colonic obstruction carry higher rates of surgical site infection, anastomotic leak, and cardiopulmonary events compared with elective operations. Colostomy reversal, when undertaken, introduces additional risk; anastomotic leak after reversal is associated with a reported mortality of 8.3%, underscoring that reversal is not a benign undertaking and must be carefully considered in light of patient comorbidities and life expectancy.[5][49] Other possible complications include bleeding, fistula formation, abscess, and long-term functional sequelae such as chronic diarrhea, incontinence, or stoma-related problems. These risks highlight the importance of individualized treatment planning, rigorous perioperative optimization, and close postoperative monitoring to detect and address complications promptly. Ultimately, minimizing complications depends on early diagnosis, judicious selection of the least invasive effective intervention, and meticulous surgical and endoscopic technique.[35]

Consultations

Optimal care of a patient with large bowel obstruction demands a coordinated, multidisciplinary approach that leverages the expertise of several specialties. Gastroenterologists are central to both diagnostic and therapeutic endoscopy, including colonoscopy, stent placement, decompression procedures, and in selected cases endoscopic dilation or management of strictures. Interventional radiologists play a crucial role in image-guided diagnosis and therapy, providing percutaneous drainage of abscesses, guidance for cecostomy or other decompressive procedures, and detailed cross-sectional imaging that refines operative planning. Their contributions are particularly important in hemodynamically fragile patients, in whom minimally invasive interventions can avert or delay major surgery. Colorectal surgeons and general surgeons with expertise in complex bowel disease oversee the operative management of mechanical obstruction, including emergency laparotomy, segmental or subtotal colectomy, and creation or reversal of stomas. They also determine the feasibility of laparoscopic versus open techniques, evaluate the risk of primary anastomosis, and manage postoperative complications. Surgical oncologists and medical oncologists collaborate to stage malignancy, decide on neoadjuvant or adjuvant systemic therapy, and align acute surgical decisions with long-term

oncologic strategy, particularly in patients with obstructing colorectal cancer or metastatic disease. In many cases, consultation with intensivists is warranted, especially for patients presenting with sepsis, shock, or multi-organ dysfunction who require advanced hemodynamic monitoring, ventilatory support, and organ-supportive therapies. Anesthesiologists contribute to preoperative risk assessment and optimization, perioperative hemodynamic management, and postoperative pain control, which can significantly influence recovery trajectories. Palliative care specialists may be involved when prognosis is limited or when the primary goal shifts toward symptom control and quality of life rather than cure. Effective interdisciplinary communication ensures that competing priorities—such as urgent decompression, oncologic clearance, and comorbidity management—are reconciled into a coherent, patient-centered plan. Early and proactive consultation is therefore essential for individuals with large bowel obstruction, as timely input from the entire care team improves the likelihood of safe intervention, reduces delays in definitive treatment, and enhances overall outcomes [35].

Patient Education

Deterrence and patient education are key components in reducing the incidence and severity of large bowel obstruction, particularly when it is secondary to colorectal malignancy. A notable and concerning epidemiologic trend is the rising incidence of colorectal cancer in individuals younger than 50 years, a group traditionally considered at relatively low risk and often outside established screening programs.[50] This shift underscores the need for clinicians to engage patients in discussions about early warning signs—such as unexplained changes in bowel habits, rectal bleeding, iron-deficiency anemia, and unintentional weight loss—and to encourage timely medical evaluation rather than attributing these symptoms solely to benign conditions like hemorrhoids or irritable bowel syndrome. Educational efforts should emphasize the importance of adherence to age- and risk-based colorectal cancer screening guidelines. This includes colonoscopy, fecal immunochemical testing, or other approved methods, depending on regional protocols and individual risk factors such as family history, personal history of polyps, or inflammatory bowel disease. For younger adults, especially those with a positive family history or genetic predisposition, clinicians should discuss the potential need for earlier and more frequent surveillance. Clear communication about the goals, benefits, limitations, and potential risks of screening is essential to promote informed decision-making and alleviate anxiety or misconceptions. Patients with known conditions that predispose to obstruction—such as chronic constipation, diverticular disease, inflammatory bowel disease, or prior pelvic radiation—also benefit from targeted education. This includes guidance on dietary fiber, hydration, prudent laxative use, adherence to prescribed medications, and recognizing alarm symptoms that warrant urgent evaluation. For individuals with stomas or prior bowel surgery, stoma nurses and dietitians play a crucial role in teaching self-care techniques and strategies to minimize functional obstruction, such as avoiding poorly digestible foods or managing medication forms that could accumulate in the bowel. Finally, patient education should address lifestyle factors associated with colorectal cancer risk, including smoking, obesity, physical inactivity, and certain dietary patterns. While these interventions do not eliminate risk, they contribute to overall health and potentially reduce the likelihood of malignant obstruction over time. By fostering an informed partnership between patients and clinicians, deterrence and education can decrease delayed presentations, facilitate earlier detection of pathology, and ultimately improve outcomes in large bowel obstruction.[50]

Other Issues

Several practical pearls are central to the effective management of large bowel obstruction and can significantly influence clinical decision-making. In centers with access to advanced endoscopy and interventional radiology, colonic stenting under direct endoscopic and fluoroscopic guidance offers a powerful tool for decompressing malignant obstructions. Placement of a self-expanding metal stent through a colonoscope allows for rapid relief of obstruction, improved patient comfort, and conversion of an emergency into a semi-elective situation, during which the patient can be physiologically optimized and definitive surgery thoughtfully planned. This approach is particularly advantageous for high-risk patients and those in whom a single-stage resection with primary anastomosis is desired.[4][5] In facilities lacking such resources, simpler decompressive measures—such as nasogastric suction and rectal tube placement—may serve as interim strategies, but they rarely provide durable relief. In these settings, timely referral or early operative intervention, including resection or stoma creation, is often necessary to prevent deterioration. Regardless of the modality used, close clinical monitoring is essential. An important principle is that the duration of distension is more strongly associated with perforation risk than a single measurement of colonic diameter. Prolonged distension predisposes to progressive ischemia and structural weakening of the bowel wall; therefore, clinicians should prioritize early decompression rather than waiting for the diameter to reach an arbitrary threshold.[18] Maintaining a high index of suspicion for perforation is crucial. Clinical indicators such as new or worsening generalized

abdominal pain, fever, tachycardia, hypotension, and peritoneal signs should prompt immediate reassessment and imaging. Subtle or occult perforations may be missed on plain radiographs or ultrasound, especially early in their course, necessitating a low threshold for CT scanning when clinical status changes.[1] Awareness of the potential limitations of each imaging modality and the possibility of micro-perforations is vital in interpreting results and planning interventions. Overall, the morbidity and mortality associated with large bowel obstruction are heavily influenced by the underlying etiology, the presence of comorbidities, and the timeliness of diagnosis and treatment. Mortality rises sharply in the presence of bowel necrosis or perforation, with reported rates of 15% to 30% in such cases.[17] Although self-expandable metallic stents have shown excellent short-term results in the palliative and bridging settings, they have not substantially altered long-term survival in the context of advanced malignancy, reinforcing that optimal oncologic management and early disease detection remain the ultimate determinants of prognosis.[17][51]

Enhancing Healthcare Team Outcomes

Improving outcomes in large bowel obstruction hinges on an interprofessional model of care that emphasizes clear communication, coordinated workflows, and shared decision-making. Surgeons, gastroenterologists, oncologists, and radiologists constitute the core clinical team responsible for diagnostic evaluation, imaging interpretation, and procedural or surgical intervention. Their collaboration ensures that the choice of management—whether stenting, decompression, resection, or diversion—is aligned with both immediate clinical needs and long-term oncologic goals. Interventional radiologists enhance diagnostic precision and offer minimally invasive options such as image-guided drainage or percutaneous cecostomy, while intensivists oversee hemodynamic stabilization and organ support in critically ill patients. Nurses and advanced practice providers (nurse practitioners and physician assistants) are indispensable at the bedside, monitoring vital signs, tracking bowel function, assessing pain and mental status, and providing early warning of clinical deterioration. They also play a key educational role, explaining procedures, postoperative expectations, stoma care, and warning signs of complications to patients and families. Pharmacists contribute by optimizing antibiotic regimens, managing drug interactions, and guiding the use of analgesics, antiemetics, prokinetics, and anticoagulants, all of which must be carefully tailored in the setting of obstruction, renal dysfunction, or hepatic impairment. Following surgical intervention, dietitians are essential in developing individualized nutrition plans, particularly for patients with new ileostomies or colostomies, malnutrition, or altered absorption. Specialized stoma nurses instruct patients on stoma appliance selection, skin care, troubleshooting leaks, and managing lifestyle changes, which directly impacts quality of life and reduces readmissions for stoma complications. Physical, occupational, and respiratory therapists facilitate early mobilization, functional recovery, and pulmonary hygiene, thereby lowering the risk of postoperative pneumonia, venous thromboembolism, and deconditioning. Patient navigators and care coordinators are increasingly recognized as vital in ensuring continuity across transitions of care, especially in oncology patients who require long-term follow-up, adjuvant therapy, and surveillance imaging. Regular multidisciplinary team meetings or tumor boards allow for comprehensive review of complex cases, harmonizing perspectives from each discipline. Effective intra-team communication—especially in high-acuity environments such as the operating room and intensive care unit—supports rapid adaptation of the treatment plan in response to evolving clinical conditions. By fostering a culture of collaboration, continuous feedback, and patient-centered care, the interprofessional team can reduce complications, shorten hospital stays, enhance functional recovery, and ultimately improve survival and quality of life for patients with large bowel obstruction [50][51].

Conclusion:

In conclusion, large bowel obstruction is a time-sensitive condition where outcomes are directly tied to the speed of diagnosis and intervention. Initial management must focus on rapid hemodynamic stabilization and systemic resuscitation to correct fluid and electrolyte deficits. Accurate diagnosis relies heavily on computed tomography imaging to identify the obstruction's cause, location, and any signs of ischemia or perforation. Treatment is highly etiology-dependent. For malignant left-sided obstructions, endoscopic stenting has become a valuable tool to convert an emergency into an elective scenario, allowing for patient optimization and planned resection. However, surgery remains the definitive treatment for many cases, including right-sided cancers, volvulus, and all presentations with signs of peritonitis or bowel compromise. Ultimately, navigating this complex emergency necessitates a tailored approach, integrating the expertise of emergency physicians, surgeons, gastroenterologists, and radiologists within a multidisciplinary framework to ensure timely, appropriate care and minimize morbidity and mortality.

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