Perforated Solitery Cecal Diverticula

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Abstract

Background: Solitary cecal diverticulitis (SCD) is an uncommon but important cause of right lower quadrant pain. It accounts for less than 1.5% of diverticular disease in Western populations and is often misdiagnosed as acute appendicitis, leading to unnecessary surgery in up to 7% of negative appendectomy cases

Aim: To highlight the diagnostic challenges of Solitary Cecal Diverticula in case of acute abdominal pain localized to the right lower quadrant and underscore the importance of maintaining clinical suspicion when imaging is inconclusive or when the appendix appears normal during surgery.

Methods: We describe two cases of perforated SCD in middle-aged women, both initially suspected to have appendicitis based on clinical symptoms including localized tenderness, fever, and leukocytosis (WBC $>15 \times 10^9$/L). Imaging either failed to detect the diverticulum or was delayed until deterioration. CT findings ultimately revealed cecal wall thickening, fat stranding, and extraluminal air.

Results: Intraoperatively, perforated solitary diverticula were found on the anterior cecal wall, while the appendix appeared normal. Right hemicolectomy with primary anastomosis was performed in both patients. Histopathology confirmed true diverticula with transmural necrosis. Postoperative recovery was uneventful, and both patients remained symptom-free at follow-up.

Conclusions: These cases highlight the diagnostic challenges of SCD and underscore the importance of maintaining clinical suspicion when imaging is inconclusive or when the appendix appears normal during surgery. While CT has a diagnostic accuracy of 83–90%, misdiagnosis remains common. Timely surgical intervention in perforated SCD ensures optimal outcomes. Greater awareness and structured diagnostic strategies are needed. **(TCM-GMJ May 2026; 11 (1): P65-P71)**

Keywords: Solitary cecal diverticulitis, Perforation, Hemicolectomy, Appendicitis mimic, Right lower quadrant pain .

Introduction

Acute abdominal pain localized to the right lower quadrant remains one of the most common causes of emergency surgical admissions worldwide, accounting for nearly one-third of all acute abdominal presentations [1]. While acute appendicitis dominates the differential diagnosis, numerous conditions including gynecologic, urologic, and gastrointestinal pathologies can present with similar clinical features. Among these, solitary cecal diverticulitis (SCD) poses a unique diagnostic challenge due to its low incidence, ambiguous symptomatology, and overlap with more familiar conditions such as appendicitis and cecal carcinoma.

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Solitary cecal diverticulitis refers to inflammation of a single, often congenital, diverticulum located on the cecum. In contrast to left-sided diverticular disease, which is common in Western populations and associated with aging and fiber-deficient diets, SCD is a rare entity, particularly outside East Asia. While studies from Japan and Korea suggest that right-sided diverticula may account for up to 40% of all colonic diverticulitis cases in their populations [2], reports from Europe and North America estimate the prevalence of SCD at less than 1.5% [3,4]. In the Middle East and South Asia, precise epidemiologic data remain limited, but case reports suggest the incidence is rising in parallel with shifts in diet and urbanization.

Despite its rarity, SCD is clinically relevant because of its tendency to mimic acute appendicitis. Both conditions often present with right iliac fossa pain, low-grade fever, and leukocytosis. However, unlike appendicitis, SCD may present more insidiously and is frequently missed on imaging. Moreover, SCD may progress to complications such as perforation or phlegmon formation when misdi-

agnosed or conservatively managed without appropriate follow-up. Recent evidence suggests that up to 75% of patients with SCD are initially misdiagnosed, and a significant percentage undergo unnecessary appendectomy before the correct diagnosis is established intraoperatively or histologically [5,6].

In this context, the present case series aims to describe two surgically managed cases of perforated solitary cecal diverticulitis that were initially mistaken for acute appendicitis. These cases were selected not only for their clinical relevance but also for their illustration of key diagnostic pitfalls and intraoperative decision-making dilemmas. By comparing the radiological, operative, and histopathological features of each case, this report seeks to contribute to the limited but growing literature on right-sided diverticulitis in non-Asian populations. The central question guiding this report is: how can clinicians distinguish solitary cecal diverticulitis from other common causes of right lower quadrant pain, and what operative strategies ensure optimal outcomes in cases complicated by perforation? As dietary patterns evolve and diagnostic imaging becomes more accessible, awareness of SCD must increase to avoid delayed interventions, reduce surgical morbidity, and inform future guidelines for management.

Methods

We describe two cases of perforated SCD in middle-aged women, both initially suspected to have appendicitis.

Case 1

A 44-year-old female presented to the emergency department with complaints of lower abdominal pain and low-grade fever for two days. The pain was dull, persistent, and localized to the right iliac fossa, without urinary or bowel symptoms. At an external facility the day prior, her complete blood count (CBC) revealed leukocytosis (WBC 18.3×10^9/L) and an erythrocyte sedimentation rate of 19 mm/hr. She was diagnosed with suspected appendicitis and advised surgical intervention but refused admission.

The following day, an ultrasound at a private clinic showed a 3 cm right ovarian cyst and equivocal signs suggestive of appendicitis. Due to worsening symptoms including increasing pain, mild tachycardia (HR 101 bpm), and low-grade fever (37.9°C) she presented to our hospital. On abdominal examination, she exhibited tenderness in the right iliac fossa, rebound tenderness, and localized guarding. Laboratory investigations repeated at our center confirmed persistent leukocytosis and elevated CRP.

Initial conservative management (IV fluids, analgesia, broad-spectrum antibiotics) was initiated. However, due to persistent peritoneal signs and lack of clinical improvement, an urgent contrast-enhanced CT scan was performed. The scan revealed localized fat stranding, cecal wall thickening, extraluminal air, and a suspected inflamed diverticulum arising from the anterior cecal wall, with a normal-appearing appendix raising the possibility of perforated cecal diverticulitis.

Case 2

A middle-aged woman presented with acute right lower quadrant pain of 48 hours duration, associated with nausea and mild fever. She reported no prior gastrointestinal complaints. On examination, her abdomen was tender with localized guarding in the right iliac fossa. Vitals were stable (BP 110/70 mmHg, HR 97 bpm, Temp 38.1°C).

Laboratory workup showed leukocytosis (WBC 15.8×10^9/L), CRP 102 mg/L, and normal liver and renal function. A contrast-enhanced CT scan revealed focal wall thickening of the cecum, surrounding inflammatory changes, and a suspected diverticulum abutting the anterior wall with extraluminal air. The appendix was unremarkable.

She was taken for emergency exploratory laparotomy. Approximately 150 mL of turbid peritoneal fluid was found, with a necrotic solitary diverticulum on the anterior cecal wall showing a pinpoint perforation and inflammatory adhesion to adjacent omentum. The appendix was again normal (Figure 2).

Results and discussion

In case 1 emergency laparotomy was performed via a midline incision under general anesthesia. Intraoperative findings included ~200 mL of turbid yellowish peritoneal fluid and a firm 6 × 5 cm mass on the anterior cecal wall, with a 4 mm perforation exuding enteric contents (Fig.1). The appendix was grossly normal. A right hemicolectomy with primary ileo-transverse anastomosis was performed. The abdominal cavity was irrigated and drained, and the patient was transferred to the surgical unit. Postoperatively, she recovered uneventfully, tolerated oral diet by day 3, and was discharged on postoperative day 9. Histopathological analysis confirmed a true diverticulum of the cecum with focal transmural necrosis and surrounding phlegmon. No dysplasia or malignancy was identified. She remained symptom-free at two-week and one-month follow-ups.

In case 2 given the risk of recurrence, sepsis, and underlying malignancy, a right hemicolectomy was performed with a stapled side-to-side ileotransverse anastomosis.

Histopathological examination revealed an inflamed true diverticulum with ulceration, necrosis, and surrounding abscess. No neoplasia was found. The patient recovered well, and no complications occurred during the hospital stay. She was discharged on day 7 with outpatient colonoscopy planned at six weeks.

Solitary cecal diverticulitis (SCD) presents a rare but clinically significant diagnostic challenge due to its anatomical and symptomatic overlap with acute appendicitis. The two cases presented in this report reflect the classic difficulty in distinguishing SCD from appendiceal pathology during both preoperative and intraoperative assessments. Despite advancements in imaging, definitive diagnosis in both patients was made intraoperatively, highlighting the persisting limitations in noninvasive diagnostics for right lower quadrant pain.

Both cases involved perforated diverticula, necessitating right hemicolectomy. These presentations are consistent with the literature describing the common progression of untreated or misdiagnosed SCD to perforation or abscess formation, classified by Hinchey staging system as Stage III and IV [7,8,9] (Table 1).

The anatomic proximity of SCD to the appendix often leads to misidentification, as evidenced by studies indicating that up to 7% of negative appendectomies later reveal

diverticular pathology [10]. In both patients, the appendix was intraoperatively confirmed as normal, underscoring the critical role of careful surgical inspection when clinical suspicion persists, especially in case of inconclusive imaging.

While CT imaging remains the gold standard for identifying SCD, interpretation is highly operator-dependent and may be confounded by bowel gas, overlapping inflammation, or inadequate contrast [11]. In our cases, CT imaging was either delayed or only ordered after deterioration in clinical status, contributing to diagnostic delay. Key radiologic features of SCD include cecal wall thickening, extraluminal air, and adjacent fat stranding with a visible diverticular outpouching finding that may resemble perforated appendicitis or cecal carcinoma [12]. The same changes were found in our both cases (Figure 3).

The definitive surgical approach to SCD remains variable and is typically guided by intraoperative findings. In the presence of localized inflammation or small, nonperforated diverticula, diverticulectomy may suffice. However, in the setting of perforation, mass formation, or concern for malignancy as seen in both presented cases right hemicolectomy is preferred to ensure complete resection, control contamination, and exclude neoplasia [2,13]. Histopathological confirmation of true diverticula with associated acute inflammation and transmural necrosis validated the surgical decisions taken in both cases.

Importantly, SCD remains underdiagnosed in Western regions, where prevalence is reported as low compared to East Asia [1,3,4,6,7] (Table 2).

This disparity emphasizes the need for increased awareness among clinicians and surgeons, especially in populations with changing dietary patterns or increasing cross-regional mobility. Missed or delayed diagnoses not only risk perforation but also lead to prolonged hospitalization and higher healthcare costs.

The long-term outcomes of SCD are generally favorable when appropriately managed, with low recurrence rates following surgical resection [14]. However, the literature lacks high-quality, prospective studies that define standardized management protocols for incidentally discovered or conservatively managed SCD. Furthermore, post-recovery colonoscopic evaluation remains critical to exclude synchronous neoplasia, particularly in older patients or those with atypical imaging findings [15].

Pathogenesis and Histology

SCD differs fundamentally from left-sided colonic diverticulosis both embryologically and structurally. Most SCDs are congenital true diverticula containing all layers of the colonic wall, unlike the acquired pseudodiverticula of the sigmoid colon which involve only mucosa and submucosa herniating through the muscularis propria (Figure 4).

This structural integrity, while theoretically protective, does not preclude inflammation, necrosis, or perforation under increased luminal pressure or mucosal injury. Notably, the anteromedial cecal wall where most SCDs occur is embryologically a watershed zone, and ischemia in this region may facilitate microperforation (11,12).

Diagnostic Challenges and Imaging Pitfalls

The clinical presentation of SCD is often indistinguishable from acute appendicitis, with right lower quadrant pain, leukocytosis, and elevated inflammatory markers being nonspecific. This overlap can mislead even experienced surgeons, particularly when laparoscopic visualization is limited or incomplete. However, unlike appendicitis, SCD may present more insidiously and is less likely to be associated with rebound tenderness or systemic toxicity in early stages.

CT imaging is the modality of choice, with reported sensitivity and specificity ranging from 79% to 99% [11]. Key CT findings include focal cecal wall thickening, pericolic fat stranding, and the presence of an inflamed diverticulum. Ultrasound and MRI can be useful alternatives, especially in specific populations or when CT is contraindicated [2]. The presence of a normal appendix on imaging should prompt consideration of SCD. Yet, imaging sensitivity can be limited by artifact, bowel gas, or radiologist experience (Table 3).

Differential Diagnoses and Treatment Considerations: Conservative vs. Operative Strategy

SCD is not the only mimic of right iliac fossa pain. Appendiceal neoplasms, Meckel's diverticulum, ileocecal tuberculosis, and Crohn's disease must also be excluded. Notably, cecal carcinoma can closely resemble inflamed diverticula on imaging. In unclear cases or when a mass-like lesion is observed, oncological resection (right hemicolectomy) is often justified. The algorithm begins with clinical evaluation and laboratory assessment, followed by CT imaging as the gold standard for diagnosis. Based on imaging and clinical findings, patients are stratified according to Hinchey classification: Hinchey I–II (localized inflammation or small/contained abscess) are typically managed conservatively with intravenous antibiotics ± image-guided drainage [3,7,16]. Advanced disease (Hinchey III–IV, perforation or generalized peritonitis) requires surgical intervention, ranging from diverticulectomy to right hemicolectomy depending on intraoperative findings [5,6,7]. Post-treatment colonoscopy is recommended, especially in patients over 50 years or with atypical imaging, to exclude malignancy and assess recurrence risk [5,7] (Figure 5).

The decision matrix for managing SCD lies in three major factors: (1) hemodynamic stability, (2) presence of peritonitis, and (3) radiological evidence of perforation or abscess. Non-operative management with bowel rest and broad-spectrum antibiotics is viable in stable patients with contained inflammation. Studies suggest a 70–80% success rate with conservative therapy for Hinchey 1a-type diverticulitis [1,4,13]. However, recurrence rates of up to 25% and diagnostic uncertainty often leads clinicians to consider elective resection following conservative therapy.

The management of perforated cecal diverticulitis is guided by the severity of the condition, often classified according to the Hinchey staging system (Table 1). For patients with Hinchey Stage I disease, characterized by a localized phlegmon or an abscess smaller than 4 cm, conservative management with intravenous antibiotics is typi-

cally effective. In cases classified as Hinchey Stage II, where the abscess exceeds 4 cm, percutaneous drainage is often required, followed by an elective surgical resection. More advanced stages, such as Hinchey Stage III and IV, which involve generalized purulent or fecal peritonitis, necessitate emergency surgical intervention usually in the form of a right hemicolectomy. Notably, laparoscopic surgical approaches have been associated with shorter hospital stays and fewer postoperative complications compared to traditional open surgery.

Surgical intervention is imperative when there is generalized peritonitis, sepsis, or radiological evidence of free perforation. Options include diverticulectomy, segmental cecal resection, or right hemicolectomy depending on intraoperative findings. A right limited resection was shown to be appropriate due to localized perforation and inflammation [14] (Table 4).

Intraoperative misidentification of the inflamed diverticulum as a necrotic appendix is a well-documented error in literature, accounting for up to 7% of negative appendectomy cases in certain series [14].

Limitations in Current Evidence and Gaps

Much of the literature on SCD comprises case reports or small retrospective series, with little consensus on long-term outcomes. The natural history of conservatively managed SCD remains poorly understood due to the lack of prospective studies. Furthermore, no clear guidelines exist on the threshold for elective surgery post-resolution. Recent advances in radiomics and AI-assisted diagnostic imaging show promise in enhancing CT interpretation, particularly in ambiguous abdominal pathologies, but are yet to be validated in SCD (15).

Given the rarity of the condition and the lack of large cohort studies, much of the existing understanding of SCD stems from case reports and small case series. Therefore, continued reporting of these cases remains crucial for enhancing diagnostic acumen and refining management algorithms.

Through this analysis, we advocate for heightened clinical suspicion of SCD in patients with right iliac fossa pain and normal appendiceal findings, especially in populations with known higher prevalence. A multidisciplinary, severity-based approach integrating imaging, clinical markers, and surgical judgment is essential for optimal outcomes.

Conclusion

Solitary cecal diverticulitis remains a diagnostic and therapeutic conundrum, particularly in non-Asian populations where its incidence is low and clinical awareness minimal.

These two cases illustrate the potential for misdiagnosis and delayed intervention when SCD mimics acute appendicitis. Both patients benefited from prompt surgical re-evaluation following failed conservative management and were found to have perforated diverticula requiring right hemicolectomy. Their successful outcomes reinforce the importance of maintaining a broad differential in right iliac fossa pain, especially when imaging or intraoperative findings are atypical. In the absence of standardized treatment guidelines for SCD, these cases highlight the value of early surgical exploration, comprehensive intraoperative assessment, and definitive resection when perforation or malignancy cannot be excluded. Greater reporting of such cases is essential to inform future diagnostic algorithms and surgical standards for this under recognized condition.

Early use of high-resolution CT scanning significantly enhances diagnostic accuracy, especially when the appendix is visualized as normal. Yet, imaging alone cannot fully capture the clinical nuance, particularly in early or perforated disease. Intraoperative decision-making, therefore, must be rooted in anatomical precision, experience, and adaptability—ranging from simple diverticulectomy to full right hemicolectomy when necessary. A multidisciplinary approach integrating radiological, surgical, and histopathological input is crucial to distinguish SCD from its malignant or inflammatory mimics.

From a global health perspective, underdiagnosis of SCD underscores disparities in radiological training, resource access, and surgical heuristics. Moreover, there exists a pressing need for structured guidelines on the management of incidentally discovered or recurrent cecal diverticula, particularly in younger patients. The role of elective surgery following conservative management remains inadequately explored.

Future research must move beyond anecdotal reporting to encompass multicenter registries, prospective outcome studies, and the development of evidence-based scoring systems for operative risk stratification. Incorporating AI-based image analysis and decision-support tools may further bridge the gap between radiological detection and clinical intervention.

Figure 1. Perforated cecal diverticulum found at operation (Case 1 presentation).

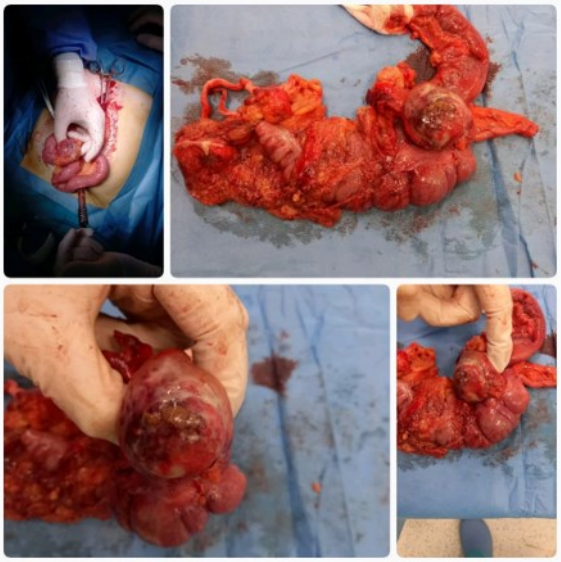

Figure 2. Perforated cecal diverticulum found at operation (Case 2 presentation).

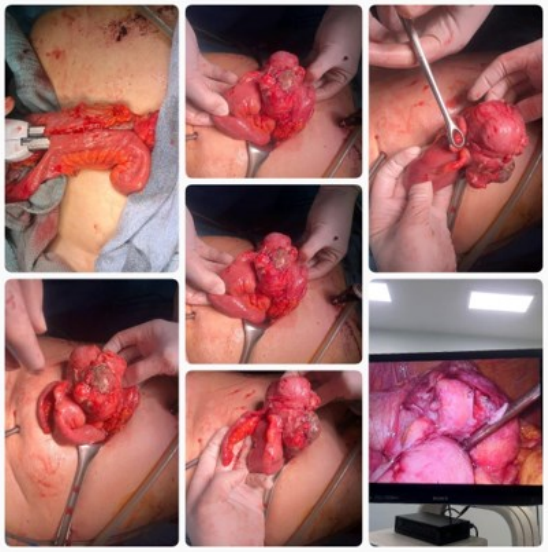

Figure 3. CT Imaging of both cases with cecal wall thickening, extraluminal air, and adjacent fat stranding with a visible diverticular outpouching.

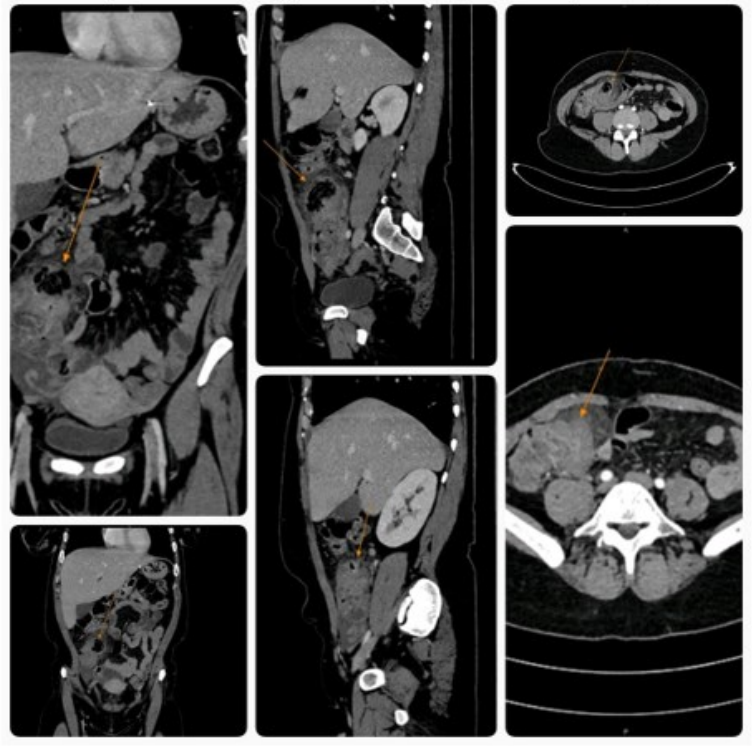

Figure 4: Structural Comparison Between True vs. False Diverticula. Illustration showing: true diverticulum contains mucosa, submucosa, muscularis propria, and serosa; pseudodiverticulum lacks muscularis layer.

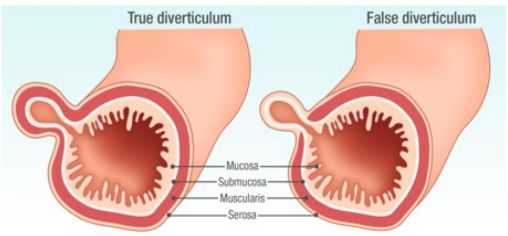

Figure 5: Diagnostic and management pathway for solitary cecal diverticulitis.

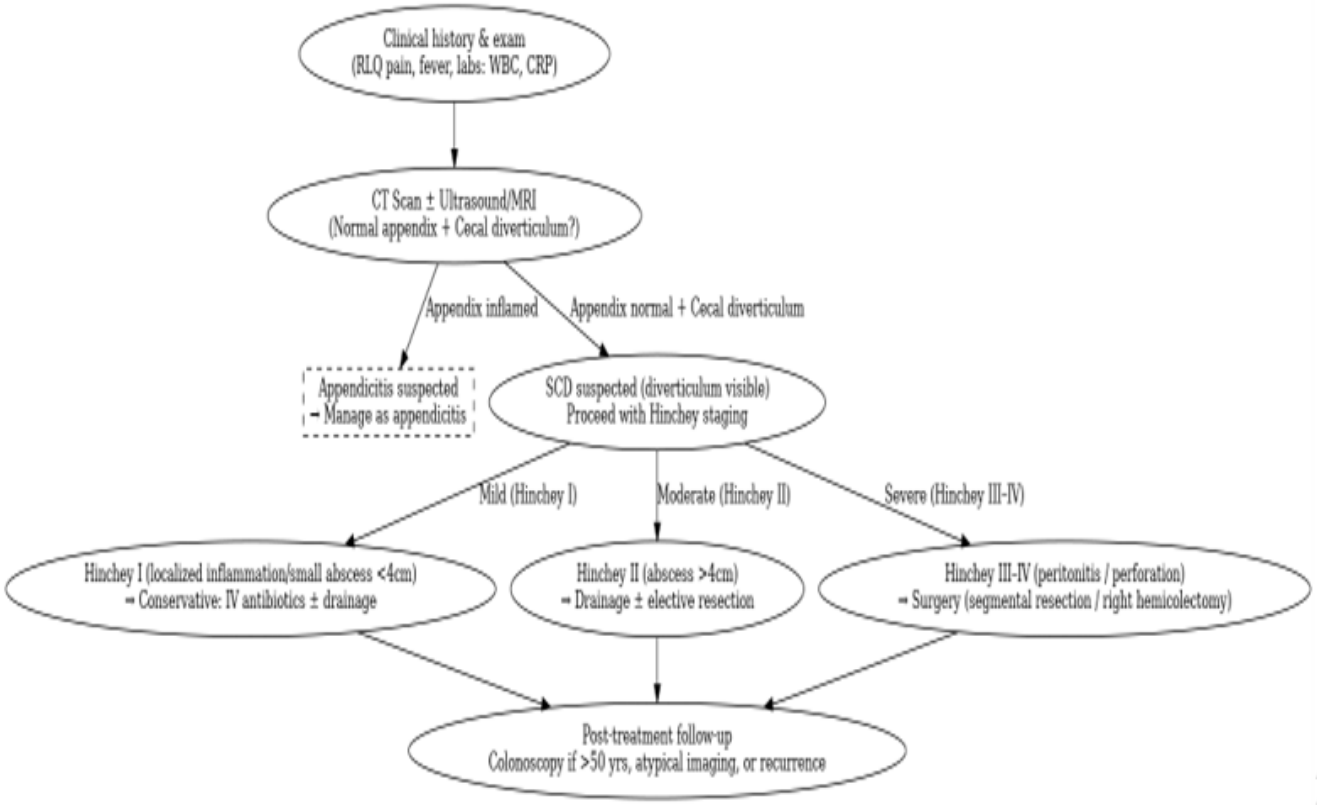

Table 1. Modified Hinchey staging system for diverticula

Modified Hinchey stage	Features
Stage 0	Diverticula with or without wall thickening of the colon
Stage 1	Diverticulitis with a confined pericolic phlegmon or abscess
Stage 1a	Phlegmon with inflammatory reaction in pericolic fat tissue
Stage 1b	Confined pericolic abscess (< 5 cm) close to the inflammatory site
Stage 2	Diverticulitis with abscess distant from the primary inflammatory site (intra-abdominal, retroperitoneal, or pelvic)
Stage 2a	Amenable to percutaneous drainage
Stage 2b	Complex abscess associated with a possible fistula
Stage 3	Generalized purulent peritonitis
Stage 4	Fecal peritonitis

Table 2: Prevalence of Solitary Cecal Diverticulum by Geographic Region.

Region	Prevalence (%)
East Asia	15-34%
Middle East	5-10%
North America	<1%
Europe	<1.5%

Table 3: Diagnostic Differentiators Between SCD and Acute Appendicitis

Parameter	**Solitary Cecal Diverticulitis**	**Acute Appendicitis**
Pain Location	Right Lower Quadrant	Right Lower Quadrant
Onset	Often insidious	Sudden
Appendix on Imaging	Normal	Enlarged, thickened
Cecal Wall Outpouching	Visible diverticulum	Absent
Extraluminal Air	If perforated	Unusual unless ruptured
CT Diagnostic Accuracy	83-90% (depends on operator expertise)	>95%

Table 4: Surgical Decision Tree for Cecal Diverticulitis

Intraoperative Finding	**Preferred Surgical Approach**	**Rationale**
Normal appendix + inflamed diverticulum	Diverticulectomy +/- appendectomy	If localized, and inflammation is minimal
Perforated diverticulum	Segmental cecal resection	Prevents recurrence, removes necrotic area
Multiple diverticula or cecal mass	Right hemicolectomy	Rule out carcinoma
Generalized peritonitis	Open/laparoscopic washout + resection	Urgent sepsis control

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