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Effective Treatment Strategies For Diverticular Disease: Review

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Abstract: The rate of colonic diverticulosis and diverticular disease rises worldwide. Most patients stay free of symptoms for life. Still, colonic diverticular disease, including acute diverticulitis, affects many people. It strains national health systems with direct and indirect costs. Experts now test treatments to find the best options. Fibre, non-absorbable antibiotics, and probiotics aid symptomatic but uncomplicated cases. 5-Aminosalicylic acid may stop acute diverticulitis. Yet solid proof for medical steps to block repeated attacks remains absent. This review covers how these treatments work and future outlooks.

Keywords: Diverticular disease, acute diverticulitis, 5-aminosalicylic acid, high-fibre diet, probiotics, non-absorbable antibiotics, endoscopy.

I. Introduction

Diverticular disease (DD) shows as sac-like bulges (diverticula). These occur when colon mucosa and submucosa push through gaps in the colon wall's muscle layer [1]. DD occurs often in developed countries. Rates are a touch higher in the USA than Europe. It stays rare in Africa. Evidence points to rising colonic diverticulosis across the globe. Lifestyle changes likely drive this [1]. Most with colonic diverticulosis face no symptoms. Around 20% gain symptoms and get DD [2]. From them, 15% face diverticulitis [3,4], with or without problems.Uncomplicated DD (SUDD). Standard terms cover diverticula cases. ‘Diverticulosis’ means colonic diverticula exist. They may cause symptoms or complications, or not. ‘DD’ marks symptomatic diverticulosis with clear clinical effects. This links to true diverticulitis or subtler issues, like gut sensitivity without proven inflammation. DD means diverticulosis turns into real sickness. ‘SUDD’ (symptomatic uncomplicated diverticular disease) fits DD with steady abdominal pain tied to diverticula, but no seen colitis or diverticulitis. ‘Diverticulitis’ means one or more inflamed diverticula. It brings acute or lasting issues. Diverticulitis splits into uncomplicated or complicated. Uncomplicated appears on CT as wall thickening plus fat stranding. Complicated shows abscess, peritonitis, blockage, fistulas, or bleeding. ‘Segmental colitis linked to diverticulosis (SCAD)’ is distinct inflammation near diverticula. Endoscopy and biopsy traits mark it as an early sign of inflammatory bowel disease (IBD).

1. Clinical features of DD

Doctors classify diverticular disease (DD) using 1999 EAES guidelines. These split DD into SUDD, recurrent symptomatic disease, and complicated forms [5]. SUDD brings vague bouts of abdominal pain. No signs of swelling show up. Pain strikes in waves most times. It may last steady. Gas or stool often eases it. Bloating hits from excess bacteria. Bowel patterns shift too. Constipation rules over loose stools. Exams find fullness or soreness in the left lower abdomen. A sore sigmoid loop may appear on touch now and then. Recurrent disease repeats these signs. Attacks strike several times a year. New reports note links to IBS-like symptoms [6]. IBS hits 4.7 times more after acute diverticulitis. Key factors include low serotonin uptake [7]. Colon lining shows extra neuropeptides [8]. Mild swelling lingers [9]. IBS-like fits better than IBS label. SUDD and IBS look alike. Clinical checks and lab tests aid splits. Cuomo's team saw few DD cases meet IBS rules (10%). Long pain over 24 hours marked SUDD more ($P<0.01$). DD brought more such flares needing care ($P<0.01$) [10]. We checked 72 patients with pain and colon diverticula. Colonoscopy spotted them. Forty-two counted as SUDD. Pain lasted 24 hours or more in left lower abdomen. Thirty qualified as IBS. Raised faecal calprotectin levels help too.

Proper diagnosis sets IBS apart from diverticular disease in patients with colonic diverticulosis [12]. Inflammation in these diverticula leads to acute diverticulitis. Fecal matter trapped inside may cause this, much like in appendicitis. It abrades the mucosa. This let's gut bacteria reach the lamina propria. Acute mucosal inflammation follows. It starts at the sac's apex [13,14]. Mesenteric and pericolic fat can inflame too. A diverticular abscess may form. Micro-perforation at the diverticulum's fundus is another cause [15]. Acute colonic diverticulitis burdens national health systems with high direct and indirect costs [16]. Relapses happen more often than once thought. One study showed 40% relapse over 10 years [17]. Past guidelines assumed two or more episodes led to complications and death [18]. Yet multiple episodes link to no higher mortality or complication risk. Patients with prior diverticulitis had 2.5% mortality. This beats 10% for first-time complicated cases [19]. Also, 78% of perforated cases had no prior history [20]. Elective sigmoid resection risks 2.3% death and 14.2% colostomy [21-23]. Recurrence after resection runs 2.6% to 10.4%. The American Society of Colon and Rectal Surgeons updated advice in 2006. They urge tailored care after acute attacks [24].

2. Medical treatment of diverticular disease: SUDD

Fibre WGO guidelines now back spasmolytics plus high-fibre diets or supplements as first-line care for SUDD [25]. Yet a fresh systematic review shows scant high-quality proof for high-fibre diets in DD treatment. Most advice rests on patchy level 2 or level 3 evidence [26]. Just three solid randomized placebo-controlled trials exist, with mixed outcomes [27,28]. That review saw no clear split between soluble and insoluble fibre. One randomized placebo-controlled trial pitted insoluble fibre (bran, 6.99 g/day) against soluble fibre (ispaghula, 9.04 g/day) and placebo (2.34 g/day) over 16 weeks. No key gains showed in pain, lower bowel signs, or full symptom scores for crispbread, ispaghula drink, or placebo. Peery et al. linked high soluble fibre intake to greater diverticulosis risk ($P=0.038$) [29]. Antibiotics Rifaximin trials for SUDD started in 1992. This antibiotic absorbs poorly yet hits a wide range of germs: Gram-positive, Gram-negative, aerobes, and anaerobes [30]. It aids SUDD treatment now and helps sustain remission. A new meta-analysis pooled four prospective randomized trials (one double-blind placebo-controlled) with 1660 patients. Rifaximin beat controls by 29.0% for symptom relief (95% CI 24.5-33.6; $P<0.0001$) [31].

Mesalazine curbs inflammation in SUDD care. Doctors have used it for years in IBD, though its action remains unclear. It works in gut lining via N-Ac-5-ASA, the key form of 5-ASA (mesalazine). It blocks parts of inflammation like cyclo-oxygenase, thromboxane-synthetase, and PAF-synthetase. It cuts interleukin-1 and free radicals, plus acts as an antioxidant [32]. Recent data tie inflammation to SUDD causes, so trials tested mesalazine. Open-label studies showed good effects despite design flaws [33,34]. Three double-blind placebo-controlled trials checked mesalazine lately. The first tested 3 g/day granules against placebo for SUDD pain in the lower abdomen. Pain drop by week 4 beat baseline (from 7-day pre-treatment score) in the per-protocol group ($P=0.05$), not intention-to-treat ($P=0.374$). Post-hoc fixes gave $P=0.005$ (per-protocol). Safety matched up [35]. The second trial gauged mesalazine, with or without probiotic, against placebo to hold SUDD remission.

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It split patients into four groups at random: Group M (mesalazine 1.6 g/day plus Lactobacillus casei subsp. DG placebo), Group LPatients received one of four treatments: Group L took active L. casei subsp. DG at 24 billion per day with mesalazine placebo. Group LM took active L. casei subsp. DG at 24 billion per day with active mesalazine. Group M took mesalazine with L. casei subsp. DG placebo. Group P took both placebos. SUDD came back in none (0%) of Group LM patients. It recurred in 7 (13.7%) of Group M patients, 8 (14.5%) of Group L patients, and 23 (46.0%) of Group P patients. P values were: LM vs M, P=0.015; LM vs L, P=0.011; LM vs P, P=0.000; M vs P, P=0.0001; L vs P, P=0.0001. The study noted no adverse events [36]. A second double-blind, placebo-controlled trial, not yet published, checked mesalazine for abdominal pain in SUDD as a key secondary goal. Patients had flexible sigmoidoscopy and biopsies at start and after 12 weeks. They kept diaries on pain and bowel habits. Random assignment gave mesalazine 3 g/day (Group M) or placebo (Group P) for 12 weeks. Follow-up came at 2 and 4 weeks. Group M saw a clear drop in pain duration (P=0.0413). Group P did not [37].

2.1Probiotics

Probiotics rank as a third option for SUDD care. They are live microbes that aid host health beyond basic food nutrition [38]. Probiotics work by blocking pathogen attachment. They boost IgA in Peyer's patches and immune action. They curb anti-inflammatory cytokines and block pro-inflammatory ones. Some bacteria offer targeted benefits in foods or live preparations. These avoid risks like antibiotic resistance. New work tested probiotics in SUDD. All strains helped patients [39-41]. Yet open-label designs cut the strength of findings. The prior double-blind trial showed mesalazine plus L. casei subsp. DG (Group LM) or L. casei subsp. DG alone (Group L) beat placebo. Recurrence dropped (LM vs P, P=0.000; L vs P, P=0.000) [36]. Table 4 lists controlled probiotic studies for these patients.

2.2 Prevention of acute diverticulitis

Preventing acute diverticulitis matters a great deal. It means sudden swelling in a colon pouch. Doctors and surgeons often handle this urgent case. Risks include obesity, smoking, low exercise, and drugs like NSAIDs. Medical care has improved lately. Most uncomplicated cases get outpatient treatment. This uses clear liquids and antibiotics [42]. Outpatients take broad-spectrum antibiotics for 7-10 days. Morphine sparks colon spasms and worsens spasms. Outpatient care works in most. Fewer than 10% return to A&E within 60 days. Guidelines call for hospital IV antibiotics if patients cannot eat by mouth, have major health issues, fail outpatient care, or face complex diverticulitis. Symptoms ease in 3-4 days. Hospital patients get 7-10 days of oral antibiotics post-discharge. Studies on prevention often clash.

2.3 Fibre

Fibre data for preventing diverticulitis conflict [43-45]. People with diverticulosis or DD seek diet and habit tips to cut risks of attacks or issues. High-fibre diets have long been advised. One case-control study with 56 people found high fibre cuts complications by 52 per 1000. It also trims surgery needs by 100 per 1000 [43]. A cohort study linked fibre intake to DD hospital stays. High fibre may lower acute diverticulitis risk by 59 per 1000 [45]. We score this evidence very low. Our group has diverticulitis history; the study did not. Just three trials tested fibre to stop diverticulitis in such patients. Small sizes failed to show gains from high-fibre supplements against simple acute cases or issues like abscess, perforation, blockage, fistula, or bleeding.

2.4 Rifaximin

Three open randomized trials with 1492 patients tested rifaximin. Four more compared rifaximin plus glucomannan or fibre against glucomannan alone. Studies on rifaximin with fibre or fibre alone found a small gain in stopping acute diverticulitis. Only the biggest trial gave clear results. Pooled data from placebo trials and open studies showed fewer cases of acute diverticulitis in those on rifaximin plus fibre than fibre alone (11/970 or 1.1% vs 20/690 or 2.9%; P=0.012) [46-49]. These findings mean 57 patients

need treatment with rifaximin plus fibre for one year to stop one attack (NNT: 57). One double-blind placebo trial checked this as a side goal. It ran for one year. All got glucomannan (2 g/day). One group took rifaximin (400 mg twice daily for 7 days each month). The other took placebo. Rifaximin matched placebo. Acute diverticulitis hit 2.4% in both groups [48].

2.5 Mesalazine

Five open randomized trials with over 400 patients compared mesalazine alone or with probiotics, or probiotics alone, to prevent acute diverticulitis. No big differences showed up. Yet only seven attacks occurred each year (2% rate) [33,34,50-52]. A recent double-blind placebo trial with dummy pills checked this as a side goal. It lasted one year. Patients got mesalazine (1.6 g/day for 10 days/month), probiotic (L. casei subsp. DG 24 billion/day for 10 days/month), both, or placebo. Mesalazine beat placebo. No cases in the mesalazine group. Probiotic had 1.78%. Placebo had 12% [36].

3. Diverticular inflammation and complications assessment (DICA) classification: Is the solution around the corner?

Several scans and checks now grade DD. No endoscopy score exists yet. We do many colonoscopies. We spot diverticular inflammation signs often [53,54]. Picking patients by colon features could boost drug effects. A new endoscopy score for DD came out and got tested [55]. DICA looks at four key points (diverticulosis spread, diverticula count per area, inflammation signs, complications) plus details. It grades as DICA 1, 2, or 3 (Table 1). Early data link scores to outcomes. Mild or symptom-free diverticulosis needs no ongoing drugs to avoid issues. A colon with repeat flares may not respond to drugs. DICA 2 fits scheduled drugs well. It covers diverticulosis with or without inflammation signs. Drugs prevent new or repeat problems. More forward studies could confirm this. Then we spot patients who gain most from ongoing care.

Table 1

Diverticular inflammation and complication assessment (DICA) classification

Items	Points		
Diverticulosis extension			
Left colon	2		
Right colon	1		
Number of diverticula (in each district)			
Up to 15: grade I	0		
>15: grade II	1		
Presence of inflammatory signs			
Edema/hyperemia	1		
Erosions	2		
SCAD	3		
Presence of complications			
Rigidity of the colon	4		
Stenosis	4		
		DICA	Numerical classification value
Pus	4	DICA 1	From 1 to 3 points
Bleeding	4	DICA 2	From 4 to 7 points
		DICA 3	>7 points

SCAD, segmental colitis associated with diverticulosis

in three grades: DICA 1, DICA 2 and DICA 3

4. Interventional Management

Patients with diverticular abscesses need interventional steps like radiology-guided drain. Abscesses under 3 cm often clear with IV antibiotics alone. Bigger ones over 3 cm seldom do. They need drain for full cure. Size guides choice. Access matters too. Gut or pelvic abscesses near bowel, big vessels, or organs risk harm from drain. For safe spots, drain plus IV drugs lets stable patients heal on sound tissue [56]. A 2019 US study saw Hartmann's as common surgery in acute cases. Yet primary join with loop ileostomy works safe even in Hinchey III-IV [57]. In Hartmann's or resection-join, cut proximal edge in healthy tissue sans swelling. No need to take long colon to clear all diverticula. Risk peaks if sigmoid stays [58]. In Hartmann's, keep longer sigmoid stump if reversal planned. It aids second surgery for stump find, move, and view. Then join to rectal tissue. For bowel join, think proximal diversion via loop ileostomy. Use it if healing risks rise. Loop ileostomy reversal is less invasive with fewer issues than Hartmann's [59]. Worry once was unprepped colon above join cuts diversion gain. Studies say table lavage adds no edge. Primary join on unprepped colon stays safe [60]. No firm data backs or drops ileostomy. Guidelines let surgeons decide [61]. Past urgent cases used open laparotomy. Now minimally invasive ways and skills grow.

Many surgeons now pick laparoscopic or robotic methods for emergency cases. These minimally invasive options link to much less pain after surgery, fewer wound splits, and shorter hospital stays. Doctors favour them over open surgery when skills exist and patient traits suit.[62]. Some suggest laparoscopic lavage alone to skip colectomy in urgent settings. Three trials from Europe gave mixed results. LOLA and SCANDIV trials found higher reoperation rates soon after lavage. DILALA saw no change in reoperations at 30 days vs Hartmann procedure. [63–65] Reviews of studies note shorter surgery times, lower infection risk at surgery sites, and brief stays with lavage. It cuts early stoma needs too.[66] LOLA team shared three-year data in 2022. That showed fewer reoperations and stomas in lavage patients at 36 months.[67] Yet clear data links lavage to higher urgent reoperation, abdominal abscess, and peritonitis risks.[68] ASCRS rules from 2020 do not back lavage as standard care.18 EAES and SAGES guides from 2018 say think about it for Hinchey III if care teams can watch close after and handle extra issues.[69] Few places use this method often. Endoscopic Checks Standard care calls for colonoscopy after acute diverticulitis heals. This checks for hidden cancers masked by the flare. Reviews and pooled data from modern scans check cancer rates on follow-up scopes. A 2019 study found 7.9% cancer in complicated cases vs 1.3% in simple ones.[70] Simple cases spark debate. In 2018 EAES-SAGES talks, Europeans skipped routine scopes. US experts kept them post-flare.14 ASCRS 2020 rules say scope only after complicated flares with no prior screening.18 Skip routine checks after simple flares. These patients match average cancer risk. Do scopes 6-8 weeks after symptoms end to cut procedure risks. Planned Surgery Old rules pushed sigmoidoscopy after two or three flares. Back then, more flares meant higher odds of bad turns, stomas, or urgent ops. New studies on disease paths challenge that view. The worst flare hits first in most cases. Youth under 50 at first flare does not raise severe repeat risk.[71] Past simple flares rarely lead to bad ones later.[72] Many old reasons to cut early fail now. Patients treated without surgery for bad acute flares form one group. They face higher odds of bad repeats. Most teams push planned surgery after just one bad flare. Death risk jumps in urgent ops from a second hit vs planned cut (4.6% vs 0.3%).[73] Debate lingers on planned cuts after healed abscesses from bad flares. Healed ones raise repeat risk. Yet for frail surgery patients, more non-op care works. Skip planned colectomy then.[74] One big review study backs this. Still, it notes high-risk abscesses—over 5 cm, in pelvis, or drained—call for planned colectomy. These raise odds of bad repeats needing urgent ops. [75,76] Weak immune patients lack clear rules for planned care. WSES 2020 guide says schedule sigmoidoscopy after any acute flare, no matter badness.[77] They face sharp death risk in urgent ops (OR 1.79 per one review).[78] That study saw no death gap in planned ops vs fit patients.[78] ASCRS 2014 urged quick cuts here. ASCRS 2020 says non-op works even in immune-weak after simple flares. Tailor planned ops to each.[79] One review found same repeat rates in weak vs fit immune groups. Weak ones start with worse flares more. Yet urgent op rates match. Non-op success at first means no set need for later cut.[80] Beyond prevention, key talks on planned ops weigh life quality hits from left-over symptoms or repeat flares.

An open-label randomized controlled trial (LASER trial) came out in 2021. It showed better quality of life at six months for patients after elective sigmoid resection. The same team shared two-year follow-up data in 2023. This again proved higher quality of life in the surgery group than in the conservative care group. Yet they noted a 10% risk of major surgery issues (Clavien-Dindo grade III

or worse). [81,82] Doctors must tailor the choice to operate to each patient. Symptomatic uncomplicated diverticular disease or smoldering diverticulitis. A few patients skip the usual course after acute diverticulitis. About 5% face ongoing symptoms.[83] Clinicians call this symptomatic uncomplicated diverticular disease (SUDD). The 2020 ASCRS guidelines label SUDD as diverticulosis linked to chronic abdominal pain without clear colitis.[79] Telling SUDD apart from irritable bowel syndrome or smoldering diverticulitis proves tough. Unclear definitions and shared signs pose issues for doctors. Some see SUDD and IBS as part of one process. Patients with smoldering diverticulitis show SUDD-like symptoms. They also have ongoing local swelling on scans, mild fever, or raised markers that resist antibiotics.[84] No agreed criteria exist. This makes diagnosis hard. Studies tested drugs like mesalamine or rifaximin for SUDD. Mesalamine failed to cut risks of diverticulitis flares.[85] Other work, though varied, hints at easing symptoms with mesalamine and rifaximin. More trials must confirm this before routine use.[86] The newest ASCRS guidelines reject standard mesalamine or rifaximin after acute flares. Suspect SUDD or smoldering diverticulitis? Rule out other causes first before elective surgery. For those with heavy impact on daily life from leftover pain or repeat attacks, sigmoid colectomy offers real help. Still, warn them surgery may not end all symptoms.

4.1 Surgical Management

Patients with complicated diverticulitis show signs of peritonitis or unstable blood pressure. They need surgery right away. Those who do not respond to drugs or drainage also require an operation. Guidelines now call for sigmoidoscopy in acute cases that need surgery. Doctors most often use Hinchey and modified Hinchey systems to grade acute diverticulitis severity (Table 2). The modified Hinchey builds on the original. It adds stage 0 for mild cases without issues. It also splits stage I into Ia for swelling near the colon and Ib for abscess [87]. Hard to tell stage I from II in modified Hinchey. So, the World Society of Emergency Surgery (WSES) and American Association for the Surgery of Trauma (AAST) made new systems based on CT scans (Table 3) [88]. Cremonini et al. checked 597 patients from four centres from 2014 to 2021. The three systems—modified Hinchey, WSES, and AAST—matched well in forecasting issues, death rates, and needs for surgery or repeat surgery [88].

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Table2.

Hinchey and Modified Hinchey classifications

Hinchey	Modified Hinchey
	Stage 0– Mild, uncomplicated acute diverticulitis
Stage I– Localized abscess (pericolic or mesenteric abscess/phlegmon)	**Stage Ia**– Confined pericolic inflammation (phlegmon)
	Stage Ib– Confined pericolic abscess
Stage II– Pelvic intra-abdominal or retroperitoneal abscess	**Stage II**– Pelvic, distant intra-abdominal, or intraperitoneal abscess
Stage III– Purulent peritonitis	**Stage III**– Generalized purulent peritonitis
Stage IV– Feculent peritonitis	**Stage IV**– Feculent peritonitis

Table 3.

World society of emergency surgery and the American association for the surgery of trauma classifications

WSES	AAST
Stage 0– Diverticula, thickening of the colonic wall, increased density of the pericolic fat	**Grade I**– Colonic inflammation
Stage Ia– Small pericolic air bubbles or some pericolic fluid without abscess	**Grade II**– Colon micro-perforation or pericolic phlegmon without abscess
Stage Ib– Abscesses ≤ 4 cm (without distant free gas)	**Grade III**– Localized pericolic abscess
Stage IIa– Abscess > 4 cm (without distant free gas)	**Grade IV**– Distant and/or multiple abscesses
Stage IIb– Distant gas (> 5 cm from inflamed bowel segment)	
Stage III– Diffuse fluid without distant free, diffuse gas	**Grade V**– Free colonic perforation with generalized peritonitis
Stage IV– Diffuse fluid with distant free, diffuse gas	

Use a proximal stoma alone only as a last option. Reserve it for cases where disease cannot be cut out and sepsis lingers. After sigmoid removal, choices include Hartmann's procedure with end colostomy or primary join-up. Hartmann's counts as the safest and simplest. Yet it leaves a lasting colostomy with its drawbacks. Pick Hartmann's for patients with low blood pressure or widespread pus or stool peritonitis. The main flaw is a need for another big operation to close the stoma. Studies show many patients skip reversal due to health risks. So, they stay with a stoma at 12 months post-op. [89] Reversal also brings high risks for these patients.[90]Data points to higher death and problem rates with Hartmann's.[91] Note that these patients often have more health issues. They arrive with bad sepsis or low blood pressure before surgery.[92] Work on life quality after emergency surgery for diverticulitis shows poorer scores for Hartmann's group. The stoma causes most of this gap.[93] Stable patients now often get resection plus primary join-up. This may include a diversion stoma. New data back primary join-up even in bad cases like Hinchey IV. It works if done on healthy bowel and the patient stays stable.[89] A 2019 US study found Hartmann's still common. Yet

primary join-up with loop ileostomy ileostomy proves safe for Hinchey III to IV.[92]For both Hartmann's and resection-join-up, cut the upper edge in healthy bowel. Skip inflammation or swelling. No need to take out long colon stretches to clear all diverticula. Recurrence links most to leftover sigmoid.[94]

In Hartmann's, leave more sigmoid below the cut if reversal is planned. This aids the next surgery. It helps find and free the lower end for the final join-up on rectal wall. For bowel join-up later, add a proximal loop ileostomy if needed.Use a diverting ileostomy with extra risks for poor healing. Loop ileostomy reversal is far less invasive. It has fewer problems than Hartmann's reversal.[91] A worry in urgent cases is the unprepared bowel above the join-up. Some think it cuts diversion benefits. But studies say on-table wash gives no extra gain. Primary join-up on unprepared bowel stays safe.[95] No firm data backs or rejects diverting ileostomy. Guidelines let surgeons decide. Open surgery via laparotomy was standard. Now minimally invasive methods rule. Training in laparoscopy has grown. Many pick laparoscopic or robotic paths for emergencies. These bring less pain after, fewer wound splits, shorter hospital stays. Choose them over open if skills and patient suit.[96] Some suggest laparoscopic wash alone instead of bowel removal in urgent care. Three European trials give mixed results. LOLA and SCANDIV saw more reoperations soon after wash. DILALA found no reoperation gap at 30 days vs Hartmann's. [97–99] Reviews show wash cuts operation time, wound infections, and stay length. It lowers first-time stoma rates too.42 LOLA's 2022 three-year check showed fewer reoperations and stomas in wash group at 36 months.[100] Yet the 2018 EAES and SAGES guidelines suggest it for Hinchey III cases. Surgeons need resources to watch patients after surgery. They must handle higher complication risks.[101] This method stays rare in practice.

4.2Endoscopic Follow-Up

Doctors once urged colonoscopy after acute diverticulitis cleared. The goal: check for hidden cancers missed in the flare. Recent reviews use modern scans. One 2019 study found cancer in 7.9% of complicated cases at follow-up. Uncomplicated cases showed just 1.3%.[102] Debate lingers for simple cases. In 2018, EAES and SAGES split: Europeans said no routine check; Americans said yes.[101] ASCRS 2020 now limits it to complicated cases without prior screening.18 Simple diverticulitis matches general cancer risk. No routine scope needed. If done, wait 6-8 weeks after symptoms end. This cuts risks from the procedure.

4.3 Elective Surgery

Old rules called for sigmoidoscopy after two or three attacks. Any severity. Back then, more episodes meant higher odds of complex disease. That raised stoma or emergency surgery risks. New data challenges this. The worst attack often hits first. Young patients at first attack do not face worse repeats.[103] Past simple cases rarely turn complex later.[104] Many reasons for planned surgery now lack backing. Non-surgical care for complex acute cases forms a key group. These patients face higher odds of complex repeats. Most offer elective surgery after one such event. Emergency surgery on a second attack kills more (4.6%) than planned resection (0.3%).[105] Healed abscesses from complex flares spark debate. They raise repeat risk. High-risk patients may succeed with repeat non-op care. Skip planned colectomy.49 One big study backs this. Still, large abscesses (>5 cm), pelvic sites, or drained ones often need surgery. They lead to urgent repeats. [106,107]

Weak immune systems form a special group. No clear rules exist. WSES 2020 says schedule sigmoidoscopy after any acute flare. Severity does not matter.[108] Emergent surgery kills more in this group. Odds ratio: 1.79 per one study. This same study found no key difference in death rates between immunosuppressed and immunocompetent patients during planned surgery.[109] One review of past cases saw equal repeat rates in both patient types. Yet more immunosuppressed patients started with worse disease. Emergency surgery rates matched too. The authors said patients treated without surgery at first do not always need later planned sigmoidoscopy.[110] Beyond prevention, quality of life counts in surgery talks. Symptoms or repeat attacks affect daily life. A 2021 open-label randomized trial (LASER trial) showed better life quality at six months after elective sigmoidoscopy. In 2023, the two-year results confirmed gains in the surgery group over non-surgery care. Still, major issues (Clavien-Dindo grade III or higher) hit 10%. [111,112] Surgery choices must fit each patient. Symptomatic Uncomplicated Diverticular Disease/Smoldering

Diverticulitis A small group skips the standard path after acute diverticulitis. About 5% face ongoing symptoms.[113] Doctors call this symptomatic uncomplicated diverticular disease (SUDD). ASCRS 2020 guidelines define it as diverticulosis with lasting abdominal pain, no clear colitis.18 SUDD signs mimic irritable bowel syndrome (IBS) and smoldering diverticulitis. Clear definitions lack, which confuses doctors. Some view SUDD and IBS as linked conditions. Smoldering diverticulitis brings SUDD-like symptoms plus slow inflammation on scans. Patients may have mild fever or raised markers that ignore antibiotics.[114] No set rules exist for diagnosis. Tests prove hard. Trials tested mesalamine or rifaximin for SUDD. Mesalamine failed to cut repeat diverticulitis risk.[115] Other varied trials hint at symptom relief from mesalamine and rifaximin. More work is needed before routine use.[116] Latest ASCRS guidelines skip mesalamine or rifaximin after acute attacks. Rule out other causes first if SUDD or smoldering diverticulitis seems likely. Elective sigmoid colectomy suits those with heavy symptom load or repeats. It may ease pain. Yet patients must know surgery offers no sure fix.

4.4 Robotic Approach for Diverticulitis in Elective and Urgent Cases

Robotic surgery now serves as a good option like laparoscopy for complex diverticulitis. The da Vinci system gives key benefits. It offers better views, more movement in tools, and ureter checks with indocyanine green (ICG). This helps with work near sore tissue [117]. These perks cut open surgery switches and match issue rates to laparoscopy. A review of 15 studies on 3711 robotic cases showed lower switch rates. Major issues stayed the same as laparoscopy [118]. Raskin et al. matched groups well. They found fewer gut blocks, wound problems, and kidney failures after robotic sigmoid cuts than laparoscopic or open ones [119]. Robotics also cut hospital stays short compared to the other two. Debate remains on robotics for urgent diverticulitis cases. New work shows it works well and matches laparoscopy, even in urgent times. Curfman et al. checked 2500 urgent bowel surgeries for diverticulitis. They compared 126 robotic, 446 laparoscopic, and 1952 open cases [120]. Robotics cut ICU needs, leak risks, and near-cut stays versus open. It matched laparoscopy on ICU time, readmits, death, and wound bugs. Robotics had far fewer switches to open (7.9% vs 28.7%). Surgeon skill was not direct-measured. But yearly robotic cases varied. Open surgeons did 16.2 robotics a year. Laparoscopic ones did 27.3. So better results may come from more skill in robotics. Arnott et al. looked at short results for 6583 urgent laparoscopic and 297 robotic bowel cuts for diverticulitis from 2012 to 2019. Data came from the American College of Surgeons NSQIP [117]. No big gaps showed in death, leaks, wound bugs, re-cuts, readmits, or stays. Switches were lower in robotics (11.5% vs 28.3%). Groups had like health issues. But laparoscopy had more pre-op sepsis (31.6% vs 10.8%) and urgent status (32.3% vs 6.7%). A 2022 WSES note stressed pick right patients, round-the-clock robots, skilled surgeons, and team support for urgent robotics [121]. First push-back exists on urgent robotic diverticulitis work. Choice needs to fit patient state, surgeon skill, and hospital robot help.

II. Concluding Remarks

Diverticular disease has many causes. Matching treatment to disease severity aids success. The DICA score gives a simple way to describe the colon with diverticula. Its ease, strong repeat scores, and links to blood tests and symptoms make it useful. More work must check its fit in trials and effect on disease course.

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Conflict of Interest

All authors declare no conflicts of interest.

Author Contribution

Authors have equally participated and shared every item of the work.

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