

Diverticulitis

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THE STORY IN ONE SENTENCE

A diverticulum is a tiny pouch that pushes out through a weak spot in the colon wall, and diverticulitis is when that pouch gets blocked, swells up, and tears or gets infected.

“Diverticulitis happens when a small pouch in your colon gets plugged with stool, swells, and tears—sometimes the infection stays trapped in one spot, but sometimes it spreads and becomes life-threatening.”

Normal anatomy — the body's job

The colon is a long, muscular tube that pushes leftover food and stool toward the rectum. Its wall has layers: a thin inner lining (mucosa), a middle muscle layer, and an outer covering (serosa). Blood vessels poke through the muscle layer to feed the inner lining. Over time, pressure inside the colon can push the inner lining out through these weak spots where blood vessels enter, forming tiny pouches called diverticula. Most diverticula sit in the sigmoid colon, the S-shaped part on your lower left side, because that section squeezes hardest and has the most pressure.

BODY'S JOB

The colon's job is to absorb water from leftover food, turn it into solid stool, and push it along with rhythmic squeezes (peristalsis) until it reaches the rectum for a bowel movement. The muscle layer contracts and relaxes in waves to keep stool moving. The inner lining makes mucus to keep stool sliding smoothly. When everything works, stool moves steadily and the colon wall stays strong and intact.

1. Picture the colon as a garden hose with thick, flexible walls.
2. Blood vessels poke through tiny holes in the hose wall to deliver oxygen and nutrients to the inner lining.

3. Over years, pressure inside the hose pushes the soft inner lining out through those holes, forming small pouches on the outside, like tiny water balloons tied to the hose.
4. These pouches (diverticula) usually stay empty and cause no trouble—most people never know they have them.
5. The sigmoid colon, shaped like an S on your lower left side, squeezes hardest and builds the most pressure, so that's where most pouches form.

What breaks

A diverticulum's narrow opening gets plugged—usually by a hard piece of stool or thickened stool. Pressure builds inside the pouch, blood flow to its thin wall slows down, and the wall weakens. Germs that normally live in the colon multiply inside the trapped pouch, the wall tears or cracks, and infection starts. That's the single upstream break that causes every sign and symptom downstream.

CLINICAL TERM

Obstruction of the diverticulum neck by a fecalith (hardened stool) or inspissated stool leads to increased intraluminal pressure, venous congestion, and starved blood flow (ischemia) (not enough blood reaching the tissue) of the diverticulum wall. Bacterial overgrowth follows, and micro- or macro-perforation (a tiny crack or a bigger hole) occurs. Inflammation spreads into the pericolic fat (the fatty tissue around the colon), and the body mounts a local inflammatory response to contain the breach.

How the body compensates

Your body tries to keep you stable by walling off the infection and ramping up fever and white blood cells to fight germs. Early on, blood pressure and heart rate may look normal even though a serious infection is brewing. The danger is missing the tipping point—when the body's walls fail, infection floods the whole belly, blood pressure drops, and organs start to fail. Watch the trend, not just one snapshot.

1. {'step': 'Local containment', 'explain': 'White blood cells, fibrin (a sticky protein), and the omentum (a fatty apron inside your belly) rush to the leaking pouch and build a wall around it, forming a phlegmon (a hot, swollen mass) or abscess (a pocket of pus). This keeps the infection from spreading—for now.'}
2. {'step': 'Fever and immune activation', 'explain': '"Your brain's thermostat is turned up (fever) to make it harder for germs to multiply, and your bone marrow floods the bloodstream with extra white blood cells (leukocytosis) to fight the infection. You feel tired and achy because the immune system is in overdrive.'}

3. {'step': 'Bowel rest response', 'explain': 'The inflamed colon slows down or stops squeezing (ileus), so stool doesn't push against the damaged spot. You may feel bloated, nauseated, or constipated—the body is trying to protect the injury.'}
4. {'step': 'Stable vital signs—early on', 'explain': 'Blood pressure, heart rate, and oxygen levels may stay normal for hours or even a day or two, because the body is clamping down blood vessels and pushing harder to keep circulation going. This can fool you into thinking the patient is stable.'}
5. {'step': 'The tipping point', 'explain': 'If the wall breaks or the abscess ruptures, infected fluid spills into the whole belly (purulent or fecal peritonitis). The body can't keep up anymore. Blood vessels leak, blood pressure drops (septic shock), and organs like the kidneys and lungs start to fail. This is the crash point.'}
6. {'step': 'Trend over time matters most', 'explain': 'A patient whose fever climbs, whose belly pain spreads, whose white count keeps rising, or who starts to look confused or short of breath is heading toward the crash point—even if vital signs still look okay. A stable snapshot on a downhill slope is not truly stable.'}
7. {'step': 'Watch for complications', 'explain': 'Even after the infection calms down, repeated episodes of diverticulitis can cause scarring (stricture) that narrows the colon and blocks stool, or an abnormal tunnel (fistula) can form between the colon and bladder or vagina. Both need surgery to fix.'}

Domino effect

1. A pouch in the sigmoid colon gets plugged with hard stool — The narrow opening of the diverticulum gets blocked by a fecalith (a small, hard piece of stool) or thick mucus. Stool and germs are trapped inside, with no way out, so pressure starts to build like air trapped in a balloon.
2. Pressure inside the pouch climbs, and blood flow slows down — High pressure squeezes the tiny veins in the pouch wall, so blood can't drain out. The wall swells and turns purple (venous congestion). Oxygen can't reach the tissue anymore (ischemia), and the thin wall starts to weaken and crack, like wet tissue paper.
3. Germs multiply, the wall tears, and infection leaks out — Bacteria that normally live in your colon (*E. coli*, *Bacteroides*) multiply fast in the low-oxygen pouch and release enzymes that digest the fragile wall. A tiny tear (microperforation) or bigger hole (macroperforation) opens up, and infected stool leaks into the fatty tissue around the colon.
4. You feel sharp pain in your lower left belly — The leaked infection irritates nerve endings in the peritoneum (the thin lining inside your belly) and the fatty tissue around the sigmoid colon. Your body also tenses the belly muscles to guard the sore spot, so it hurts sharply when you press on your lower left side.

5. Fever starts, and you feel tired and sick — Your immune system detects the infection and releases chemicals (cytokines) that turn up your brain's thermostat, causing fever. Your bone marrow pumps out extra white blood cells to fight the germs. You feel exhausted because the immune response drains a lot of energy.
6. The body builds a wall around the infection — White blood cells, fibrin (a sticky clotting protein), and the omentum (a fatty curtain inside your belly) rush to the breach and form a thick wall around it. This traps the infection in a phlegmon (inflamed lump) or abscess (pus pocket), keeping it from spilling into the whole belly—for now.
7. If the wall fails, infected fluid floods your whole belly — If the tear is too big, or the abscess bursts, or the body's defenses can't hold, pus-filled (purulent) (pus-filled) or fecal (stool-contaminated) fluid spills into the entire peritoneal cavity. Now the infection spreads everywhere, and you feel severe pain all over your belly, not just one spot.
8. Blood pressure drops, organs fail, and you go into septic shock — Bacteria and toxins flood your bloodstream (sepsis). Blood vessels leak and dilate, so blood pressure crashes. Your heart races to pump harder, but can't keep up. Organs like the kidneys, lungs, and brain don't get enough oxygen and start to shut down. This is the life-threatening crash point that needs emergency surgery and ICU care.

Symptoms · what the patient feels, and why

- Pain in the lower left belly that gets worse over hours to days: One or more of the small pouches (diverticula) in the colon wall gets blocked by stool, swells up, and becomes infected or inflamed—like a tiny abscess forming in the bowel wall—so the area gets sore and tender.
- Fever (temperature above 100.4°F or 38°C): The body's immune system is fighting the infection in the colon wall, which raises body temperature as part of the defense response.
- Tenderness when you press on the lower left belly (left lower quadrant): The inflamed or infected diverticula lie just beneath that part of the belly, so pressing down pushes on swollen, irritated tissue and causes pain.
- High white blood cell count (leukocytosis) on a blood test: White blood cells are the body's infection fighters, so the bone marrow makes more of them when there is an active infection in the colon.
- Change in bowel habits—either diarrhea or constipation: Inflammation and swelling in the colon wall can narrow the passage for stool or irritate the bowel lining, which speeds up or slows down how quickly things move through.
- Nausea or vomiting: Inflammation anywhere in the belly can send signals to the brain that trigger nausea, and if the bowel slows down or becomes partly blocked, food and gas back up and cause vomiting.

- Blood in the stool (hematochezia): A small blood vessel in an inflamed diverticulum can break open and bleed into the colon, mixing blood with the stool.
- Severe belly pain that spreads all over or feels rigid: The infected pouch may burst (perforate), spilling bacteria and stool into the belly cavity—a medical emergency called peritonitis.
- Right-sided belly pain in younger or Asian patients: In younger people and those of Asian descent, diverticula more often form on the right side of the colon instead of the left, so inflammation shows up on that side.

Focused exam

- Tenderness in the lower left belly, right where the sigmoid colon sits (below the belly button, on the left side): Most diverticula (small pouches bulging out of the colon wall) form in the sigmoid colon. When one gets blocked and inflamed, that exact spot hurts. The tenderness tells you infection is local and has not spread through the whole belly yet.
- Fever, usually 100.4°F (38°C) or higher: Fever means your body's immune system is fighting the infection inside the blocked pouch right now. It separates active diverticulitis from old, quiet pouches that are not causing trouble.
- Guarding or rigidity when you press on the belly — the muscles tense up on their own: The belly wall is protecting the inflamed tissue underneath. If the entire belly is rock-hard and rigid, the infection may have broken through the colon wall into the open belly space (perforation) — that is a surgical emergency.
- No rebound tenderness, or only mild rebound, if the infection is walled off: Rebound tenderness (pain when you quickly lift your hand off the belly) means the lining of the belly (the peritoneum) is irritated. If there is none or very little, the infection is probably still contained. Strong rebound across the whole belly signals a hole in the colon with spilled contents — that needs emergency surgery.
- Recent constipation or change in bowel habits in the days before pain started: Hard stool or a piece of stool can plug the narrow neck of a diverticulum, trapping bacteria inside. This blockage is the first domino that leads to swelling, infection, and pain.
- Urinary urgency, burning, or frequency if the inflamed colon sits next to the bladder: The bladder wall can get irritated by the swollen colon right next door. These urinary symptoms tell you the inflammation is large enough to affect nearby organs, not tiny and contained.

Diagnostics · every test answers a question

- Complete blood count (CBC) with differential → Is the body fighting an infection right now?
- C-reactive protein (CRP) → How much inflammation is happening in the body?

- CT scan of the abdomen and pelvis with IV contrast → Where exactly is the inflamed pouch, is there a hole in the colon, and is there a pocket of pus (abscess)?
- Basic metabolic panel (BMP) → Are the kidneys working, and are salt and fluid levels safe?
- Lactate level (venous or arterial) → Is the body's tissue getting enough oxygen, or is infection turning into sepsis?
- Urinalysis → Is the bladder inflamed or infected, or is the diverticulitis touching the bladder?

Treatment logic

- CT scan of the abdomen and pelvis with IV contrast → Shows you exactly which part of the colon is swollen, whether a hole has formed, how big any pus pocket is, and whether the infection is contained or has spread. This one image decides whether the patient stays in the hospital, needs a drainage procedure, or goes straight to surgery.
- IV antibiotics covering gut bacteria (e.g. ciprofloxacin + metronidazole, OR piperacillin-tazobactam, OR ceftriaxone + metronidazole) for complicated or severe diverticulitis; oral antibiotics (e.g. amoxicillin-clavulanate or ciprofloxacin + metronidazole) for mild, uncomplicated cases if chosen → Kills the bacteria that leaked through the tiny tear in the pouch wall, stops the infection from spreading into the bloodstream or belly, and reduces fever and pain within 48-72 hours. Some current guidelines allow select low-risk patients to skip antibiotics and use observation alone, but most moderate-to-severe cases still need them.
- Bowel rest (nothing by mouth) and IV fluids during the acute phase → Stops stool from pushing into the inflamed segment, gives the swollen tissue time to calm down, and keeps the patient hydrated while nausea or vomiting may prevent drinking. Once pain and fever improve, you can restart a clear liquid diet, then advance slowly.
- Percutaneous (through-the-skin) drainage of an abscess if it is 3-4 cm or larger on CT → A radiologist guides a needle or thin tube through the skin into the pus pocket and drains it, shrinking the infection without emergency surgery. This often allows the patient to recover with antibiotics alone and have elective surgery later (or none at all).
- Emergency surgery (sigmoid colectomy, often with temporary colostomy) if there is a large perforation with stool spilling into the belly, peritonitis (inflamed belly lining), sepsis, or the patient gets worse despite antibiotics and drainage → Removes the damaged piece of colon that is leaking infection, stops the source of contamination, and saves the patient's life. In a very sick patient, the surgeon often brings one end of healthy colon out through the belly as a temporary stoma (colostomy) to let the belly heal; the colon is reconnected later.

- Elective sigmoid colectomy 6–8 weeks after recovery, offered to patients with recurrent attacks (two or more episodes), a complication like stricture (narrowing) or fistula (abnormal connection to bladder, vagina, or skin), or one severe complicated episode → Removes the segment of colon full of diverticula before it ruptures again, ending the cycle of repeated infections, hospital stays, and antibiotic courses. Most patients return to normal life afterward with lower long-term risk.
- High-fiber diet after recovery (25–35 grams per day) to prevent future episodes → Keeps stool soft and moving, reducing the chance that a hard piece will plug a pouch opening. Fiber bulks up stool so the colon does not have to squeeze as hard, lowering pressure inside the colon that creates new pouches.

Medications

Ciprofloxacin · Fluoroquinolone antibiotic

Ciprofloxacin kills bacteria by stopping them from copying their DNA. When bacteria can't copy their DNA, they can't multiply and they die. It works especially well against the gram-negative bacteria (the type with a thin outer wall) that often cause diverticulitis, like *E. coli*.

1. You swallow the pill, and it gets absorbed into your bloodstream from your intestines
2. The drug travels through your blood to the infected area in your colon
3. It enters the bacteria that are causing the infection
4. Inside each bacterial cell, it blocks an enzyme called DNA gyrase (the tool bacteria use to unwind and copy their DNA)
5. Without working DNA gyrase, the bacteria cannot reproduce or repair themselves
6. The bacteria die, and your immune system clears them away
7. The inflammation in the diverticulum starts to go down as the infection is controlled

SAFETY WATCH

Can damage tendons (the cords connecting muscle to bone), especially the Achilles tendon in your heel — stop the drug and call your doctor if you get sudden heel or leg pain · Can cause nerve damage (peripheral neuropathy) with tingling, numbness, or burning in hands or feet · May lower your seizure threshold if you have epilepsy or brain conditions · Can prolong the QT interval (a measure on your heart's electrical rhythm), which may cause dangerous irregular heartbeats in people with heart rhythm problems · Avoid taking it with dairy products, calcium, or antacids because they block absorption · May worsen muscle weakness in people with myasthenia gravis · Can cause blood sugar swings, especially in people with diabetes

Metronidazole · Nitroimidazole antibiotic

Metronidazole kills anaerobic bacteria (bacteria that live without oxygen). These bacteria are common in the colon, and they often join gram-negative bacteria in causing diverticulitis. Metronidazole enters bacterial cells and breaks their DNA strands so they cannot survive.

1. You swallow the pill, and it is absorbed from your intestines into your blood
2. The drug reaches the infected area in your colon through your bloodstream
3. It enters anaerobic bacterial cells (like *Bacteroides* species)
4. Inside the bacteria, the drug is activated by special bacterial enzymes that only work without oxygen
5. Once activated, metronidazole damages the bacteria's DNA by breaking the strands
6. The bacteria can no longer function and they die
7. Combined with ciprofloxacin (which kills aerobic bacteria), this covers the full range of bacteria in diverticulitis

SAFETY WATCH

NEVER drink alcohol while taking this drug or for 72 hours after stopping it — the combination causes severe nausea, vomiting, flushing, fast heartbeat, and headache (disulfiram-like reaction) · Can cause a metallic taste in your mouth · May cause numbness or tingling in hands or feet (peripheral neuropathy) with long-term use · Can cause nausea or stomach upset · Rarely, can cause seizures or confusion, especially at high doses · May darken your urine (harmless but surprising)

Amoxicillin-clavulanate (Augmentin) · Beta-lactam antibiotic with beta-lactamase inhibitor

This is a combination drug. Amoxicillin kills bacteria by breaking down their cell walls so they burst and die. Clavulanate blocks an enzyme (beta-lactamase) that some bacteria make to protect themselves from amoxicillin. Together, they kill both aerobic and anaerobic bacteria that cause diverticulitis.

1. You swallow the pill, and both drugs are absorbed from your intestines
2. They travel through your blood to the infected area in your colon
3. Amoxicillin attaches to proteins in bacterial cell walls (called penicillin-binding proteins)
4. This stops the bacteria from building and repairing their protective outer wall
5. Without a strong wall, the bacteria absorb water, swell, and burst
6. Clavulanate blocks beta-lactamase enzymes that some bacteria make to chew up amoxicillin
7. This lets amoxicillin work even against bacteria that would normally resist it
8. The infection is controlled, and inflammation decreases

SAFETY WATCH

Common cause of diarrhea because it kills normal gut bacteria along with the bad ones · Can cause allergic reactions — get emergency help if you develop hives, swelling of face or throat, or trouble breathing · May cause liver problems (rare) — watch for yellowing of skin or eyes, dark urine, or severe stomach pain · Can cause yeast infections (thrush or vaginal yeast) because it kills protective bacteria · The clavulanate part can cause more stomach upset than amoxicillin alone · Tell your doctor if you have a history of penicillin allergy before taking this

Piperacillin-tazobactam (Zosyn) · Extended-spectrum beta-lactam antibiotic with beta-lactamase inhibitor (intravenous)

This IV combination is used for severe or complicated diverticulitis in the hospital. Piperacillin kills a wide range of bacteria by destroying their cell walls. Tazobactam blocks the enzymes bacteria use to resist piperacillin. Together, they cover almost all the bacteria that cause serious colon infections.

1. The drug is given directly into your vein (IV) in the hospital
2. It quickly reaches high levels in your blood and infected tissues
3. Piperacillin binds to penicillin-binding proteins in bacterial cell walls
4. This stops bacteria from building new cell wall material
5. The bacteria become fragile, burst, and die
6. Tazobactam blocks beta-lactamase enzymes that resistant bacteria produce
7. This protects piperacillin and lets it work against a broader range of bacteria
8. The combination treats the severe infection while you are monitored in the hospital

SAFETY WATCH

Can cause severe allergic reactions, especially in people with penicillin allergies · May cause diarrhea, including *C. difficile* infection (severe watery or bloody diarrhea with fever) · Can lower blood cell counts (white cells, red cells, or platelets) · May cause bleeding problems, especially in people on blood thinners · Can cause seizures if kidney function is poor and the dose is not adjusted · May cause electrolyte imbalances (low potassium, high sodium)

Ceftriaxone + Metronidazole · Third-generation cephalosporin antibiotic + Nitroimidazole antibiotic (intravenous)

This is a two-drug IV combination for hospitalized patients with complicated diverticulitis. Ceftriaxone kills aerobic gram-negative bacteria by breaking their cell walls. Metronidazole

(described above) kills anaerobic bacteria. Together, they cover the full range of bacteria in severe colon infections.

1. Both drugs are given through an IV in the hospital
2. Ceftriaxone binds to bacterial cell wall proteins and stops bacteria from building strong walls
3. Aerobic bacteria (like *E. coli*) lose their structure and die
4. Metronidazole enters anaerobic bacteria and breaks their DNA
5. Anaerobic bacteria (like *Bacteroides*) die
6. Together, the drugs control the mixed bacterial infection in complicated diverticulitis
7. Inflammation starts to decrease as the infection is cleared

SAFETY WATCH

Ceftriaxone can cause gallbladder sludge (thick bile) or gallstones, especially in children or with high doses · May cause allergic reactions (risk is lower than penicillins but still possible) · Can cause diarrhea or *C. difficile* infection · Ceftriaxone should NOT be mixed with calcium-containing IV fluids in newborns · Metronidazole safety warnings are the same as listed above (no alcohol, neuropathy risk) · Both drugs can affect blood clotting tests

Red flags

- Severe belly pain that spreads everywhere or belly feels hard and board-like (suggests perforation)
- High fever (above 102°F or 39°C) or shaking chills (suggests severe infection or abscess)
- Unable to keep down food or water, or signs of dehydration (dry mouth, dizziness, little urine)
- Large amount of blood in the stool or black tarry stools (suggests significant bleeding)
- Confusion, very low blood pressure, or rapid heart rate (suggests sepsis—infection spreading through the bloodstream)

Nursing priorities

1. Check vital signs every 2 to 4 hours, especially temperature, heart rate, and blood pressure, and report fever above 102°F (39°C), heart rate above 110, or systolic blood pressure below 90. — Fever and fast heart rate (tachycardia) show how severe the infection is. Low blood pressure (hypotension) means the infection may be spreading to the blood (sepsis) and the patient is going into shock. Early recognition saves lives.

2. Keep the patient NPO (nothing by mouth) if they have severe pain, vomiting, or signs of complicated diverticulitis, and start IV fluids at the rate ordered by the provider. — Bowel rest lets the inflamed colon heal without being stretched by food. IV fluids prevent dehydration and keep blood pressure stable when the patient cannot drink. The gut needs time to calm down.
3. Perform a focused abdominal exam every 4 to 8 hours: look for increasing firmness (rigidity), listen for bowel sounds, gently press all four quadrants, and check for rebound tenderness or guarding. — A belly that becomes hard and board-like means peritonitis from a perforation. Absent bowel sounds suggest the bowel has stopped moving (ileus) or is blocked. Worsening tenderness or guarding means the infection is spreading and may need surgery.
4. Give IV or oral antibiotics exactly on time as ordered, and do not skip or delay doses. — Antibiotics kill the bacteria causing the infection. Consistent blood levels of the antibiotic are needed to stop bacteria from growing and prevent the infection from getting worse or forming an abscess.
5. Monitor intake and output every shift: measure all IV fluids going in and all urine coming out, and report urine output less than 30 mL per hour or 0.5 mL per kilogram per hour. — Low urine output means the kidneys are not getting enough blood flow, which happens in dehydration or sepsis. The kidneys are very sensitive to drops in blood pressure, and poor urine output is an early warning sign.
6. Assess and document pain level every 4 hours using a 0-to-10 scale, give pain medicine as ordered, and report pain that suddenly gets much worse or spreads across the whole belly. — Sudden worsening or spreading pain suggests a complication like perforation or abscess rupture. Pain control helps the patient rest and breathe deeply, which prevents lung problems like pneumonia. But masking worsening pain with too much medicine can hide a surgical emergency.
7. Watch for and report immediately any signs of sepsis: confusion, very low or very high temperature (below 96.8°F or above 101°F), fast breathing (above 20 breaths per minute), or mottled (blotchy) skin. — Sepsis means bacteria or toxins have entered the bloodstream and are causing whole-body inflammation. It can quickly lead to organ failure and death. Early recognition and treatment with fluids and antibiotics reduce mortality.
8. Inspect every stool for color, consistency, and blood, and save any bloody stool to show the provider. — Large amounts of bright red blood or clots mean active bleeding from a diverticulum, which may need urgent colonoscopy (camera exam of the colon) or surgery. Black tarry stools suggest bleeding higher up in the digestive tract. Tracking stool helps assess if the bowel is working and healing.

Sources

- American College of Gastroenterology (ACG) 2021 Diverticulitis Guideline
- American Society of Colon and Rectal Surgeons (ASCRS) 2020
- Cochrane Database of Systematic Reviews
- UpToDate (Wolters Kluwer)

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