

Ovarian Torsion

The ovary twists on its own stalk, kinking its blood vessels and starving itself of oxygen.

THE STORY IN ONE SENTENCE

The ovary twists on its own stalk, kinking its blood vessels and starving itself of oxygen.

“Ovarian torsion means the ovary spun on the ligaments that hold it in place, cutting off its own blood supply—like twisting a garden hose until water stops flowing.”

Normal anatomy — the body's job

Each ovary hangs in the pelvis on a ligament called the utero-ovarian ligament and the infundibulopelvic (IP) ligament (also called the suspensory ligament of the ovary). The IP ligament carries the ovarian artery (which brings oxygen-rich blood from the aorta) and the ovarian vein (which drains old blood back toward the heart). The ovary also sits near the fallopian tube. Normally the ovary is about the size of an almond and weighs roughly 10 grams, so it hangs still and doesn't spin.

BODY'S JOB

The ovary's job is to grow and release an egg each month and to make hormones—estrogen and progesterone—that control your cycle and keep bones, heart, and mood steady. The ovarian artery delivers the oxygen and nutrients the ovary needs to do that work, and the vein carries away carbon dioxide and waste. Because the ovary hangs on a flexible ligament rather than being glued in place, it can move a little—but it should never twist.

1. Picture the ovary as a small, smooth egg hanging from a thin rope (the ligament).
2. Inside that rope run two tubes: the ovarian artery (bringing oxygen in) and the ovarian vein (taking waste out).
3. The ovary sits quietly, releasing one egg a month and making hormones that flow into the bloodstream.
4. Because the rope is flexible, the ovary can shift an inch or two when you move, but it always settles back into place.

5. That flexibility is usually safe—unless something makes the ovary heavy enough to flip over on its stalk.

What breaks

Something makes the ovary grow bigger and heavier than normal—most often a cyst (a sac of fluid inside the ovary), a benign tumor, or swelling during pregnancy or fertility treatment. The extra weight tips the balance, and the ovary rotates on its ligament, twisting the blood vessels inside. Veins (which have thin walls and low pressure) collapse first, so blood keeps flowing in through the artery but can't drain out through the vein. The ovary swells with trapped blood. As pressure builds, the artery kinks shut too, and oxygen stops arriving. Without oxygen, ovarian tissue begins to die within hours.

CLINICAL TERM

Ovarian torsion occurs when the ovary rotates on the infundibulopelvic ligament, occluding venous outflow first (because veins are low-pressure and collapse easily) and then arterial inflow. The most common predisposing factor is an ovarian mass greater than 5 cm—typically a functional cyst, dermoid cyst (mature cystic teratoma), or corpus luteum cyst—though torsion can occur in normal-size ovaries, especially in children or during pregnancy when the ligament is longer and more lax. Venous congestion causes bleeding-driven (hemorrhagic) tissue death from blocked blood flow (infarction) and swelling (edema); prolonged starved blood flow (ischemia) (typically >10–12 hours) leads to irreversible tissue death (necrosis), peritonitis, and potential sepsis.

How the body compensates

At first, the body tries to protect the ovary and keep you stable. Your heart beats faster to push more blood toward the twisted ovary, hoping to force flow through the kinked artery. The adrenal glands release cortisol (your main stress hormone) and adrenaline to keep blood pressure up and sharpen your pain signals so you'll seek help. Pain and vomiting are alarms—not the disease itself—telling you something vital is dying. But these defenses can't reopen a twisted vessel, so vital signs may look nearly normal for the first few hours even as the ovary is dying inside. By the time fever and high white count appear, hours of starved blood flow (ischemia) have already passed and the window to save the ovary is closing.

1. {'what': 'A fast heart rate (Tachycardia) (fast heart rate)', 'why': "Your brain's autonomic centers (in the brainstem) sense pain and low oxygen, so they tell the heart to beat faster—trying to push more blood through the partially blocked artery.", 'limit': "A faster heart can't open a kinked vessel, so the ovary keeps dying even though your pulse is 110."}

2. {'what': 'Nausea and vomiting', 'why': "Dying ovarian tissue and stretching of the peritoneum (the lining around the ovary) send pain signals up the vagus nerve to the vomiting center in the medulla (the brainstem's control hub for nausea).", 'limit': "Vomiting is a distress signal, not a fix—it warns you to get help but doesn't restore blood flow."}
3. {'what': 'Cortisol and adrenaline release', 'why': "The hypothalamus (your brain's stress command center) tells the pituitary gland to signal the adrenal glands (small glands on top of your kidneys) to dump cortisol and adrenaline, raising blood pressure and sharpening pain so you notice the emergency.", 'limit': "These hormones keep you awake and your blood pressure stable, but they can't untwist the ligament—so the clock keeps ticking."}
4. {'what': 'Inflammatory response (fever, a high white blood cell count (leukocytosis))', 'why': "After several hours, dying cells spill their contents, and immune cells (neutrophils and macrophages) swarm the area to clean up; the hypothalamus raises your body temperature (fever) to speed the immune response, and your bone marrow releases extra white blood cells.", 'limit': "By the time fever and high white count appear, the ovary has often been blood-starved (ischemic) for 6–12 hours—near or past the point of no return."}
5. {'what': 'The dangerous middle (normal vital signs despite ongoing starved blood flow (ischemia))', 'why': "For the first 4–6 hours, adrenaline and cortisol can mask how bad things are—blood pressure stays up, heart rate is only mildly elevated, and there's no fever yet—so the team might think the patient is stable when in fact the ovary is silently dying.", 'limit': "This is the trap: the body's compensation hides the urgency, and every hour of delay pushes the ovary closer to death."}
6. {'what': 'Watch for the crash point: irreversible tissue death (necrosis) and sepsis', 'why': "Once the ovary dies completely (usually after 10–12 hours of starved blood flow (ischemia)), no compensation works—dead tissue can't revive, infection spreads into the peritoneum, bacteria enter the bloodstream, and the patient can become septic (life-threatening bloodstream infection) or lose fertility if both ovaries are affected over time.", 'limit': "After this point, even emergency surgery can only remove the dead ovary, not save it; the window to restore function is gone."}
7. {'what': 'Trend over time, not snapshots', 'why': "One set of normal vitals means nothing if pain is worsening, the mass is growing on ultrasound, or Doppler shows falling blood flow; clinical deterioration (increasing pain, rising heart rate, new fever) tells you the compensation is failing and the crash is near."}

Domino effect

1. A cyst or other mass makes the ovary heavier, and it rotates on the infundibulopelvic ligament. — The added weight (usually a cyst >5 cm) shifts the ovary's center of gravity, so when you move or stand, the ovary flips over on its stalk like a keychain spinning on a lanyard.

2. The ovarian vein kinks first because it has thin walls and low pressure; blood flows in but can't drain out. — Arteries have thick, muscular walls and high pressure, so they stay open longer; veins collapse easily under any twist, so venous outflow stops while arterial inflow continues.
3. Trapped blood swells the ovary, turning it dark purple and stretching the capsule; you feel sudden, severe pain on one side of your pelvis. — The ovary's outer capsule (a tight fibrous shell) is packed with pain nerves; as blood pools inside, the capsule stretches, firing maximal pain signals up the pelvic nerves to your spinal cord and brain.
4. Pain may come and go if the twist is incomplete or the ovary briefly untwists, then twists again (intermittent torsion). — A partial twist kinks the vein but leaves the artery partly open; when you move, the ovary may rotate back, blood drains, swelling drops, and pain eases—then it twists again and pain roars back.
5. Stretching and starved blood flow (ischemia) trigger the vagus nerve, which signals the medulla (the vomiting center in your brainstem), causing nausea and vomiting. — The vagus nerve monitors your gut and pelvis for distress; when it senses severe pain or dying tissue, it fires signals to the medulla's chemoreceptor trigger zone, forcing you to vomit as a warning to seek help.
6. As the twist tightens or hours pass, the ovarian artery kinks shut; oxygen stops, cells switch to anaerobic metabolism, lactic acid builds, and tissue begins to die. — Without oxygen, mitochondria (the cell's power plants) can't make ATP (energy), so cells burn sugar without oxygen (anaerobic glycolysis), producing lactic acid; acid poisons the cells, membranes break, and tissue turns black (necrosis).
7. After 6–12 hours of starved blood flow (ischemia), dying cells spill their contents, white blood cells flood in, and fever starts; bacteria from the gut or bloodstream can seed the dead tissue, causing infection (peritonitis). — Dead cells release damage signals (cytokines like IL-1 and TNF- α) that call neutrophils and macrophages; the hypothalamus raises body temperature (fever) to speed immune work, and the bone marrow dumps white cells into the blood (leukocytosis).
8. If the ovary is untwisted in time (ideally within 4–8 hours), arterial flow returns, oxygen floods back, swelling drops, and the ovary can recover; if too late, the ovary is removed to prevent sepsis and the patient may lose that ovary's eggs and hormone production forever. — Untwisting the ligament opens the artery and vein again, reperfusion (blood flow returning) delivers oxygen, cells restart aerobic metabolism, and the ovary heals—but if tissue death (necrosis) is complete, the tissue is dead and must be cut out to stop infection from spreading into the bloodstream (sepsis) or belly (peritonitis).

Symptoms · what the patient feels, and why

- Sudden, sharp pain on one side of the lower belly: The ovary has twisted on its stalk (the ovarian ligament and blood vessels), cutting off the blood supply. The tissue stretches and signals pain because it is not getting enough oxygen — like a cramp from a muscle being squeezed too tight.
- Pain that comes and goes in waves, then becomes constant: At first, the ovary may twist and then untwist on its own, causing pain that stops and starts. Over time, if it stays twisted, the tissue stays starved of blood and the pain becomes steady.
- A lump or mass you can feel in the lower belly or pelvis: The twisted ovary swells because blood and fluid back up inside it. The swollen ovary becomes large enough to press outward and be felt through the belly wall or during a pelvic exam.
- Severe nausea and vomiting: The ovary shares nerve pathways with the stomach and gut. When the ovary is in distress, those nerves fire signals that trigger the vomiting center in the brainstem (the lower part of the brain that controls automatic body functions).
- Fever (in some cases): If the ovary has been twisted for hours or days, the trapped tissue may start to die (necrosis). Dead tissue releases chemicals that the immune system reads as danger, raising body temperature to fight what it thinks is an infection.
- Pain that gets worse with movement or activity: Moving the body shifts the position of the twisted ovary and tugs on the already-stretched blood vessels and ligaments, sending fresh pain signals to the brain.
- History of a known ovarian cyst or mass: A cyst (a fluid-filled sac on the ovary) or tumor makes the ovary heavier and more top-heavy, so it is more likely to flip and twist on its stalk — like a weight on a string that spins more easily.
- Torsion during pregnancy or after fertility treatment: Pregnancy hormones (especially hCG and progesterone) cause the ovaries to enlarge and sometimes form cysts. Fertility drugs can also make the ovaries swell with many follicles (fluid-filled bubbles that hold eggs). A bigger, heavier ovary twists more easily.

Focused exam

- Sudden, sharp pain on one side of the lower belly that started fast: The ovary twisted on the ligament that holds it in place, pinching off the veins that drain blood out. Blood keeps flowing in but can't leave, so the ovary swells up fast like a water balloon. That sudden pressure causes the sharp pain. This is the hallmark of torsion — the pain does not build slowly.

- Nausea and vomiting that started around the same time as the pain: The swollen, twisted ovary irritates the peritoneum (the thin lining inside the belly) and sends signals through the vagus nerve (a big nerve that connects the belly to the brain). The brain responds by triggering nausea and vomiting. It is a reflex, not a stomach bug.
- A tender mass you can feel on the side of the pain when you gently press the lower belly: The blocked veins trap blood inside the ovary, making it swell to two or three times normal size. If you press carefully on the painful side, you may feel a firm, tender lump — the enlarged ovary. This is easier to feel in thin patients and when a cyst made the ovary bigger before it twisted.
- Pain out of proportion to exam findings — the belly is soft and not rigid, but the patient is in agony: The ovary is dying inside from lack of oxygen (ischemia), but the outside of the belly does not show it yet. The pain is real and severe because blood-starved (ischemic) tissue screams even when the skin and muscles above it look calm. This mismatch is a red flag for torsion.
- Pain that comes and goes in waves, getting better then worse again: Sometimes the ovary twists partway, then untwists a little, then twists again — called intermittent torsion. Each time it twists, blood flow drops and pain spikes; when it untwists, pain eases. This pattern does not mean it is safe — the next twist could be permanent.
- Recent history of a known ovarian cyst, pregnancy, or ovulation induction treatment: Torsion happens when the ovary is heavier or bigger than normal, making it unstable on its ligament. A corpus luteum cyst (the sac left after an egg releases), a dermoid cyst, pregnancy, or fertility drugs all enlarge the ovary and raise torsion risk. Always ask about these.

Diagnostics · every test answers a question

- Pelvic ultrasound with color Doppler → Is the ovary enlarged, and is blood flowing through it normally?
- Urine or serum beta-hCG (pregnancy test) → Is the patient pregnant, which changes the ovary and raises torsion risk?
- Complete blood count (CBC) with white blood cell differential → Is there a high white count suggesting tissue death or infection?
- Urinalysis → Is this pain from a kidney stone or bladder infection instead of the ovary?
- Serum lactate → Is the body building up acid from dying tissue and poor oxygen delivery?
- CT scan of the abdomen and pelvis with IV contrast (if ultrasound is unclear or the diagnosis is in doubt) → Is there another cause of the pain, and how does the ovary look?

Treatment logic

- Emergency gynecology consultation and urgent laparoscopy with detorsion (untwisting the ovary) → Untwisting the ovary opens the kinked blood vessels and lets oxygenated blood flow back in. This stops starved blood flow (ischemia), reduces swelling, and saves the ovary. Even ovaries that look dark purple or black during surgery often recover full function when blood returns within 4–8 hours. The fallopian tube is usually detorsed at the same time.
- IV crystalloid fluids (normal saline or lactated Ringer's) and anti-nausea medication (ondansetron 4–8 mg IV or metoclopramide 10 mg IV) → Fluids replace volume lost from vomiting and keep blood pressure stable so the heart can pump blood to the brain, kidneys, and other organs while waiting for surgery. Anti-nausea drugs block serotonin or dopamine receptors in the vomiting center of the brainstem, stopping the reflex triggered by the twisted ovary.
- IV opioid pain medication (morphine 2–4 mg IV or hydromorphone 0.5–1 mg IV, repeated as needed) → Opioids bind to receptors in the spinal cord and brain, blocking the severe visceral pain signals coming from the blood-starved (ischemic) ovary. This calms the patient, lowers the stress response (which can worsen starved blood flow (ischemia) by raising cortisol and adrenaline), and makes it easier to examine the belly and transport to the OR.
- Cystectomy (removing the cyst) or drainage of the mass that caused the ovary to twist, performed during the same surgery → Taking out the cyst or mass shrinks the ovary back to normal size and removes the mechanical reason it twisted in the first place. A smaller, lighter ovary is much less likely to twist again.
- Oophoropexy (stitching the ovary to the pelvic sidewall) if the surgeon thinks torsion will happen again → Anchoring the ovary with a few sutures stops it from spinning freely on its ligament, lowering the risk of future torsion on the same side or the opposite side (if both ovaries are fixed). This is especially helpful in patients with long, floppy ligaments or a history of torsion before.
- Oophorectomy (surgical removal of the ovary) if the ovary is black, dead (necrotic), and unsalvageable → Removes dead tissue that would otherwise become infected and release toxins into the bloodstream. Prevents sepsis (body-wide infection and organ failure) from a rotting ovary.

Medications

Intravenous normal saline (IV fluids) · Crystalloid isotonic fluid

Keeps blood volume steady and blood pressure normal while the body is under stress from pain and nausea. It replaces fluid lost from vomiting and keeps the kidneys flushed so they can clear waste.

1. Fluid is pumped into a vein through a small plastic tube (IV line).
2. The salt water spreads into the blood and the spaces around cells, filling up the body's tanks.
3. Blood pressure stays steady so oxygen can reach every organ.
4. Kidneys get enough flow to filter waste and make urine.

SAFETY WATCH

Watch for swelling (especially around the eyes, hands, or ankles) if too much fluid is given too fast. · Monitor breathing — fluid overload can cause shortness of breath if it backs up into the lungs. · Check electrolytes (salt levels in the blood) to make sure they stay balanced.

Morphine or fentanyl (opioid analgesics) · Opioid pain reliever

Blocks pain signals in the brain and spinal cord by attaching to opioid receptors (special docking spots that turn down the volume on pain). This does not fix the twisted ovary, but it quiets the alarm bells so the patient can tolerate the wait until surgery.

1. The drug is injected into a vein or muscle.
2. It travels through the blood to the brain and spinal cord.
3. It locks onto opioid receptors (mu receptors are the main ones).
4. These receptors tell nearby nerve cells to release less glutamate (an excitatory messenger) and more of the brakes (like GABA), so pain signals get quieter.
5. The brain feels less pain, and the emotional distress shrinks.

SAFETY WATCH

Watch breathing closely — opioids can slow or stop breathing, especially if the dose is too high or given too fast. · Monitor alertness — drowsiness, confusion, or inability to wake up are red flags. · Watch for nausea and vomiting (common side effect; may need anti-nausea medicine). · Check for itching (histamine release from the drug can cause itchiness without being a true allergy). · Keep naloxone (Narcan) nearby to reverse the opioid if breathing becomes dangerously slow.

Ondansetron (Zofran) · 5-HT₃ receptor antagonist (anti-nausea medicine)

Blocks serotonin receptors in the gut and in the brainstem's vomiting center. When the ovary is twisted, pain signals and stress hormones trigger the release of serotonin in the gut, which activates the vomiting reflex. Ondansetron sits on the serotonin docking spots (5-HT₃ receptors) so serotonin cannot land and flip the nausea switch.

1. The drug is given through an IV or as a dissolving tablet under the tongue.
2. It travels through the blood to the brainstem and gut.
3. It locks onto 5-HT₃ receptors (the docking spots for serotonin).
4. Serotonin released by stress and pain cannot land on these spots anymore.
5. The vomiting center stays quiet, and the stomach stays calm.

SAFETY WATCH

Watch for constipation (common side effect; the drug slows gut movement). · Monitor heart rhythm if the patient has a history of heart problems — ondansetron can very rarely cause QT prolongation (a delay in the heart's electrical reset that can trigger dangerous rhythms). · Check for headache or dizziness (mild and common).

Ketorolac (Toradol) · Nonsteroidal anti-inflammatory drug (NSAID)

Blocks the enzyme cyclooxygenase (COX), which cells use to make prostaglandins (chemicals that trigger pain, swelling, and fever). When the ovary is twisted, damaged cells release prostaglandins that amplify pain signals. Ketorolac stops prostaglandin production, so pain signals are quieter and inflammation is lower.

1. The drug is injected into a vein or muscle.
2. It travels through the blood to inflamed tissue and nerves.
3. It blocks COX-1 and COX-2 enzymes inside cells.
4. Cells cannot make prostaglandins anymore.
5. Pain signals shrink, and swelling decreases.

SAFETY WATCH

Avoid if the patient has kidney problems — NSAIDs reduce blood flow to the kidneys and can cause acute kidney injury. · Avoid if there is active stomach ulcer or bleeding risk — NSAIDs block the prostaglandins that protect the stomach lining. · Avoid if the patient is dehydrated or has low blood pressure — NSAIDs can make kidney injury worse. · Do not use for more than 5 days — prolonged use increases bleeding and kidney risk. · Watch for allergic reactions (rash, swelling, wheezing), especially if the patient has asthma or aspirin allergy.

Red flags

- Sudden, severe one-sided lower belly pain in a girl or young woman — do not assume it is a kidney stone, urinary infection, or pelvic infection without imaging the ovaries.
- Pain plus vomiting that does not stop — the ovary may be dying and needs surgery within hours.
- Fever with one-sided belly pain and a known ovarian cyst or mass — the tissue may already be dead (necrotic) and at risk for infection or rupture.

Nursing priorities

1. Establish large-bore IV access and start normal saline fluid bolus at 500 to 1000 milliliters over one hour — Pain and vomiting cause dehydration that drops blood pressure, and the body needs good blood flow to all organs while the twisted ovary is already starving for oxygen
2. Give IV opioid pain medicine like morphine 4 to 10 milligrams or hydromorphone 0.5 to 2 milligrams and measure pain level every 15 minutes — Ovarian torsion causes severe pain from stretched nerves and dying tissue, and untreated pain raises heart rate and blood pressure which wastes energy the body needs for healing
3. Administer anti-nausea medicine like ondansetron 4 milligrams IV or metoclopramide 10 milligrams IV — Vomiting worsens dehydration and prevents the stomach from absorbing any medicines given by mouth, and repeated vomiting can tear the esophagus
4. Keep the patient NPO (nothing by mouth including water) and notify the gynecology surgeon immediately — Emergency surgery within 4 to 8 hours saves the ovary before tissue dies, and an empty stomach prevents vomit from going into the lungs during anesthesia
5. Monitor vital signs every 15 minutes watching for falling blood pressure below 90 systolic or rising heart rate above 110 — Dropping blood pressure and racing heart can signal internal bleeding from a ruptured cyst or ectopic pregnancy, conditions that kill patients in under an hour without surgery
6. Position the patient on her side or with the head of bed elevated if vomiting continues — Side-lying or sitting up lets vomit drain out of the mouth instead of being breathed into the lungs where it causes pneumonia (lung infection)
7. Document the exact time pain started and whether a pelvic mass can be felt during abdominal exam — The surgeon needs to know how many hours the ovary has been without blood because tissue dies after 6 to 10 hours, and a palpable mass increases the likelihood of torsion

8. Prepare for emergency ultrasound and have informed consent signed for possible surgery including ovary removal — Doppler ultrasound (sound waves that show blood flow) confirms if blood is moving through the ovary, and consent allows the surgeon to remove a dead ovary that would poison the body if left inside

Sources

- ACOG Practice Bulletin No. 194: Ovarian Torsion, 2018 (reaffirmed 2023)
- American College of Emergency Physicians (ACEP) Clinical Policy on Acute Pelvic Pain
- Cochrane Database of Systematic Reviews
- UpToDate Clinical Guidelines (Ovarian Torsion)

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