

Spinal Cord Compression and Cauda Equina

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THE STORY IN ONE SENTENCE

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“Cauda equina syndrome is a spine emergency. When something crushes the nerve bundle below L2, you lose feeling in the saddle area, cannot pee (then overflow leaks out), lose control of your bowels, get leg weakness and pain in both legs, and your anal tone goes soft. Get an MRI right away. Surgery must happen within 48 hours or the damage becomes permanent.”

Normal anatomy — the body's job

The spinal cord ends around L1 or L2. Below that, a bundle of nerves called the cauda equina (like a horse's tail) runs down the bony tunnel and carries the wires for leg movement, leg feeling, bladder control, bowel control, and sensation in the saddle area (the skin that touches a saddle when you sit on a horse). Those nerves—L2 through S5—talk up and down freely, so your brain can tell your legs to move, feel a pinch, squeeze to pee, squeeze to hold poop, and feel touch around your bottom and genitals.

BODY'S JOB

Each nerve root has a job. The lumbar roots (L2, L3, L4, L5) control the big muscles in your thighs and shins and carry feeling from your legs. The sacral roots (S1, S2, S3, S4, S5) control your bladder muscle (the detrusor, the muscle that squeezes to push pee out), your anal sphincter (the ring muscle that holds poop in), and the feeling in the saddle area. Because all these wires run side by side in one tight space, anything that squeezes the whole bundle shuts down all those jobs at once—that is the signature of cauda equina syndrome.

1. Brain sends a 'move' signal down the spinal cord.
2. At L1 or L2, the spinal cord ends and splits into a spray of individual nerve roots—the cauda equina.
3. Each nerve root exits through a small window in the bones and plugs into a muscle, a patch of skin, or an organ.
4. When the nerve carries the signal, the muscle contracts, the bladder squeezes, or you feel a touch.
5. Sensory signals travel back up the same wires to tell the brain what is happening.

What breaks

Something big squeezes the whole nerve bundle at once, cutting off the wires for legs, bladder, bowels, and saddle feeling all together. The four common causes are a huge ruptured disc (the cushion between two spine bones bursts and the jelly inside crushes the nerves from behind), a tumor (a growth in the bone or near the nerves), an abscess (a pocket of pus from infection), or a blood clot (hematoma, often after spine surgery or if you take blood thinners). Rarely, a broken spine bone (fracture) or a slipped bone (spondylolisthesis) can do it too.

CLINICAL TERM

Cauda equina syndrome is acute compression of the lumbosacral nerve roots (L2–S5) within the spinal canal, most often at L4–L5 or L5–S1. The compression blocks both motor efferents (causing leg weakness and loss of anal sphincter tone) and sensory afferents (causing saddle anesthesia and loss of bladder/bowel sensation). The four leading causes are central disc herniation (45–50%), malignancy (tumor, metastasis, or lymphoma), spinal epidural abscess, and epidural a pooled collection of blood (hematoma). Because the nerve roots are peripheral nerves (not spinal cord), the reflex arc is interrupted, so reflexes are diminished or absent (lower motor neuron pattern). Bladder dysfunction progresses from urinary retention (detrusor absent reflexes (areflexia)) to overflow incontinence as the bladder overdistends.

How the body compensates

The body has no way to compensate for crushed nerves. Unlike blood pressure or breathing, where the body can speed up the heart or take faster breaths to keep oxygen flowing, there is no backup plan when the nerve wires are cut. The bladder just keeps filling because the signal to squeeze never arrives. The anal sphincter stays loose because the signal to tighten is gone. Legs stay weak because the command to move cannot get through. The only 'compensation' you see is overflow incontinence—when the bladder gets so overfilled that pee leaks out passively, like water spilling over the top of a dam. That is not the body fixing the problem; it is just physics. The real danger is that vital signs (heart rate, blood pressure, oxygen) often look completely normal, so the team can miss how urgent this is. The clock is ticking on the nerves, not the heart. Once 48 hours pass, even perfect surgery cannot bring dead nerves back to life.

1. {'what': 'Bladder retention progresses to overflow incontinence.', 'why': 'The parasympathetic nerves (S2, S3, S4) that tell the detrusor muscle to squeeze are cut off, so the bladder cannot empty. It fills and fills—500, 800, 1000 mL or more—until the pressure inside is higher than the sphincter can hold, and pee dribbles out. The patient may say 'I'm peeing all the time' when really they are retaining a huge volume and just overflowing. A bladder scan or post-void residual catheterization shows the truth.'}
2. {'what': 'Loss of sensation masks the problem.', 'why': 'Normally a full bladder hurts and you feel the urge to pee. But saddle anesthesia wipes out that feeling, so the patient does not know their bladder is dangerously full. Same with the bowels—they lose the urge to poop, so constipation and fecal retention build silently.'}
3. {'what': 'Leg weakness may improve slightly with rest, fooling the team.', 'why': 'If there is also nerve root inflammation (radiculopathy) on top of the compression, lying flat and taking anti-inflammatories can reduce swelling just enough to ease some leg pain or tingling. But the core problem—the mass squeezing the whole bundle—is still there and still getting worse. A brief plateau or slight improvement does not mean you can wait; the 48-hour countdown continues.'}
4. {'what': 'Vital signs stay normal until very late.', 'why': 'Cauda equina syndrome does not affect the heart, lungs, or blood pressure directly. The autonomic nerves that control those (sympathetic chain, vagus) are higher up in the spinal cord and are not part of the cauda equina. So heart rate and BP look fine even as the bladder is about to burst and the nerves are dying. The danger is invisible on a monitor.'}

5. {'what': 'The crash point is permanent nerve death after 48 hours.', 'why': 'Peripheral nerves (like the cauda equina roots) can recover if compression is relieved quickly, because the nerve cell bodies (in the dorsal root ganglia and anterior horn of the spinal cord) are still alive. But if the nerve is crushed for more than about 48 hours, the axons (the long wire part) die and scar tissue forms. Even after surgery, those nerves never regrow enough to restore normal function. Bladder and bowel control, in particular, almost never come back if surgery is delayed beyond 48 hours. Leg strength may recover partially, but saddle sensation and sphincter tone usually stay gone.'}
6. {'what': 'Watch the trend, not the snapshot.', 'why': 'A patient who was walking yesterday, then today has foot drop and new saddle numbness, is on a steep downhill slope even if their pain is currently 4/10 and their BP is 120/70. The velocity of change—how fast things are getting worse—is more important than how bad they are right now. Any progression of weakness, numbness, or bladder symptoms is a red flag to move faster.'}

Domino effect

1. A big disc, tumor, abscess, or blood clot squeezes the cauda equina nerve bundle below L2, blocking all the nerve signals going to and from the legs, bladder, bowels, and saddle area. — Because all those nerve roots run side by side in one tight bony tunnel, anything that takes up space in the canal—whether it pushes in from behind (disc), grows from inside (tumor), or fills the space with pus or blood—crushes the whole bundle at once. The nerves are soft and squishy; the bone around them is hard. When pressure goes up, the nerves get flattened like a garden hose pinched under a car tire.
2. The motor signals going down to the leg muscles are cut off, so both legs get weak. The sensory signals coming back up are also cut, so you lose feeling in both legs and in the saddle area (the skin around your bottom, genitals, and inner thighs). — The lumbar nerve roots (L2, L3, L4, L5) control the hip flexors, knee extensors (quadriceps), ankle dorsiflexors (the muscles that lift your foot up), and ankle plantarflexors (the muscles that point your foot down). The sacral roots (S1, S2) carry feeling from the back of the leg and the sole of the foot. When the bundle is crushed, all those wires go quiet. Weakness is often worse in the ankles (foot drop) and may be asymmetric at first, but it usually affects both legs because the compression is central.

3. The parasympathetic nerves that tell the bladder to squeeze (S2, S3, S4, carried in the pelvic splanchnic nerves) are blocked, so the detrusor muscle stops contracting and the bladder cannot empty. — Normally, when the bladder fills to about 300–400 mL, stretch receptors in the bladder wall send a signal up the sacral nerves to the brain. The brain sends a signal back down the same nerves to contract the detrusor and relax the internal sphincter, and you pee. When those sacral nerve roots are crushed, the whole loop is broken. The bladder fills but never gets the 'squeeze' command, so it just keeps filling—500, 800, 1000 mL or more (normal capacity is about 400–600 mL). Eventually the pressure inside the bladder is higher than the urethral sphincter can hold, and pee leaks out passively. That is overflow incontinence. The patient may say they are peeing all the time, but really they are retaining a huge volume and just dribbling the overflow.
4. Saddle anesthesia (loss of feeling in the saddle area) wipes out the normal sensation of a full bladder and the urge to pee or poop, so the patient does not realize anything is wrong until overflow or fecal incontinence starts. — The sacral dermatomes (S2, S3, S4, S5) cover the skin around the anus, genitals, perineum, and inner thighs—the exact area that would touch a saddle. When those sensory nerves are crushed, that whole patch of skin goes numb. You lose not just light touch but also the deep sensation of fullness in the bladder and rectum. That is why patients often present late—they did not feel the problem building.
5. Anal sphincter tone goes soft and the bulbocavernosus reflex and anal wink reflex disappear, because the motor nerves to the external anal sphincter and the reflex arcs through S2–S4 are cut. — The external anal sphincter is controlled by the pudendal nerve (S2, S3, S4). When you do a rectal exam, you normally feel the sphincter squeeze tight around your finger. In cauda equina syndrome, the sphincter feels loose and floppy, like a rubber band that lost its stretch. The anal wink reflex (when you scratch the skin next to the anus, the sphincter should twitch) and the bulbocavernosus reflex (when you squeeze the glans penis or tap the clitoris, the anus should contract) both disappear because the reflex arc is broken. These are objective signs that the sacral nerves are dead or dying.
6. Lower-extremity reflexes (especially the ankle jerk, S1) become diminished or absent, and you may also lose the knee jerk (L3–L4) if the compression is high or severe. — A reflex is a loop: tap the tendon → stretch receptor fires → sensory nerve carries signal to spinal cord → motor nerve carries signal back to muscle → muscle contracts. When the nerve roots are crushed, the loop is broken, so the reflex disappears. This is a lower motor neuron pattern (flaccid weakness, lost reflexes) because the damage is to the peripheral nerve roots, not the spinal cord itself. If the spinal cord were crushed (above L1), you would see upper motor neuron signs (spasticity, overactive reflexes (hyperreflexia), Babinski). The pattern of lost reflexes helps you know exactly where the damage is.

7. Bowel control is lost because the sensory nerves that signal 'I need to poop' and the motor nerves that squeeze the anal sphincter are both cut, leading to fecal incontinence or severe constipation. — The rectum fills with stool, but the patient does not feel it because the sensory nerves (S2–S4) are numb. The internal anal sphincter (smooth muscle, controlled by autonomic nerves) and external anal sphincter (skeletal muscle, controlled by the pudendal nerve) both lose tone. Stool either leaks out passively or gets impacted in the rectum because the patient cannot coordinate a bowel movement. Either way, bowel control is gone.
8. If the compression is not relieved by surgery within 48 hours, the nerve axons die, scar tissue forms, and the damage becomes permanent—especially bladder and bowel function, which almost never recover after that window closes. — Peripheral nerves can heal if the cell body is alive and the crush injury is relieved quickly. But if the nerve is squashed for too long, the axon (the long wire part) degenerates and the myelin sheath (the insulation) breaks down. Even if you take the pressure off later, the nerve cannot regrow all the way back to the muscle or skin—it scars and stops halfway. The sacral nerves that control the bladder and bowels are especially vulnerable. After 48 hours, even perfect decompression surgery leaves most patients with permanent bladder dysfunction (needing intermittent catheterization for life) and bowel incontinence. Leg strength may recover partially because those nerves are shorter and closer to the spinal cord, but the autonomic and sphincter nerves rarely come back. That is why every guideline (AANS/CNS, NICE, Cochrane) says surgery must happen within 48 hours—ideally within 24 hours if symptoms are rapidly progressive.

Symptoms · what the patient feels, and why

- Sudden trouble peeing or can't pee at all: The nerves that control the bladder (the sacral nerves at the very bottom of the spinal cord) get squashed, so the signal telling the bladder to squeeze and empty gets cut off. The bladder fills but can't empty itself.
- Pee left in the bladder over 100 mL after trying to go (called post-void residual): The bladder muscle can't squeeze hard enough because the nerves controlling it are damaged by the compression. Urine stays trapped inside even after the person tries to pee.
- Numbness or tingling in the saddle area (around the butt, inner thighs, and private parts): The sacral nerve roots carry feeling from this 'saddle' zone. When they're crushed, the signals can't get through, so the skin there feels numb or tingly—like when your foot falls asleep.
- Can't control bowel movements or don't feel when you need to go: The same sacral nerves also control the muscles that hold stool in and signal when the rectum is full. Compression cuts those signals, so you may leak stool or not realize you need to go.

- Weakness in both legs, especially trouble standing up or walking: Motor nerve roots to the legs are compressed, blocking the signals from the brain that tell leg muscles to contract. Without those signals, the muscles can't work properly and feel weak.
- Severe lower-back pain that may shoot down both legs: The compressed nerve roots themselves send out pain signals, and inflammation around the injury irritates the nerve fibers. The pain often radiates down the path of the nerves (both legs, following the sciatic nerves).
- Loss of reflexes in the ankles (absent ankle-jerk reflex): The reflex arc depends on intact nerve roots. When the lower sacral and lumbar roots are crushed, the signal can't complete the loop from the tendon tap to the spinal cord and back to the muscle, so the reflex disappears.
- Sexual problems (can't get or keep an erection, or loss of sensation during sex): The sacral nerves also control blood flow and sensation needed for normal sexual function. Compression disrupts these signals, leading to erectile dysfunction or numbness in the genital area.

Focused exam

- Check saddle sensation—run your gloved hand over the person's bottom, inner thighs, and genital area and ask if they feel it: Numbness here means the sacral nerves (S2–S4, the lowest nerve roots from the spine) are crushed. These nerves control feeling in that area AND control the bladder and bowel. Losing saddle sensation is the red flag that the cauda equina bundle is dying right now.
- Check anal tone—insert a gloved finger into the rectum and ask the person to squeeze; feel how tight the ring of muscle is at rest and when they try to squeeze: A loose or floppy anal sphincter (the ring muscle that holds poop in) means the pudendal nerve and sacral roots are not sending signals anymore. This is a sign the nerves are badly damaged and time is running out to save them.
- Ask about urination—when did they last pee, do they feel the urge, can they start the stream, do they feel dribbling or leaking without noticing: Not being able to pee OR peeing without feeling it means the detrusor muscle (the bladder wall muscle that squeezes pee out) and the bladder stretch sensors have lost their nerve supply from S2–S4. Urine backs up into the kidneys and can cause permanent kidney damage within days.

- Check lower-limb motor strength—ask the person to push their foot down against your hand (ankle plantarflexion, S1), pull their foot up toward their nose (ankle dorsiflexion, L5), and lift their knee toward the ceiling (hip flexion, L2–L4): Weakness in both legs means the motor nerve roots below the spinal cord injury are being crushed. The cauda equina is a bundle of all the nerve roots from L2 down to S5, so squeezing it hits many muscles at once. This is different from a stroke or single pinched nerve, which hits one side or one level only.
- Check patellar and Achilles reflexes—tap the tendon below the kneecap and the tendon behind the ankle with a reflex hammer and watch for the leg to kick: Absent or very weak reflexes in both legs mean the reflex arc (sensory nerve → spinal cord → motor nerve → muscle) is broken. In cauda equina syndrome, the break is in the nerve roots themselves below the spinal cord, so both legs lose reflexes at the same time.
- Measure post-void residual volume—use a bladder ultrasound or insert a catheter right after the person tries to pee and measure how much urine is still trapped inside: More than 100–200 mL of urine left after trying to pee means the bladder is not emptying because the nerves that squeeze it are dead. This urine backs up into the kidneys and raises pressure, which kills kidney tissue. It also grows bacteria and causes bladder infections that can spread to the blood.

Diagnostics · every test answers a question

- MRI of the lumbar and sacral spine with and without gadolinium contrast, done within 24 hours → What is squeezing the cauda equina nerve bundle—a herniated disc, a tumor, an infection abscess, a blood clot (hematoma), or a broken bone fragment?
- Post-void residual urine volume by bladder ultrasound or straight catheterization → Is the bladder able to empty, or is urine trapped inside because the nerves are dead?
- Complete blood count (CBC) with differential → Is there infection or bleeding happening right now?
- Red blood cell (Erythrocyte) sedimentation rate (ESR) and C-reactive protein (CRP) → Is there inflammation or infection brewing in the spine?
- Blood cultures × 2 sets from different sites if fever or high suspicion of infection → Is bacteria in the bloodstream, and if so, what kind, so we can choose the right antibiotic?
- Coagulation panel (PT/INR, aPTT, platelet count) if on blood thinners or recent trauma → Is the blood clotting normally, or is there a bleeding problem that caused or worsened a spinal a pooled collection of blood (hematoma)?
- Serum creatinine and blood urea nitrogen (BUN) → Are the kidneys already damaged from backed-up urine?

Treatment logic

- Stat MRI of the lumbar and sacral spine (within 24 hours, ideally within 6–12 hours of symptom onset) → Shows exactly where and what is squeezing the cauda equina—a herniated disc, tumor, abscess, a pooled collection of blood (hematoma), or bone fragment—so the surgeon knows where to cut and what to remove. It also rules out mimics like transverse myelitis or Guillain-Barré syndrome that do not need surgery.
- Emergency surgical decompression (laminectomy, discectomy, abscess drainage, tumor debulking, or a pooled collection of blood (hematoma) evacuation) within 48 hours—ideally within 24 hours → Physically removes or cuts away the disc, bone, pus, tumor, or blood clot squeezing the cauda equina nerve bundle, so blood flow and oxygen return to the nerve roots. This stops further nerve death and gives damaged nerves a chance to heal over weeks to months. Studies show surgery within 48 hours gives the best chance of recovering bladder, bowel, and leg function.
- Dexamethasone 10 mg IV immediately, then 4 mg IV every 6 hours until surgery (if cause is tumor or severe disc herniation); hold steroids if infection (abscess) is suspected until antibiotics are on board → Shrinks swelling (edema) around the crushed nerve roots by blocking inflammation chemicals (cytokines and prostaglandins), giving the nerves a little more room inside the tight spinal canal while you arrange surgery. This buys time and may prevent a few more nerve cells from dying.
- Insert a Foley (indwelling urinary) catheter immediately and measure post-void residual if not already done → Drains trapped urine from the bladder, stopping backup into the kidneys (which would cause hydronephrosis and acute kidney injury within days). It also prevents bladder overdistension, which damages the bladder wall muscle (detrusor) and makes recovery of bladder control even harder later.
- Start broad-spectrum IV antibiotics immediately (e.g., vancomycin 15–20 mg/kg IV every 8–12 hours PLUS ceftriaxone 2 g IV daily, or meropenem 1 g IV every 8 hours) if epidural abscess or discitis is suspected, before or during MRI → Kills bacteria causing the spinal infection (most often *Staph aureus*, including MRSA) and stops the abscess from growing bigger and squeezing more nerve roots. Antibiotics also prevent the infection from spreading into the bloodstream (sepsis) or brain (meningitis).
- Start a bowel regimen (docusate 100 mg PO twice daily, senna 2 tablets at bedtime, polyethylene glycol 17 g PO daily) and perform a rectal exam and digital disimpaction if needed → Keeps stool soft and moving through the colon to prevent fecal impaction (a rock-hard plug of poop stuck in the rectum), which raises pressure in the pelvis and worsens pain. Stool softeners and laxatives do not restart the nerve signals, but they keep the plumbing open while nerves heal.

- Physical therapy and occupational therapy starting in the hospital and continuing for months after surgery → Retrains leg muscles, teaches safe transfers and walking with assistive devices (walker, cane), and helps the brain rebuild motor control as nerve healing slowly happens. Therapy also prevents muscle wasting (atrophy), joint stiffness (contractures), and pressure sores from being bedbound.

Medications

Dexamethasone · Corticosteroid (a powerful anti-swelling medicine)

Dexamethasone shrinks the swelling around the spinal cord or nerve bundle. When a tumor, infection, or inflamed disc pushes on the cord, the tissue around it swells up—like a sprained ankle puffing up. That extra swelling makes the squeeze even tighter. Dexamethasone tells the body to dial down that swelling fast, buying precious time for surgery or radiation to fix the root cause.

1. Dexamethasone enters cells near the compression and flips on anti-swelling genes.
2. Those genes turn down the production of prostaglandins and cytokines—chemicals that call in fluid and immune cells, causing puffiness.
3. Blood vessels tighten a little, leaking less fluid into the tight space.
4. Swelling drops, pressure eases, and the cord or nerves get a bit more breathing room.
5. Pain may ease and function may stabilize while the team tackles the underlying cause (tumor, abscess, or herniated disc).

SAFETY WATCH

High blood sugar—steroids push glucose up, risky if you have diabetes. · Stomach irritation or ulcers—take with food or a stomach protector if needed. · Mood swings, trouble sleeping, or feeling jittery. · Weakened immune defenses if used for weeks—infections can sneak in more easily. · Muscle weakness and bone thinning with long use, so the team keeps the course as short as possible.

Enoxaparin (or heparin) · Anticoagulant (a blood-thinner that stops new clots)

Enoxaparin prevents dangerous blood clots in the legs and lungs when someone suddenly cannot move their legs. Lying still for hours or days lets blood pool and thicken in the deep veins of the calves and thighs—like a garden hose with slow water turning sludgy. A clot can break off, travel to the lungs, and block oxygen. Enoxaparin blocks a clotting protein called Factor Xa so new clots cannot form.

1. Enoxaparin binds to antithrombin, a natural brake on clotting, and revs it up about 1,000 times.

2. Supercharged antithrombin grabs and shuts down Factor Xa, a key builder in the clotting chain.
3. Without Factor Xa, thrombin (the final clot-maker) cannot be made in large amounts.
4. Blood stays thinner and flows freely, so clots do not form in stagnant leg veins.
5. Existing clots are not dissolved, but new dangerous clots are blocked while the patient is immobile.

SAFETY WATCH

Bleeding risk—watch for unusual bruises, blood in urine or stool, or bleeding gums. · Do NOT use if there is active bleeding in the brain or spine, or right after spinal surgery in some cases (the surgeon decides). · Rarely, a reaction called HIT (heparin-induced a low platelet count (thrombocytopenia)) where platelets drop and clotting gets worse—requires switching drugs immediately. · Kidney function matters—dose is adjusted if kidneys are weak, because enoxaparin is cleared by the kidneys.

Gabapentin or pregabalin · Anticonvulsant used for nerve pain (originally made to stop seizures, now widely used to calm misfiring nerves)

Gabapentin quiets nerve pain signals that fire like a broken alarm after the spinal cord or nerve roots are squeezed. Damaged nerves send wild, burning, or shooting pain messages even when no new injury is happening. Gabapentin latches onto calcium channels on nerve endings and turns down the release of excitatory messengers like glutamate, so fewer pain signals reach the brain.

1. Gabapentin binds to the alpha-2-delta subunit of voltage-gated calcium channels on nerve cells.
2. Calcium cannot rush into the nerve terminal as easily.
3. With less calcium inside, the nerve releases less glutamate (the main excitatory messenger).
4. Fewer glutamate molecules means fewer pain signals jump across to the next nerve.
5. The brain receives a quieter pain signal, and the burning or electric-shock sensations ease.

SAFETY WATCH

Dizziness and drowsiness, especially in the first few days—do not drive until you know how it affects you. · Swelling in the ankles or hands in some people. · Mood changes or suicidal thoughts are rare but serious—report any new depression or dark thoughts immediately. · Do not stop suddenly after weeks of use—taper slowly to avoid withdrawal or rebound pain. · Kidney dosing—if kidneys are weak, the dose must be lowered because gabapentin is removed by the kidneys.

Opioid analgesics (e.g., morphine, oxycodone, hydromorphone) · Opioid pain relievers (strong medicines that block severe pain signals in the brain and spinal cord)

Opioids are used for severe pain when the spinal cord or nerve roots are freshly compressed and other medicines are not enough. They work by mimicking the body's natural pain-blockers (endorphins) and binding to opioid receptors in the spinal cord and brain. This shuts down pain signals before they can be felt as overwhelming suffering, buying comfort while surgery or other treatments are arranged.

1. The opioid molecule locks onto mu-opioid receptors on nerve cells in the spinal cord and brain.
2. Activating these receptors opens potassium channels and closes calcium channels on the nerve.
3. The nerve becomes less excitable and releases fewer pain messengers like substance P and glutamate.
4. Pain signals are blocked or weakened before they reach the brain's awareness centers.
5. The person feels less pain and can rest or tolerate positioning for scans and surgery.

SAFETY WATCH

Constipation is nearly guaranteed—start a bowel regimen (stool softener and stimulant laxative) right away. · Drowsiness and confusion, especially in older adults or with kidney/liver problems. · Respiratory depression (slowed breathing)—dangerous at high doses or when combined with sedatives or alcohol. · Risk of dependence and addiction with long-term use—use the lowest dose for the shortest time. · Nausea and itching are common; anti-nausea medicine or an antihistamine can help. · Do not drive or operate machinery while taking opioids.

Red flags

- New inability to pee, or bladder that stays full and won't empty (over 100 mL left after trying)
- Numbness in the saddle area (butt, groin, inner thighs, genitals)
- Loss of bowel or bladder control, or can't feel when you need to go
- Weakness in both legs that's getting worse, trouble walking or standing
- Severe back pain plus any of the above nerve symptoms—this is a surgical emergency

Nursing priorities

1. Keep the patient flat in bed with log-roll turning only, no twisting at the waist. — Twisting can shift a herniated disc or unstable bone and crush more nerves. Log-rolling (turning the whole body as one unit) protects the spine until imaging and surgery.
2. Insert a Foley catheter and measure urine output every hour; record the amount of urine drained immediately after insertion. — A bladder holding more than 100 milliliters after voiding (post-void residual) confirms nerve damage. Continuous drainage prevents bladder overdistension (overstretching), which can damage the bladder muscle permanently.
3. Perform and document a focused neurologic exam every 2 hours: check leg strength, saddle sensation, and rectal tone with a gloved finger. — Cauda equina can worsen rapidly. Serial exams catch new weakness or numbness early so the surgeon knows if the window for nerve recovery is closing.
4. Keep the patient NPO (nothing by mouth) from the moment cauda equina is suspected. — Emergency decompression surgery will happen within hours. Food or drink in the stomach increases the risk of aspiration (breathing in vomit) during anesthesia, which can cause pneumonia or death.
5. Administer dexamethasone 10 milligrams intravenous push immediately, then 4 milligrams every 6 hours as ordered. — Dexamethasone (a steroid) shrinks swelling (edema) around the compressed nerves. Less swelling means less pressure and a better chance the nerves will recover after surgery.
6. Notify the provider immediately if the patient reports new numbness, cannot move toes, or has a blood pressure above 180 systolic. — New numbness or paralysis means more nerves are dying. High blood pressure can increase bleeding risk during surgery but must be balanced against blood flow (perfusion) (blood flow) to the spinal cord.
7. Apply sequential compression devices (SCDs) to both legs and give subcutaneous heparin 5000 units every 8 to 12 hours if ordered. — Paralyzed legs cannot pump blood back to the heart. Stagnant blood clots easily, forming a clot in a deep leg vein (deep vein thrombosis) (DVT). SCDs squeeze the legs mechanically; heparin thins the blood chemically.
8. Document bowel sounds in all four quadrants and ask about last bowel movement; start a bowel program with stool softener and scheduled suppository. — Nerve damage stops normal colon contractions (peristalsis). Stool backs up and hardens, causing impaction (stool stuck in the rectum). Softeners and suppositories prevent this complication during the recovery period.

Sources

- NICE 2016 guideline on suspected cauda equina syndrome
- American Association of Neurological Surgeons (AANS) clinical guidelines

- Cochrane reviews on emergency spinal decompression
- North American Spine Society (NASS) evidence-based clinical guidelines

Last reviewed: 2026-07-07