

Bone infection

A plain-English guide for you and your family

WHAT IS HAPPENING

Healthy bone has a hard outer shell (the cortex) and a rich network of tiny blood vessels inside that deliver oxygen, immune cells, and nutrients. That steady flow keeps bacteria from taking hold. Picture it like a fortress with thick walls and supply trucks running in and out. When bacteria sneak past that defense—through a deep cut, surgical hardware like a screw, a diabetic foot ulcer that reaches bone, or by riding the bloodstream from another infection—they multiply faster than white blood cells can kill them. The bone swells, pressure builds, and small blood vessels get squeezed shut, which starves the bone and traps pus inside. You see pain at the spot, warmth, redness, sometimes drainage from the skin, and fever if the infection spills into the blood. In the spine (vertebral osteomyelitis), it shows up as fierce back pain plus fever. In a diabetic foot, you might see a sore that won't heal with bone poking through. Every one of these signs traces back to the same upstream break: bacteria have set up camp in bone, and the body's defenses can't reach them without help. Antibiotics kill the bugs, but if a pocket of dead bone (called a sequestrum) forms, surgery has to remove it—otherwise the infection hides inside and comes back.

What you might feel

- Pain right over the infected bone that gets worse when you press or move it
- Warmth, redness, and swelling of the skin over the bone
- Fever and chills
- An open sore or draining wound near the bone that won't heal, especially in people with diabetes or poor circulation
- New or worsening limping, inability to bear weight, or refusal to use an arm or leg (especially in children)
- Bone tenderness or a positive probe-to-bone test in someone with a diabetic foot ulcer
- Fatigue, irritability, and poor appetite (especially in babies and young children)
- Visible pus draining from a surgical site, fracture, or puncture wound near bone

Call the doctor right away if...

- Fever above 101.5°F (38.6°C) with bone pain, especially in a child or after surgery or injury
- Severe pain that does not improve with rest or over-the-counter pain medicine
- Red streaks spreading from the area, confusion, very fast heartbeat, or low blood pressure (signs bacteria are spreading into the bloodstream)
- A non-healing wound or ulcer over a bony area, especially in someone with diabetes, peripheral artery disease, or a weakened immune system
- New inability to move a limb, numbness, tingling, or loss of pulse below the infection site (may mean the infection is pressing on nerves or blood vessels)

What the care team will do

- Obtain two sets of blood cultures from different sites before giving any antibiotics, unless patient shows sepsis (low blood pressure, confusion, or organ failure)
- Check vital signs every 4 hours and watch for fever above 100.4 degrees, heart rate over 90, or blood pressure dropping below 90 systolic
- Assess pain level every shift using 0 to 10 scale and give prescribed pain medicine; position affected limb with pillows to reduce swelling and pressure on bone
- Check blood sugar (glucose) every 6 hours in diabetic patients and report values above 180 to doctor; give insulin as ordered to keep sugar between 80 and 180
- Protect the infected area from weight or pressure by using special boots (for foot), bed rest (for spine), or slings (for arm); coordinate with physical therapy for safe movement
- Start IV antibiotics exactly on time (vancomycin plus ceftriaxone or fluoroquinolone) and monitor IV site for redness or swelling; flush IV line before and after each dose
- Prepare patient for bone biopsy or surgical debridement by keeping nothing by mouth (NPO) after midnight and explaining that surgery removes dead bone (sequestrum) and pus that antibiotics cannot reach
- Monitor kidney function (creatinine and BUN lab tests) and ask about ringing in ears (tinnitus) or dizziness when patient is getting vancomycin, as these drugs can damage kidneys and hearing

Medicines you may be given — and why

Vancomycin

Vancomycin kills bacteria by punching holes in the wall they build around themselves. Without a strong wall, the bacteria burst open and die. It works especially well against *Staphylococcus aureus*, including the tough MRSA kind (methicillin-resistant *Staph aureus*, a strain that

ignores many common antibiotics). Bone infections often start with Staph bacteria, so vancomycin is a go-to choice when MRSA is suspected or proven.

Ceftriaxone

Ceftriaxone kills bacteria by blocking the enzymes (proteins that do chemical jobs) they need to build their cell wall. Without a strong wall, the bacteria cannot hold their shape and they fall apart. It covers a wide range of bacteria, including many gram-negative bacteria (a type identified by how they stain in the lab) that can cause bone infections, especially when the infection spreads from a nearby ulcer, surgical site, or through the bloodstream.

Piperacillin-tazobactam

Piperacillin kills bacteria by blocking the enzymes they use to build their cell wall, causing them to burst. Tazobactam protects piperacillin from being destroyed by enzymes (called beta-lactamases) that many bacteria make to defend themselves. Together, they cover a very broad range of bacteria, including many gram-negative bacteria and some that live without oxygen (anaerobes), making this combination useful when the infection involves multiple types of bacteria or the exact cause is not yet known.

Levofloxacin or Ciprofloxacin

Levofloxacin and ciprofloxacin kill bacteria by blocking enzymes (called DNA gyrase and topoisomerase IV) that bacteria need to unwind, copy, and repair their DNA. Without working DNA, the bacteria cannot multiply or survive. These drugs are especially useful for bone infections because they penetrate bone tissue well and cover many gram-negative bacteria and some gram-positive ones. They can be switched from IV to pills, which is helpful for the long treatment courses bone infections require.

Linezolid

Linezolid stops bacteria from making the proteins they need to survive and multiply. It works by blocking the very first step of protein assembly inside the bacteria. It is particularly useful against MRSA and other tough gram-positive bacteria, and it can be given by mouth (not just IV), which is helpful for long bone-infection treatments after the first few weeks of IV therapy.

Where this information comes from

- IDSA Clinical Practice Guideline for Osteomyelitis 2015
- CDC guidance on bone and joint infections
- American Academy of Orthopaedic Surgeons (AAOS)
- Cochrane reviews on diagnosis and treatment of osteomyelitis

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