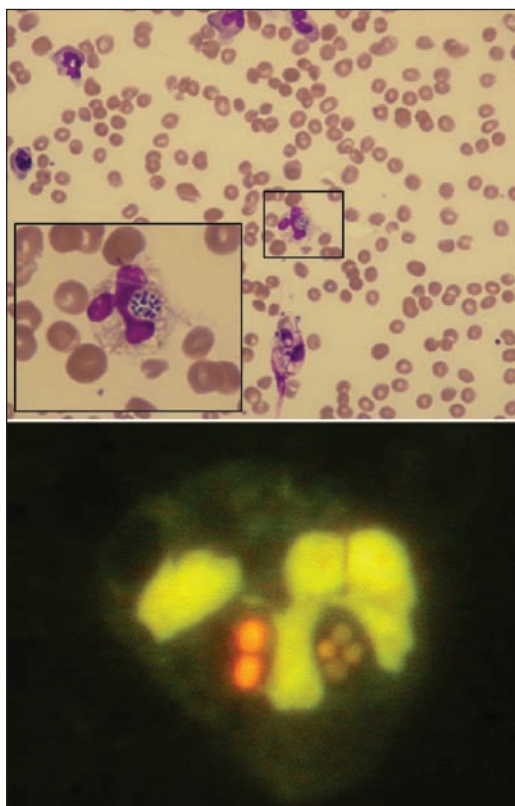


## CLINICAL VISTAS BRIEFS

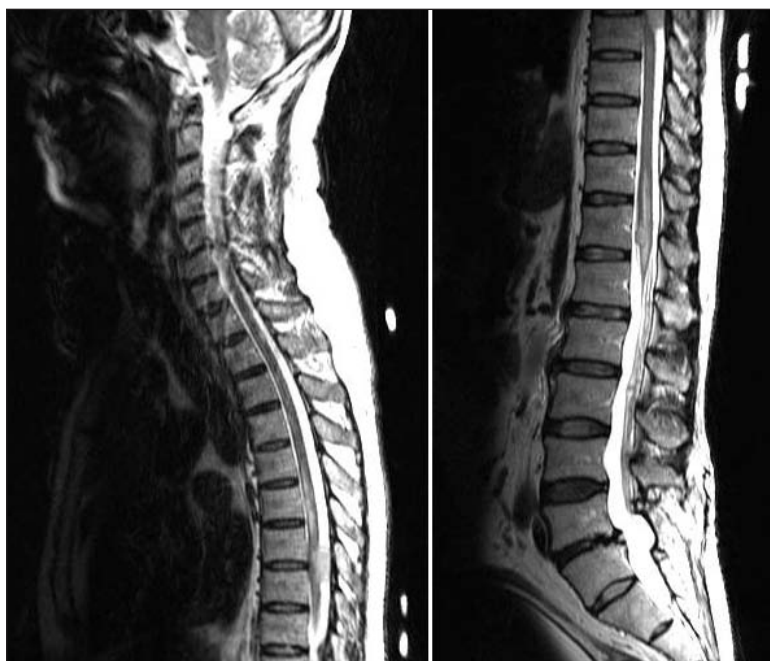
## What's your call?



Six weeks after a 49-year-old woman underwent an instrumented cervical fusion procedure, she experienced pain at her left iliac crest and weakness in her left hip. Plain radiographs show her pelvis in an anteroposterior view (left) and with the left hip in abduction (right).



Peripheral-blood smears with Giemsa (upper image) and acridin orange staining (lower image) from an 85-year-old woman, 20 days after a surgical repair of a perforated duodenal ulcer. She had recently begun to experience mental confusion, gastrointestinal blood loss and tachycardia.



MRIs of the spine of a 54-year-old man with a history of glioblastoma multiforme, who presented with new urinary frequency and urgency, thoracic-to-lumbar back pain and inability to walk.

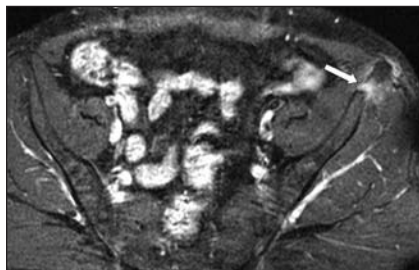
See page 476 for diagnoses.

## CLINICAL VISTAS BRIEFS

## Postoperative iliac-crest avulsion fracture

This patient, a smoker with cervical spondylotic myeloradiculopathy, had required a C4–C5 anterior cervical discectomy and fusion with a tricortical autograft harvested with a sagittal saw and osteotome from her left anterior iliac crest, and anterior cervical plate fixation. Six weeks after surgery her myeloradiculopathic symptoms had improved, but she was experiencing acute pain at her graft-harvest site despite no history of trauma. Plain film radiographs revealed an avulsion fracture of her left anterior superior iliac spine (ASIS), confirmed by MRI (Fig. 1).

Initially she was treated conservatively with modified activity, analgesics, anti-inflammatory medications and physical therapy. Two years later her pain was still present but much reduced, and a CT scan revealed bone healing at the fracture site (Fig. 2).



**Fig. 1:** Axial MRI of the pelvis, 6 weeks after the patient's autograft operation. It shows a left avulsion fracture (arrow) of the left anterior superior iliac spine, with edema at the fracture site.



**Fig. 2:** Axial CT of the pelvis 2 years after surgery, showing bone healing at the fracture site (arrow).

The iliac crest, which is rich in cancellous, cortical and corticocancellous bone stock and the osteocompetent cells necessary for optimal bone fusion, is a common donor site for bone grafts. Avulsion fracture of the ASIS is an uncommon adverse event after graft harvesting. More common complications at the ASIS after harvesting include neural and vascular injuries, hematoma, infection, chronic pain, and cosmetic defects. Avulsion fractures may occur because of altered stresses by the sartorius and tensor fascia lata muscles.

Although predisposing risk factors are not yet certain, the patients who seem to be at greatest risk of such fractures are those in whom graft material was harvested less than 5 cm from the ASIS (*Clin Orthop Relat Res* 1986;Aug:224-6) and in whom an osteotome was used (*Spine* 1993;18:2048-52). Reduced bone density may also play a role, since such fractures occur more often in women (6:1 females to males) who are mostly in the fifth decade of life (*J Oral Maxillofac Surg* 2004;62:781-6).

### Dino Samartzis

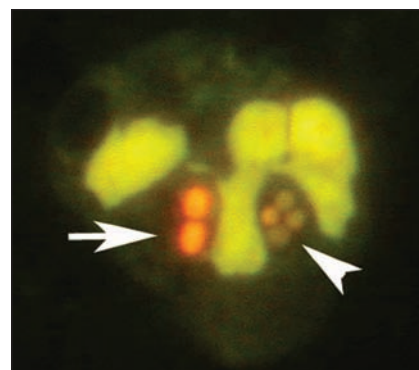
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## Polymicrobial sepsis

Our patient was not febrile, which is often the case for septic elderly patients (*Am J Med* 1996;100:65–70), but blood tests revealed leukocytosis ( $16.2 \times 10^9/L$ ; normal  $4.0-10.0 \times 10^9/L$ ) and an elevated neutrophil cell count ( $16.0$  [normal  $2.0-7.0$ ]  $\times 10^9/L$ ) with a left shift of 68.5% band forms (normal  $< 10\%$ ).

Bacteria are rarely seen in routine blood smears. In her case there were early indications of polymicrobial sepsis in a blood sample taken the day af-



ter the onset of her decline. Giemsa staining revealed neutrophils with ingested bacteria (Fig. 1, arrow). Gram staining was inconclusive, but acridin-orange staining showed bacteria with 2 different morphologies: cocci in tetrads (Fig. 2, arrowhead) and rods (arrow). Blood cultures ultimately grew Mitis-group streptococci and *Klebsiella pneumoniae*. Since *K. pneumoniae* are nonmotile, rod-shaped bacteria with a prominent polysaccharide capsule, and *Streptococcus* species are round cocci, these organisms were likely to correspond to those seen in the neutrophils.

The source of the organisms was unknown, but endoscopy did reveal small gastric erosions. Despite the administration of proton-pump inhibitors, packed red blood cells, fresh frozen plasma and antibiotics, her condition worsened; she died of septic shock 3 days after her decline.

Granulocytes and macrophages have evolved to ingest as many bacteria as possible and kill them with a combination of various microbicidal systems. The identification on blood smears of such phagocytes containing bacteria can allow early diagnosis of bacter-

emia, sometimes while results from blood cultures are still pending. In these very rare cases, ingested bacteria seen in granulocytes in a peripheral-blood smear should lead to early implementation of therapy for sepsis.

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## Drop metastases

Intradural extramedullary spinal metastases that arise from intracranial lesions are called drop metastases. This rare complication occurs in about 1% of patients who have glioblastoma multiforme (GBM), the most common form of malignant primary brain tumour (Fig. 1). The mechanism of spread is thought to be via cerebrospinal fluid when the tumour reaches and exfoliates cells into the subarachnoid space. Interventions such as surgical manipulation may enhance the likelihood of drop metastases, although it has also been reported in people who have never had surgery.

Perhaps because of gravitational effects, these lesions typically occur in the dorsal lower-thoracic to lumbar spine

(Fig. 2). Nerve roots, cauda equina, nerve root sleeves and the fundus of the thecal sac are also common sites of spread (*Surg Neurol* 1991;35:377–80). Most patients will complain of back pain with neurologic symptoms and signs.

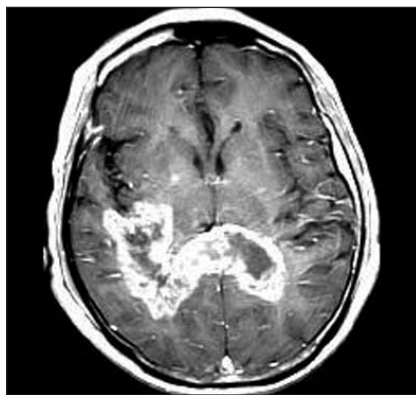
Because the lesions may be missed on x-ray films and sometimes on CT scans, the investigative method of choice is spinal MRI with contrast.

Depending on the location, size and number of lesions, the management of drop metastases may include neurosurgery, radiation and steroid therapy. However, the prognosis of such patients is poor.

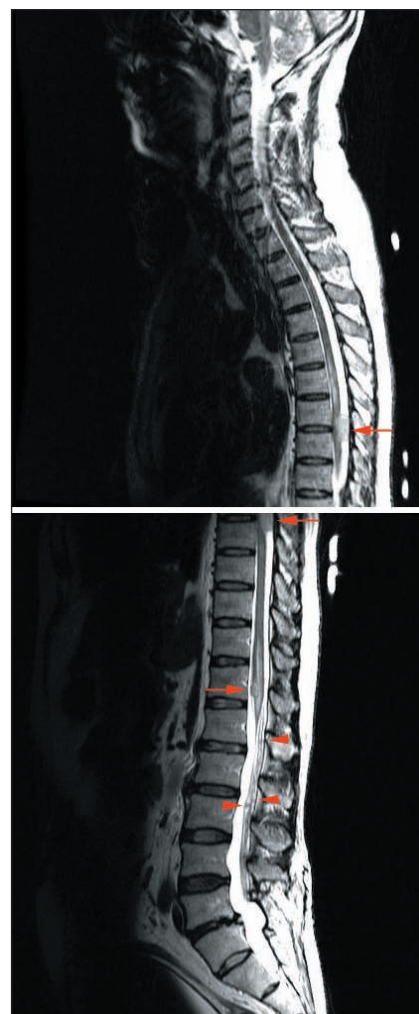
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DOI:10.1503/cmaj.060308



**Fig. 1:** MRI of the patient's brain, T1-weighted, with gadolinium.



**Fig. 2:** T2-weighted spinal MRIs. The 2 largest lesions are visible at the mid-T7–T8 and the T12 levels. Several smaller nodules can also be seen within the cauda equina.

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