

Figure 2. Membrane bound granules from middle ear biopsy. Uranyl acetate and lead citrate. $\times 21\,543$

have formed. The most common mediators are 5HT which causes diarrhoea and hypertension, and bradykinin which produces the classical carcinoid flush, hypotension and bronchospasm⁸.

The pharmacological blockade before the second operation produced conditions of cardiovascular stability during the anaesthetic, despite considerable tumour manipulation. There was minimal bleeding and this is of particular importance during middle ear surgery. Cyproheptadine is a potent anti-cholinergic drug with pronounced anti-serotonin effects. Ketanserin may reduce blood pressure by preventing amplification of the α_1 adrenergic receptor antagonism, or alternatively, by α_1 adrenergic receptor antagonism⁹. Parachlorophenylalanine is a specific inhibitor of tryptophan hydroxylase and decreases the production of serotonin. Aprotinin is a kalikrein trypsin inhibitor and blocks the formation of bradykinin. Previous reports of anaesthesia for the removal of carcinoid tumour suggest that

ketanserin may be a better drug than cyproheptadine in achieving cardiovascular stability¹⁰. Our experience suggests that a combination of these two drugs used in conjunction with aprotinin and parachlorophenylalanine provides good anaesthetic stability and represents a satisfactory regimen to use.

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Cryptococcal infection of the lumbar spine

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Cryptococcus neoformans is a fungus commonly found in droppings of many avian species and may infect human beings particularly the immunocompromised¹. In most cases the portal of entry is the respiratory tract, and from there other sites are involved via haematogenous spread. The central nervous system and the lungs are the commonest sites involved, while other internal organs, bone and muscles are seldom affected except in disseminated cryptococcal infection. We report a case of localized infection of the lumbar spine and the paraspinal muscles in an otherwise healthy subject.

Case report

A 27-year-old Chinese housewife, who lived in a suburban area, presented to an orthopaedic surgeon with a 2-month history of moderately severe localized low back pain. This was not preceded by trauma or lifting of heavy objects. There

was no weakness or sensory disturbance in the legs and sphincter functions were normal. Examination revealed only local tenderness at the lumbar spine and straight leg raising was full. Complete blood picture, erythrocyte sedimentation rate, renal and liver function tests as well as lateral and anteroposterior views of lumbosacral spine radiographs were normal. She was treated with analgesics and pelvic traction for 3 weeks with no improvement. Metrizamide myelography was then performed and showed prolapsed of L4/5 disc indenting mildly the theca but not the spinal roots. Analysis of the cerebrospinal fluid (CSF) revealed numerous red blood cells due to a traumatic tap, 10 WBC/ μ l (all lymphocytes), normal glucose and protein levels.

As her symptoms were not relieved by conservative treatment, anterior spinal fusion of the L4/5 level was performed. The pain, however, persisted and on the 5th postoperative day, a tender mass of about 30 mm in diameter was noted in the midline of her back at L2 to L3 region. The mass enlarged over the next few days despite antibiotic therapy. Computed tomography (CT) of L2 to L5 vertebra revealed erosion of the spinous processes and laminae of L2 and L3 and the transverse processes of L2, as well as abscess cavities in adjacent paraspinal muscles (Figure 1a, b and c). Surgical exploration of the back at the L2 and L3 region was carried out. An abscess with encapsulated walls containing thick yellowish pus was present in the paraspinal muscles and reaching the bone, but the dura was not involved. About 0.3 m³ of pus was aspirated and the abscess wall partially excised. Numerous round and capsulated yeast-like organisms were seen microscopically in the pus and abscess wall, and Indian-ink preparation and culture confirmed that these were *Cryptococcus neoformans*.

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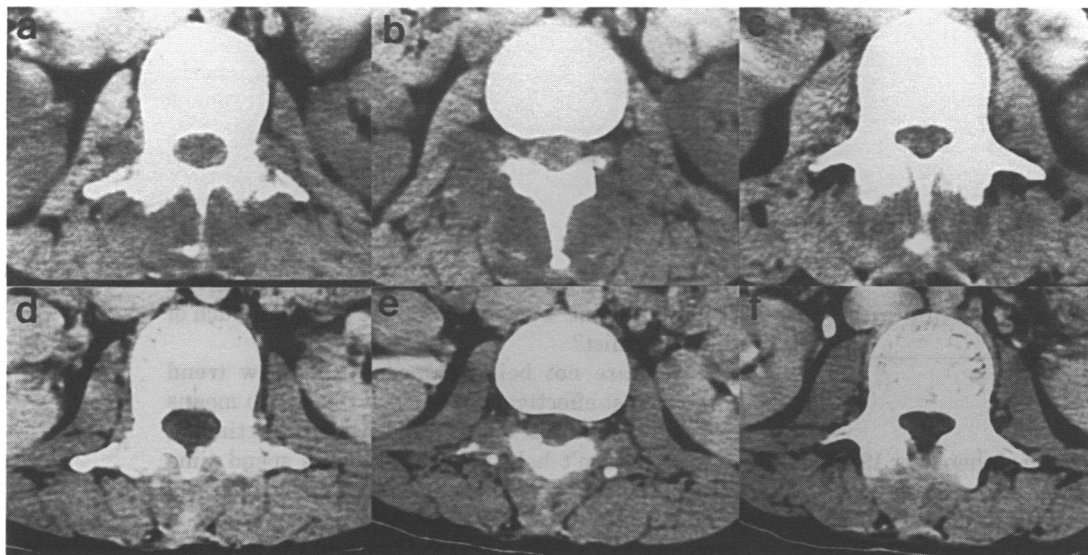


Figure 1. CT lumbar spine. Pre-treatment scans (plain) at (a) L2, (b) L2/3 and (c) L3 levels showing bone erosion of transverse processes of the L2 vertebra and spinal laminae, as well as abscess formation in the paraspinal muscles. Post-treatment scans (contrast-enhanced) at corresponding levels (d), (e) and (f). The hypodensities in the paraspinal muscles are no longer evident and bone erosion is arrested

She was transferred to Queen Mary Hospital for further management. The serum cryptococcal antigen titre was 1 : 320. Chest radiograph was normal. She was treated with a 7-week course of amphotericin B at 0.8 mg/kg/day and 5-fluorocytosine at 2.0 g daily. She became asymptomatic after 3 weeks' therapy and on completion of the treatment, a contrast-enhanced CT scan (Figure 1d, e and f) showed resolution of the hypodensities in the muscles and arrest of bone erosion. Lumbar puncture (LP) at L5/S1 level revealed clear CSF with an opening pressure of 0.15 m of water. The CSF was entirely normal with negative smear and culture for cryptococcus; the cryptococcal antigen titre was not elevated. The raised serum cryptococcal antigen titre reverted to normality after two months. Her immunoglobulins and T-lymphocyte functions showed no abnormality.

Discussion

Cryptococcosis localized at the lumbar spine and paraspinal muscles is a rare condition. Collins², in his study of 200 cases of cryptococcosis, identified 20 cases (10%) with bone involvement usually as part of disseminated infection. Nottebart *et al.*³ updated the data and estimated a 5% frequency of bone involvement in systemic cryptococcosis, a figure in close agreement with another study of 69 cases of cryptococcosis in which two (3%) had both bone and cutaneous involvement⁴. No particular bone is spared, but only 11 cases of infection of the spine have been reported^{2,5-13}. The thoracic spine was involved in isolation in two cases^{5,8}, in conjunction with the lumbar spine in one⁷ and with other bones in two^{2,8}. The cervical spine was infected along with the left ischium, left 9th rib and os calcis in one patient⁹. The lumbar spine was affected in isolation in two cases^{10,11} and with other bones in three^{2,12,13}.

The onset of skeletal cryptococcosis is usually insidious with a slow clinical progression¹⁴. Constitutional symptoms such as fever, malaise and weight loss may well be absent as in our patient. Often the first symptom is pain at the site of involvement. As a result of the close anatomical relation of the spinal cord and nerve roots to the vertebrae, pressure effect on these structures may also occur¹¹. A local fluctuant mass may develop and exploration of such a mass typically yields a thick gelatinous material which contains *Cryptococcus neoformans*. Histology of the lesion shows non-caseating granulomatous reaction with chronic inflammatory cell infiltrate. Langhan's giant cells and cryptococcus with its thick glistening capsule can be identified¹⁴. Radiography is often negative in early lesions though in gross lesions, osteolytic changes with minimal periosteal reaction and bony sclerosis are demonstrated. Computed tomography by virtue of its high resolution and

cross-sectional image display, would be expected to detect early changes and better define the extent of involvement. In our patient, the initial lumbosacral radiography was entirely normal, but subsequent CT scans delineated the extent of bone erosion and hypodensity in the muscles.

The portal of entry of the organism could not be ascertained in our patient with such localized cryptococcosis. Inoculation of the organism via the first LP was considered unlikely as the pain, presumably due to infection, predated the procedure, and the site of LP at L4/5 did not correspond to the site of infection (L2 and L3). Moreover meningitis would be a more likely sequel if there was inadvertent inoculation. It appears that the usual route of haematogenous spread from the lungs was probable, although the chest radiography was normal. This is analogous to the observation that in the majority of patients with cryptococcal meningitis, pulmonary lesion is not detected on radiographs¹⁵.

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