Not just a 'simple stroke'

W Russell, W Taylor, G Ray, J Gravil & S Davidson

Key Points
- A broad differential is important for all patients presenting with acute unilateral neurological deficit – stroke is not the only cause.
- A thorough history should elicit prodromal symptoms, raising the possibility of an infective or inflammatory cause.
- Chest X-ray is an essential investigation for any patient presenting with acute neurological deficit.
- Brain abscesses require prompt antibiotic therapy and early neurosurgical review in order to minimise the morbidity and complication rate.

Abstract
A 51-year-old man presenting with left arm weakness and slurred speech was referred to the acute medical team. Admission chest X-ray showed a cavitating lesion, which had not been present 2 weeks earlier. Systemic enquiry elicited a 2 month prodromal illness and back pain. Urgent CT of his head and chest revealed evidence of thoracic discitis spreading anteriorly into a pleural-based lung abscess and an intracerebral abscess causing his neurological deficit. He was transferred for urgent craniotomy and evacuation of a Streptococcus milleri abscess. Following several weeks of neurosurgical care and antibiotics he made a near full recovery.

Keywords
Streptococcus milleri, discitis, intracerebral abscess, stroke

Case report
A 51 year old joiner with no significant past medical history was referred to the acute medical unit with a suspected stroke. He had presented to his general practitioner having noticed a left sided weakness of his arm and face and some slurred speech on waking that morning. He denied head injury, headache or nausea but did describe a 2-month history of lethargy, weight loss, sweats, non-productive cough and lower back pain. His GP had investigated with a chest X-ray (CXR) 2 weeks previously, which had been reported as normal, although his C-reactive protein (CRP) was markedly elevated at 390 (normal range <6)

On admission his observations were unremarkable and he was afebrile. Examination revealed a left upper motor neurone facial nerve deficit, mild slurred speech and mild reduction of power in his left arm. The remainder of his neurological, cardiovascular, respiratory and abdominal examination were normal.

A chest x-ray undertaken on admission revealed a new large, cavitating lesion in the right lung (see figure 1). Blood tests revealed a white cell count of 8.7 x10^9/L and elevated CRP of 167 mg/L. He was initially given intravenous amoxicillin and clarithromycin, which was changed to intravenous co-amoxiclav, flucloxacillin and metronidazole the following day on microbiological advice.

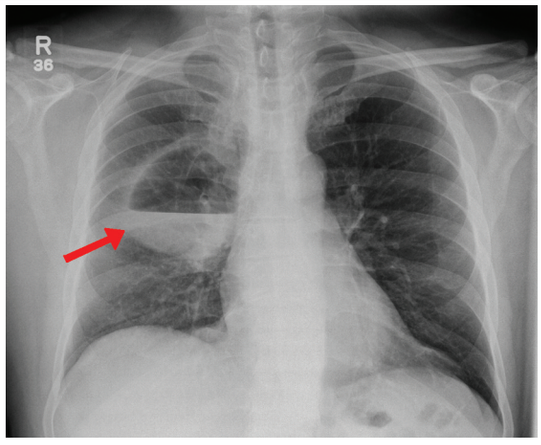

Figure 1. CXR on admission to medical unit showing large cavitating lesion right midzone (arrow).

An urgent contrast-enhanced CT scan of his chest and brain revealed evidence of discitis at the T4-5 level, extending into a 9x7x7cm pleural based lung abscess (see Figure 2). There was also a 4x4cm mass lesion in the right cerebral hemisphere (see Figure 3), with features suggestive of an intracerebral abscess.

Further history revealed 2 months of constant inter-scapular back pain. There were no risk factors for HIV and thorough examination revealed no signs of endocarditis or other source of infection.

He was transferred to the Neurological Institute for urgent craniotomy and evacuation of his intracerebral abscess. Cultures the aspirate grew *Streptococcus milleri*. HIV serology was negative, orthopantomogram was normal and transthoracic echocardiography show no vegetations or valvular abnormalities.

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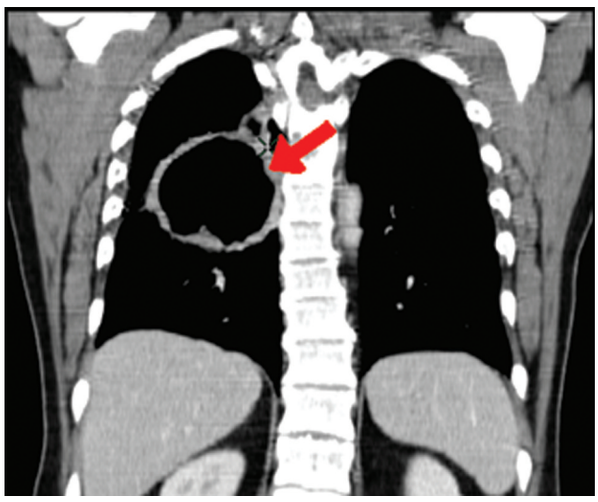

Figure 2. Resonstructed coronal slice from CT chest/abdo/pelvis showing large pleural based abscess arising from T4-5 discitis (arrows)

Subsequent MRI of his spine showed T 4-5 vertebral body erosion with gas present and disruption of the disc (see Figure 4). There was no evidence of extension into the spinal canal, and no cord compression. The lung abscess was drained under CT guidance.

He was treated with intravenous benzypenicillin and metronidazole for four weeks and the cerebral abscess required one further drainage procedure prior to discharge with almost complete neurological recovery. He received a further 2 weeks of oral antibiotics; follow-up CXR and inflammatory markers at 6 weeks were normal, with CT brain showing only minor enhancement visible at the site of the original abscess. The original source of infection remains unknown. (Figure 5)

Discussion

The advent of thrombolysis for the treatment of ischaemic stroke, along with the proven benefit of specialist stroke wards has radically changed the management of patients presenting to hospital with acute hemiparesis. There is increasing pressure for such patients to be transferred to an acute stroke ward as early as possible in their hospital stay. This case highlights the importance of a careful history in identifying patients with alternative causes of their neurological deficit. The combination of prodromal symptoms, systemic upset, raised inflammatory markers and an abnormal admission CXR raised the possibility of an infective cause for his symptoms, and prompted early initiation of antibiotic therapy.

Brain abscesses are a rare but important 'stroke mimic'. Headache and fever are the most common features, both seen in approximately 50% cases.[1] Nausea and vomiting, focal neurological deficits or altered mental state are also commonly described.[1,2] If the diagnosis is suspected an urgent contrast-enhanced CT of the head is indicated[3] with prompt antibiotic administration and input from the neurosurgical team. In almost all cases definitive management requires surgical drainage,[2,4] with a prolonged course of parenteral antibiotics and regular follow-up CT scanning.[5] Failure to provide prompt treatment may lead to rupture or consequences of raised intra-cranial pressure, including long-term neurological sequelae or death.[6]

This gentleman had presented to his GP several times in the months preceding his admission with back pain and systemic upset. Inflammatory markers were raised but a chest X-ray was normal. Back pain is common, affecting 70% people in their lifetime, and discitis is the cause in only 0.01% of patients presenting with this symptom in

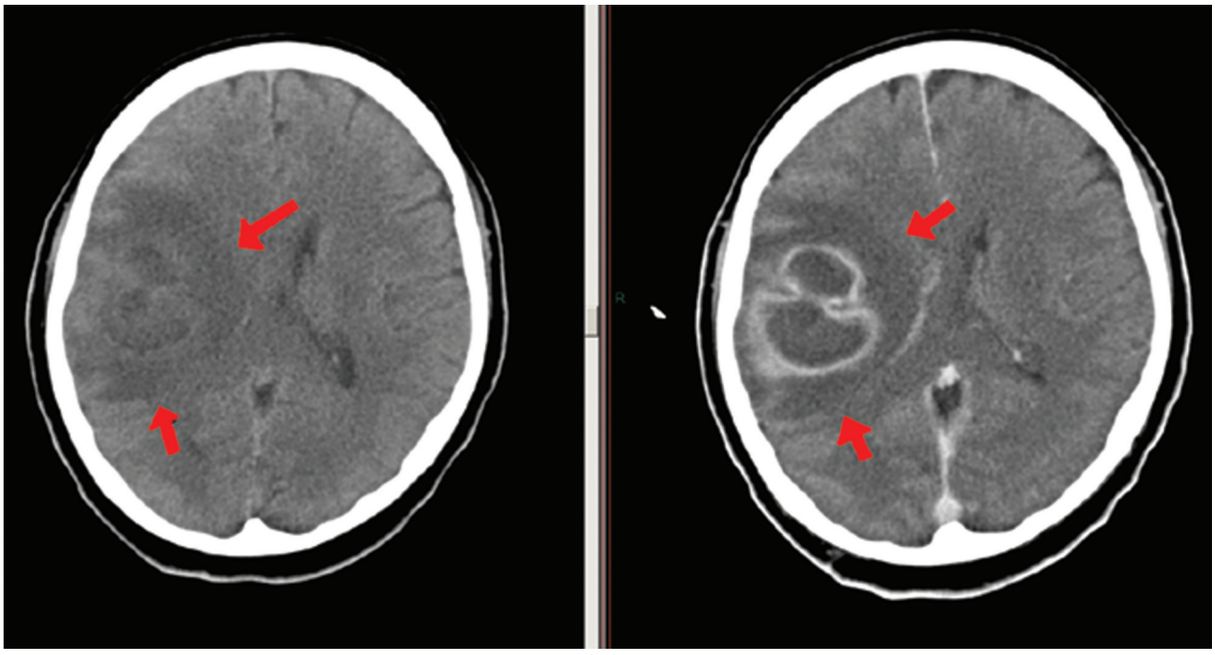

Figure 3. CT of brain, on the left without contrast and on the right contrast enhanced, showing large temporo-parieto-frontal abscess with mass effect (arrows).

- <20 or >55 years old
- Non-mechanical, pain in all directions, constant/progressive
- Violent trauma
- Thoracic level of pain
- History of cancer, steroids, HIV, IVDU
- Unwell, weight loss, fever/chills
- Neurological deficit
- Structural deformity
- Persistent night pain
- Saddle anaesthesia/sphincter disturbance

Box 1. 'Red Flag' signs and symptoms indicating serious underlying pathology.

the primary care setting.[7] So-called 'Red Flag' features should always be sought to identify serious causes of back pain (see Box 1). Infection is most commonly due to *Staphylococcus aureus*, Tuberculosis[8,9] or Streptococcus[9] species. This is usually spread to the disc via the metaphyseal arteries, causing infection of the endplates,

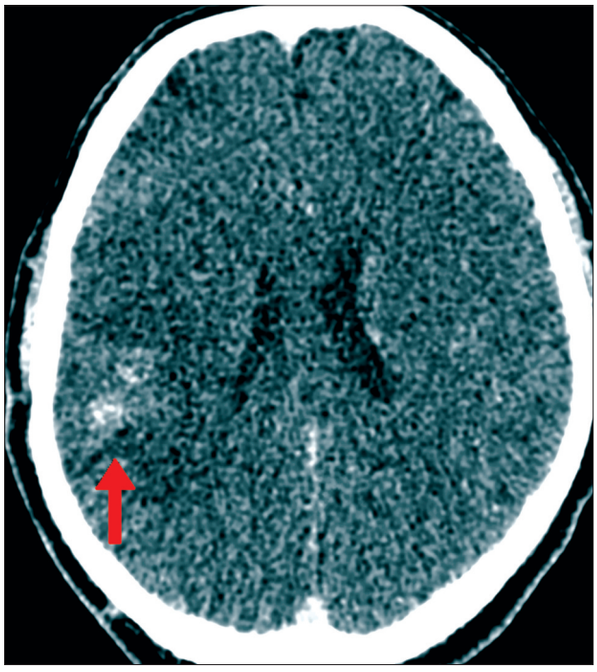

Figure 5. CT of brain at 6 weeks showing marked improvement in the size of the abscess (arrow).

Figure 4. MRI thoracic spine with gadolinium enhancement of T4-5 disc and vertebrae (arrow).

which can then spread locally. ESR and CRP are commonly raised; plain X-rays are often normal early in the disease and CT or MRI are required for diagnosis. Treatment is with parenteral antibiotics for 6-8 weeks and surgery is reserved for localised complications such as abscesses or failure of conservative treatment.[8,10] There are only 3 case reports of discitis spreading anteriorly to cause a pleural-based abscess,[11] although extension into the epidural space and surrounding soft tissues is a well recognised complication.

References

1. Brain abscess; clinical analysis of 53 cases. Kao PT, Tseng HK, Su SC *et al. J Microbiol Immunol Infect*. 2003; **36(2)**: 129–36.
2. Retrospective analysis of 49 cases of brain abscess and review of the literature. Carpenter J, Stapleton S, Holliman R. *Eur J Clin Microbiol Infect Dis*. 2007; **26(1)**: 1–11.
3. Diagnosis and management of brain abscess and subdural empyema. Bernardini GL. *Curr Neurol Neurosci Rep*. 2004; **4(6)**: 448–56.
4. Bacterial brain abscesses: an evaluation of 96 cases. Hakan T, Ceran N, Erdem I *et al. J Infect*. 2006; **52(5)**: 359–66.
5. Strategies for the management of bacterial brain abscess. Lu CH, Chang WN, Lui CC. *J Clin Neurosci*. 2006; **13(10)**: 979–85.
6. Clinical features and predictive factors of intraventricular rupture in patients who have bacterial brain abscesses. Lee TH, Chang Wn, Su TM *et al. J Neurol Neurosurg Psychiatry*. 2007; **78(3)**: 303–9.
7. Pyogenic vertebral osteomyelitis. Carragee EJ. *J Bone Joint Surg Am*. 1997; **79**: 874–80.
8. Spondylodiscitis. A retrospective study of 163 patients. Karadimas EJ, Bunger C, Lindblad BE *et al. Acta Othop*. 2008; **79(5)**: 650–9.
9. Infectious spondylodiscitis. Analysis of a series of 105 cases. Bontoux D, Codello L, Debiais F *et al. Rev Rhum Mal Osteoartic*. 1992; **59(6)**: 401–7.
10. Acute pyogenic diskitis (spondylodiskitis) in adults. Tyler KL. *Rev Neurol Dis*. 2008; **5(1)**: 8–13.
11. Compressive thoracic spondylodiscitis associated with pleural abscess: Surgical treatment through an enlarged posterior approach. Pascal-Moussellard H, Cousin A, Ribeyre D *et al. Eur J Orthop Surg Traumatol*. 2004; **14**: 165–8.