Fulminant pneumococcal meningitis manifesting as acute abdomen

Introduction

Pneumococcal meningitis has become the leading cause of bacterial meningitis in the past two decades. Usually it does not cause diagnostic problems in previously healthy people as the absence of the classic clinical triad of fever, nuchal rigidity and altered mental state eliminates the diagnosis (Attia et al, 1999; Weisfelt et al, 2006). However, atypical presentations – which are infrequently reported – may lead to delay in treatment and devastating consequences. This case adds to the spectrum of unusual presentations of this disease.

Discussion

Acute bacterial meningitis manifesting as acute abdomen is very rare. Pneumococcal meningitis is more likely to present with the classic triad of fever, nuchal rigidity and altered mental status than other meningitides (Weisfelt et al, 2006). The classic triad occurred in 44% of the cases although about 95% had at least two of the three symptoms (Weisfelt et al, 2006). Normal neurological examination in adults with low risk for meningitis almost excludes the diagnosis (Attia et al, 1999).

Acute abdomen as a salient manifestation of bacterial meningitis is very rare and only documented in three case reports (Defeler and Lawler, 1964; Saelinger et al, 1973; Schmid, 1998). To the best of the authors' knowledge, there is only one case report describing a patient with pneumococcal meningitis whose diagnosis was confused with appendicitis (Defeler and Lawler, 1964). It is suggested that acute abdomen might be referred pain as a result of radiculitis secondary to the meningeal inflammatory process surrounding the visceral afferent sensory neurons (Defeler and Lawler, 1964; Saelinger et al, 1973).

The authors hypothesize that this patient's acute abdomen may be caused by vasculitis affecting the bowel which has previously been described in a case report (Alkhasawneh and Dye, 2004). Her symptoms might have been a result of bacteraemia affecting the gastrointestinal tract which has been previously suggested (Petti et al, 2002). There have been two case reports of atypical presentations of bacterial meningitis, one with epididymitis and the other with stroke and minimal deficit but only with meningococcal meningitis (Davis and Scardino, 1972; Hsu and Kim, 1998).

Deterioration in patients with pneumococcal meningitis occurs rapidly and is unpredictable as it is frequently associated with either neurological sequelae or systemic compromise, which this patient developed (seizures, infarctions, septic shock, disseminated intravascular coagula-

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Case Report

In January 2007, a 21-year-old woman presented to the emergency department with abdominal pain, fever, nausea, vomiting and diarrhoea for 6 hours. She had no other associated symptoms with unrevealing previous history. On examination she was ill-looking, conscious and oriented, with a temperature of 39.2°C, blood pressure 96/52 mmHg and pulse rate 140 beats per minute, and had clinical evidence of dehydration. Her abdomen was rigid, mainly in the right lower quadrant, with sluggish bowel sounds. The rest of the clinical examination was normal including the neurological examination. The results of blood tests were white blood cell count= 19 x 10^9/litre (normal range (NR) 4–11x 10^9/litre) with 91% neutrophils, sodium 138 mmol/litre (NR 135–145 mmol/litre), potassium 3.4 mmol/litre (NR 3.5–5 mmol/litre), serum glucose 7.1 mmol/litre (NR 4–6 mmol/litre). A chest radiograph was normal; the abdominal X-ray showed dilated bowel loops and no free gas under the diaphragm.

The initial differential diagnosis was gastroenteritis *vs* acute appendicitis. The normal abdominal ultrasound and normal computed tomography (CT) scan made the diagnosis of appendicitis very unlikely. The patient was admitted as a case of gastroenteritis and improved on intravenous hydration, pain control, and intravenous ciprofloxacin 400 mg 12-hourly and metronidazole 500 mg 8-hourly.

Twenty-nine hours after admission she complained of headache, became increasingly lethargic and febrile (39°C), and the abdomen was still rigid. Her level of consciousness deteriorated with Glasgow Coma Scale of 8/15 (eye opening 2/4, verbal response 2/5 and motor response 4/6) and nuchal rigidity was obvious at this stage. Formal neurological exam was not feasible because of the patient's condition, but she was moving all her limbs and had no obvious clinical evidence of lateralizing signs.

Bacterial meningitis was suspected and treated with intravenous dexamethasone 6-hourly, ceftriaxone 2 g 12-hourly and vancomycin 1 g 12-hourly. An hour later, while awaiting a CT scan she developed tonic clonic seizures with fixed dilated pupils and was transferred to the intensive care unit where she was immediately intubated and ventilated. CT of the brain was normal (*Figure 1*). Lumbar puncture revealed a total cell count of 80 x 10^9/litre with 52% polymorphs and 48% mononuclear cells, protein concentration 8.3 g/litre (NR 0.1–0.4 g/litre), glucose concentration was $<$0.03 mmol/litre (NR $<$20 mg/dl), and Gram staining of CSF showed Gram-positive diplococci. Subsequently, CSF and blood cultures yielded *Streptococcus pneumoniae* sensitive to penicillin so she was given intravenous penicillin G 4 million units 4-hourly.

Over 2 days she developed septic shock requiring inotropes, and remained in a deep coma. Magnetic resonance imaging of the brain showed diffuse leptomeningeal enhancement and multiple infarctions in both cerebral hemispheres, the brainstem and cerebellum (*Figure 2*). Unfortunately the patient never regained consciousness and 5 days after presentation she died despite all supportive measures.

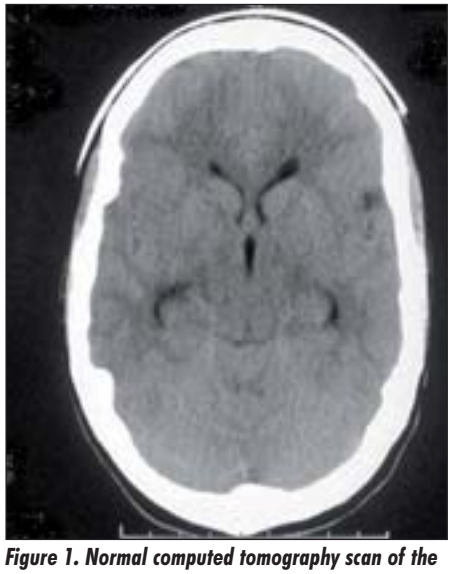

Figure 1. Normal computed tomography scan of the brain.

tion and eventually deep coma) (Kastenbauer and Pfister, 2003; Ostergaard et al, 2005). The patient might develop a deep coma as illustrated in this case. In this situation computed tomography or magnetic resonance imaging of the brain is mandatory before performing lumbar puncture to exclude serious complications like acute hydrocephalus, subdural or epidural collection, cerebritis, brain abscess and stroke (van de Beek et al, 2004). The elderly, the very young and the immunocompromised often present with subtle findings of meningitis (Menaker et al, 2005), but this patient presented with acute abdomen which is not the usual presentation of a healthy young adult.

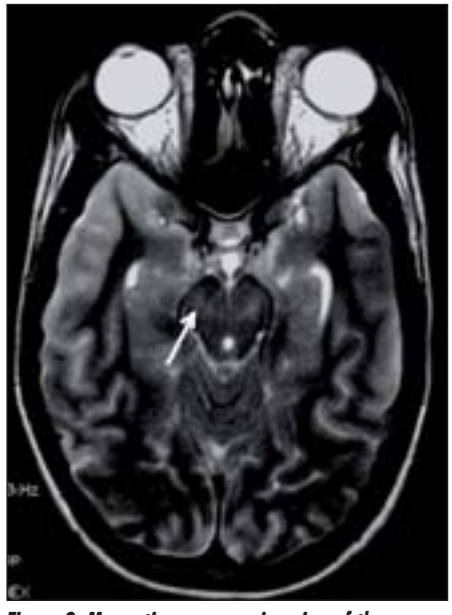

Figure 2. Magnetic resonance imaging of the brain showing bilateral brainstem infarction and enhanced leptomeninges.

Conclusions

Acute abdomen may antedate other typical manifestations of bacterial meningitis. Physicians should maintain a high degree of suspicion because what is usually a common symptom could be the first presentation of a serious and often fatal condition. Delayed diagnosis in such cases may result in a catastrophic outcome as illustrated in this case. This is vital as pneumococcal meningitis still carries a high morbidity and mortality despite the availability of effective antibiotic and modern supportive care facilities. **BJHM**

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