Gingivitis, facial weakness and focal seizures

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The patient was a 58-year-old previously fit and well Caucasian woman. Two weeks previous to her initial assessment, the patient complained to her husband of sore gums and throat. After this had continued for one week, she consulted her general practitioner who diagnosed pharyngitis and noticed the presence of mild left-sided facial weakness. The next day she was no better and was referred to the local Casualty Department. The assessing doctor noticed a markedly swollen left lip and diagnosed an allergic reaction to a new brand of lipstick the patient had used some days earlier.

A week later, when the patient was reviewed routinely, she had developed a mild left-sided upper motor neuron VIIth cranial nerve palsy and mild pyramidal weakness down the left side. An urgent neurological opinion was arranged. Unfortunately, before she was seen by the neurologists, she re-presented to the Casualty department with focal seizures affecting the left arm and face. Initial investigations revealed a normal full blood count and electrolytes and a raised erythrocyte sedimentation rate at 39 mm/h. Cranial computed tomography (CT) demonstrated a single ring-enhancing lesion in the right cerebral hemisphere (figure 1). She was immediately transferred to the local Neurosurgical Centre where a stereotactic biopsy was performed. From this, pus was aspirated and a formal craniotomy was arranged. A modified Ziehl–Neelson stain of the pus is shown (figure 2).

Figure 1 CT scan demonstrating a single ring-enhancing lesion in the right cerebral hemisphere

Figure 2 Modified Ziehl–Neelson stain of pus aspirated from the lesion

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Questions

- 1 What is demonstrated in the pus smear?
- 2 What is the diagnosis?
- 3 What other major organ system should be investigated?

Answers

QUESTION 1

Modified Ziehl–Neelson staining of pus from the stereotactic aspiration shows a network of weakly acid-fast beaded narrow branching filaments on a background of polymorphs. The appearance of these organisms is typical of *Nocardia* and acid-fastness is a helpful characteristic separating it from the morphologically similar but non-acid-fast actinomycete organisms. A heavy pure growth of a filamentous Gram-positive organism was isolated on aerobic media after 48-h incubation. All anaerobic cultures were sterile. The organism was identified by routine laboratory methods² and confirmed as *Nocardia asteroides* by Dulwich Public Health Laboratory Regional Centre for Tuberculosis Bacteriology, London. Antibiotic susceptibility testing showed the isolate to be resistant to penicillin, chloramphenicol, trimethoprim, sulphamethoxazole, co-trimoxazole, ampicillin, minocycline, and erythromycin and sensitive to imipenem, ciprofloxacin, co-amoxiclav, amikacin, and cefotaxime. Blood cultures obtained pre-operatively proved to be sterile.

QUESTION 2

Brain abscess due to *Nocardia*.

Cerebral abscess due to *Nocardia* is associated with a mortality rate more than three times that of abscesses due to other bacteria (streptococci, staphylococci and anaerobes). Also, unlike other abscesses, craniotomy and excision of the entire abscess and wall is usually more effective than antibiotics or aspiration with drainage alone.

QUESTION 3

The respiratory tract. The organisms are usually introduced through the respiratory tract and pulmonary infection is the commonest form of nocardiosis. A CT scan of the thorax in this patient was unremarkable; in particular, no abscesses or cavitating pulmonary lesions (commonly observed in pulmonary nocardiosis) were detected.

Treatment

The organism in this case was resistant to sulphonamides, co-trimoxazole (rarely reported), and minocycline. Intravenous imipenem–cilastatin was administered without problems but the choice of agents for continuing oral therapy was difficult. Eventually, an empirical combination of co-amoxiclav and ciprofloxacin was chosen.

A routine CT of the thorax was unremarkable but a cranial scan 10 days later showed a recurrence of the abscess. Despite the abnormal findings on scan, the patient was well and referred back to the neurosurgeons for complete excision of the abscess. She made a good recovery and continued on oral co-amoxiclav with ciprofloxacin. As yet, no further problems have arisen.

Discussion

Nocardia are branching, weakly acid-fast, higher bacterial organisms that inhabit the soil. Most human infections are caused by *N. asteroides*. Although pulmonary infection is the commonest clinical form of nocardiosis, occasionally the alimentary tract is penetrated, especially the appendix, and rarely after dental trauma. Involvement of the central nervous system occurs in approximately one-third of patients with nocardial infection and brain abscess is the commonest presentation.¹ This case is unusual because no evidence of pulmonary infection was found and we believe that gingivitis was the primary site of infection.

One of the difficulties in the treatment of nocardial brain abscess is the lack of strong clinical data defining the optimal treatment regimen. Nevertheless, sulphonamides, alone or in combination with trimethoprim are the most effective and should be continued for several months. Recommended second-line agents in cases of allergy or resistance include minocycline, imipenem or aminoglycoside in combination with a third-generation cephalosporin.³

The successful management of nocardial brain abscess remains problematic. Despite improvements in imaging techniques and surgical therapy, nocardial brain abscesses remain difficult to cure. Unlike other bacterial brain abscesses, craniotomy and excision of the entire abscess and wall is usually more effective than aspiration and drainage,³ particularly when they have not responded to antibiotic therapy (as in this case). Susceptibility of *Nocardia* to antimicrobial agents varies considerably from strain to strain, and *in vitro* testing of the infecting organism is important.

Final diagnosis

Brain abscess due to *Nocardia asteroides*.

Keywords: *Nocardia asteroides*, brain abscess

1 Lerner PI. *Nocardia* species. In: *Principles and practice of infectious diseases*. Churchill Livingstone, 1995; pp 2273–80.
2 Cowan ST, Steel KJ. *Manual for the identification of medical bacteria*. Cambridge: Cambridge University Press. 1993.

3 Mamelak AN, Obana WG, Flaherty JF, Rosenblum ML. Nocardial brain abscess: treatment strategies and factors influencing outcome. *Neurosurgery* 1994; 35: 622–31.