A curious case of confusion

Natalie Joyce1, Kavil Patel1, Andrew Whitehead1, Richard Armstrong2, Nilangi Virgincar3 and Apurba Chatterjee1

1Department of Elderly Care, Royal Berkshire NHS Foundation Trust, London Road, Reading RG1 5AN, UK
2Department of Neurology, Royal Berkshire NHS Foundation Trust, London Road, Reading RG1 5AN, UK
3Department of Microbiology, Royal Berkshire NHS Foundation Trust, London Road, Reading RG1 5AN, UK
Corresponding author: Apurba Chatterjee. Email: apurba.chatterjee@royalberkshire.nhs.uk

Lesson
Delirium secondary to pneumonia is expected in the elderly, but when persistent and incongruent with expectation, cerebral abscess should be considered.

Keywords
Cerebral abscess, delirium, pneumonia

Case report
A functionally independent 89-year-old woman with a background of hypertension, atrial fibrillation and diverticular disease presented with delirium.

On examination, she was drowsy, pyrexial, tachycardic and desaturating in air. Auscultation revealed an ejection systolic murmur and crepitations in the right lung. Abdominal examination was normal. Neurological examination was unremarkable. Inflammatory markers were raised and chest radiograph revealed consolidation in the right mid-zone. Delirium secondary to community-acquired pneumonia was diagnosed and intravenous teicoplanin and clarithromycin commenced, following hospital guidance for penicillin allergy.

Despite 72 h of treatment, she remained unresponsive and pyrexial, with rising inflammatory markers. Antibiotics were changed to aztreonam and teicoplanin for four days, with linezolid for two days, to which there was a good biochemical response. Blood cultures on admission (BacT/Alert 3D, Biomerieux) and three subsequently were all negative. Coliforms were isolated from urine. Streptococcus pneumoniae and Legionella pneumophila serogroup 1 urinary antigens were negative (Alere BinaxNOW®). Transthoracic echocardiogram identified no valvular lesion or vegetation. Due to frailty, antiocoagulant state and number of abscesses, Anti-Toxoplasma gondii total immunoglobulin (VIDAS® TOXO Competition) and Hydatid serology were also negative.

Our patient’s clinical condition began to improve from day 20 onwards, with subsequent brain imaging on day 27 showing reduced abscess size with intense rim enhancement.

Discussion
Cerebral abscess is a relatively rare diagnosis with significant morbidity and mortality.1 The majority originates from infection of contiguous cranial structures (40–50%), followed by haematogenous spread from a remote site. Immunosuppression secondary to transplant or chemotherapy also increases risk of infection from atypical organisms. However, in at least 15% of cases, no source can be identified.2

Pneumonia is a common diagnosis in the elderly; however, the literature reflects the rarity with which cerebral abscesses are a complication.1 In our patient,
the initial focus of sepsis was pulmonary. We believe therefore that haematogenous spread from this site is the most likely route of infection given the diffuse distribution of lesions and lack of other risk factors. In such cases, the most frequently isolated microorganisms are streptococci and staphylococci species.3–5

Conservative management of cerebral abscesses carries a higher risk of mortality over neurosurgical intervention; however, success has been seen with early initiation of treatment.3,6 Guidance for the duration of treatment remains limited, with four to six weeks’ intravenous antibiotics widely considered appropriate when the organism is unknown.3 Serious complications include intraventricular rupture, with survivors at increased risk of recurrence, and neurological sequelae including hemiparesis, cognitive dysfunction and 30–50% risk of seizure.7

**Conclusion**

Many elderly patients who present with pneumonia and delirium might have features of reduced conscious level, pyrexia and headache, which are consistent also with cerebral abscesses. Although there is no indication to consider brain imaging in the short term, should the confusion persist despite appropriate therapy, cerebral abscess should be considered and investigated appropriately.

**Key points**

1. Cerebral abscess originating from a distant site is extremely rare.
2. Pulmonary infection is common, with which delirium is also a common complication in the elderly.
3. In cases where delirium is out of keeping with the clinical picture, brain imaging should be considered to investigate other causes.

**Declarations**

**Competing interests:** None declared

**Funding:** None declared

**Ethical approval:** Written informed consent for publication was obtained from the patient’s next of kin.

**Guarantor:** AC

**Contributorship:** All authors were directly involved with the care of the patient. NJ, AW and KP drafted and revised the report. RA and NV provided specialist consultation and proofread. Overall supervision was provided by AC.

**Acknowledgements:** None

**Provenance:** Not commissioned; peer-reviewed by Kevin Kerr

**References**

1. Roche M, Humphreys H, Smyth E, et al. A twelve-year review of central nervous system bacterial abscesses; presentation and aetiology. Clin Microbiol Infect 2003; 9: 803–809.
2. Arlotti M, Grossi P, Pea F, et al. Consensus document on controversial issues for the treatment of infections of the central nervous system: bacterial brain abscesses. Int J Infect Dis 2010; 14(Suppl 4): S79–S92.
3. Hakan T, Ceran N, Erdem I, Berkman MZ and Göktaş P. Bacterial brain abscesses: an evaluation of 96 cases. J Infect 2006; 52: 359–366.
4. Khatib R, Ramanathan J and Baran J Jr. Streptococcus intermedius: a cause of lobar pneumonia with meningitis and brain abscesses. Clin Infect Dis 2000; 30: 396–397.
5. Mishra AK and Fournier PE. The role of streptococcus intermedius in brain abscess. Eur J Clin Microbiol Infect Dis 2013; 32: 477–483.
6. Rosenblum ML, Mampalam TJ and Pons VG. Controversies in the management of brain abscesses. Clin Neurosurg 1986; 33: 603–632.
7. Xiao F, Tseng MY, Teng LJ, Tseng HM and Tsai JC. Brain abscess: clinical experience and analysis of prognostic factors. Surg Neurol 2005; 63: 442–450.