

Introduction:

Brain abscesses have an incidence of 0.3–1.3 / 100,000 population with 2–5% being dental in origin¹. *Streptococcus anginosus* is a pathogen widely associated with cerebral abscess. *S.anginosus* is a highly virulent α -hemolytic gram-positive member of the *Streptococci viridans* group, also known as the *Streptococcus milleri* group. *S.anginosus* is a commensal microbe of the oropharynx, gastrointestinal and urogenital tract. While cerebral abscesses are rare, risk factors for infection include immunosuppression, penetrating trauma and invasive neurosurgical procedures. Contiguous spread to the brain is classically associated with a focus of infection within the oral cavity, sinusitis, and mastoiditis. Compared to other Streptococci species, *S.anginosus* cerebral abscesses invariably require aggressive neurosurgical intervention and prolonged courses of antimicrobial therapy. *S.viridans* species are typically susceptible to penicillin and beta lactams are generally effective.

Case Presentation

We report the case of a 60 year old Aboriginal gentleman presenting to a tertiary Australian hospital with a 24 hour history of right upper limb weakness, worsening confusion and headache. Family reported patient was confused and nonsensical for two days prior to his admission. He reported worsening blurred vision in his right eye associated with multiple falls in the days preceding admission. On the morning of presentation, patient was noted for right upper limb weakness and clumsiness. A collateral family history also revealed patient had a recent respiratory tract infection and complained of a cough productive of yellow sputum and haemoptysis for several months.

Patient was febrile to 38.2°C and tachycardic to 120bpm on admission. All other vital signs were within normal range and GCS was 14/15. Neurological exam was notable for a right inferior quadrantanopia without diplopia or nystagmus. Tone, power, coordination, sensation and reflexes were grossly intact. Auscultation revealed coarse crackles bilaterally and patient had grade 4 finger clubbing. Heart sounds were dual with nil added sounds. Examination of the oral cavity revealed poor dentition with multiple dental caries. The remainder of the clinical exam was unremarkable.

Differential Diagnosis:

Cerebral Infarction and haemorrhage
Primary CNS malignancy or secondary metastasis
Intracerebral abscess: bacterial, mycobacterial or fungal
Synchronous cerebral and respiratory infection e.g. <i>Pseudomonas</i> , <i>Burkholderia</i> or <i>Nocardia</i> infections.

Further workup :

Past medical history was notable for previous *Acinetobacter baumannii* pneumonia, *Mycobacterium avium complex* and *Pseudomonas aeruginosa* colonisation, bronchiectasis, urogenital syphilis, NSTEMI and ischaemic heart disease. Full blood count on admission revealed Hb 96, WCC 17.8, Neutrophils 13.2 and CRP 77. Respiratory BioFire was negative. A chest x-ray demonstrated bilateral mid-lower zone opacifications. On arrival, a non contrast CT brain revealed a 19mm x 15mm x 24mm lobulated left occipital hyperdense lesion with surrounding oedema (**Fig 1**). A subsequent MRI brain demonstrated a left occipital lobulated cystic intra-axial lesion with well-defined margins compatible with a left occipital cerebral abscess (**Fig 2**).

Investigations:

X3 sets peripheral blood cultures: negative
Blood borne virus serology -HIV, Hepatitis B & C: negative
Cryptococcal antigen: negative , serum galactomannan <0.06
<i>Toxoplasma gondii</i> IgM neg / IgG neg
BAL washings: Nocardia, Aspergillus, Mycobacteria and <i>B.pseudomallei</i> : negative . <i>Candida albicans</i> : positive
<i>T. pallidum</i> (antibody pos /RPR neg), Strongyloides IgG ratio elevated at 2.73 , <i>B.pseudomallei</i> titre 80

Fig 1: Non contrast CT brain

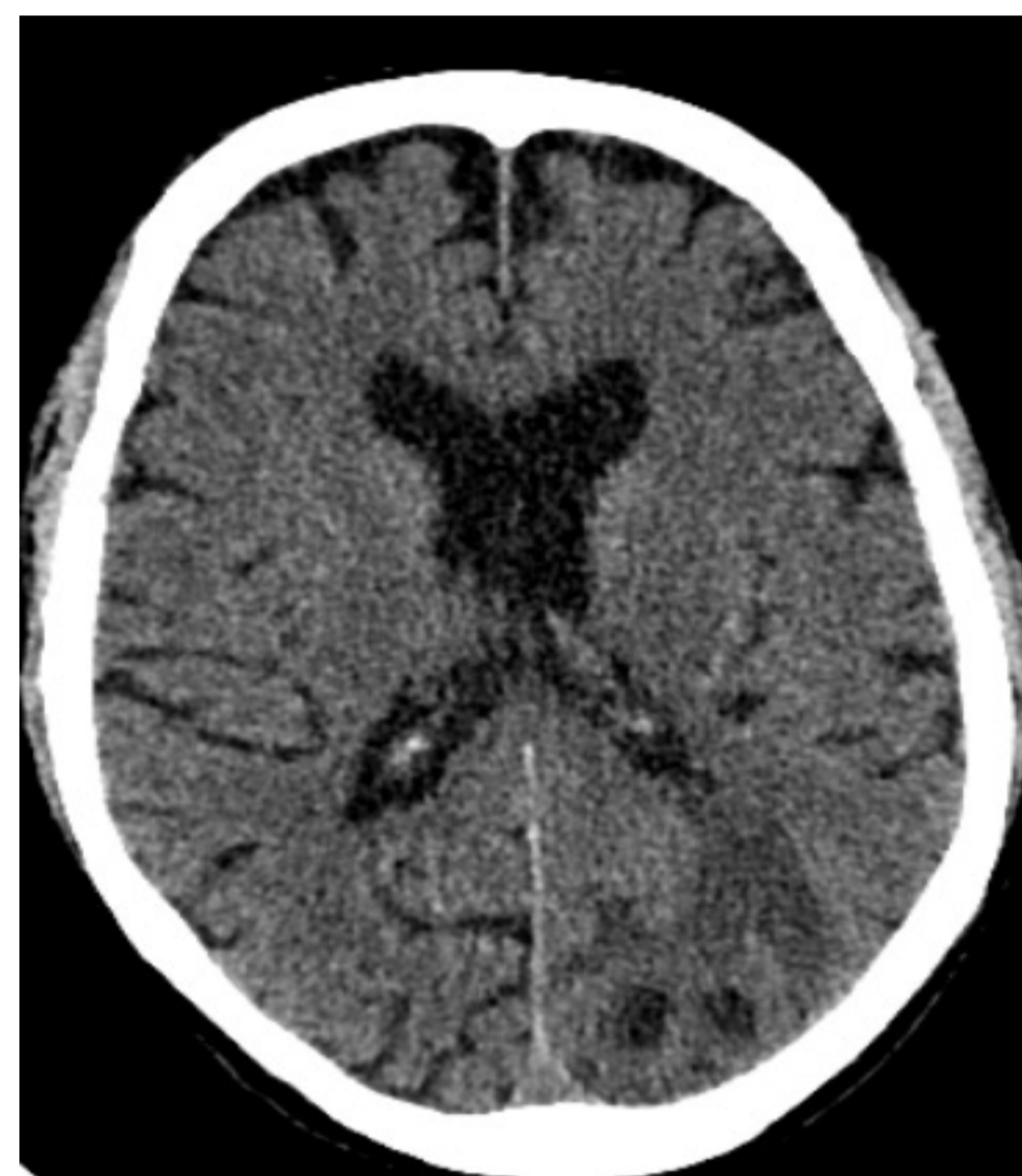
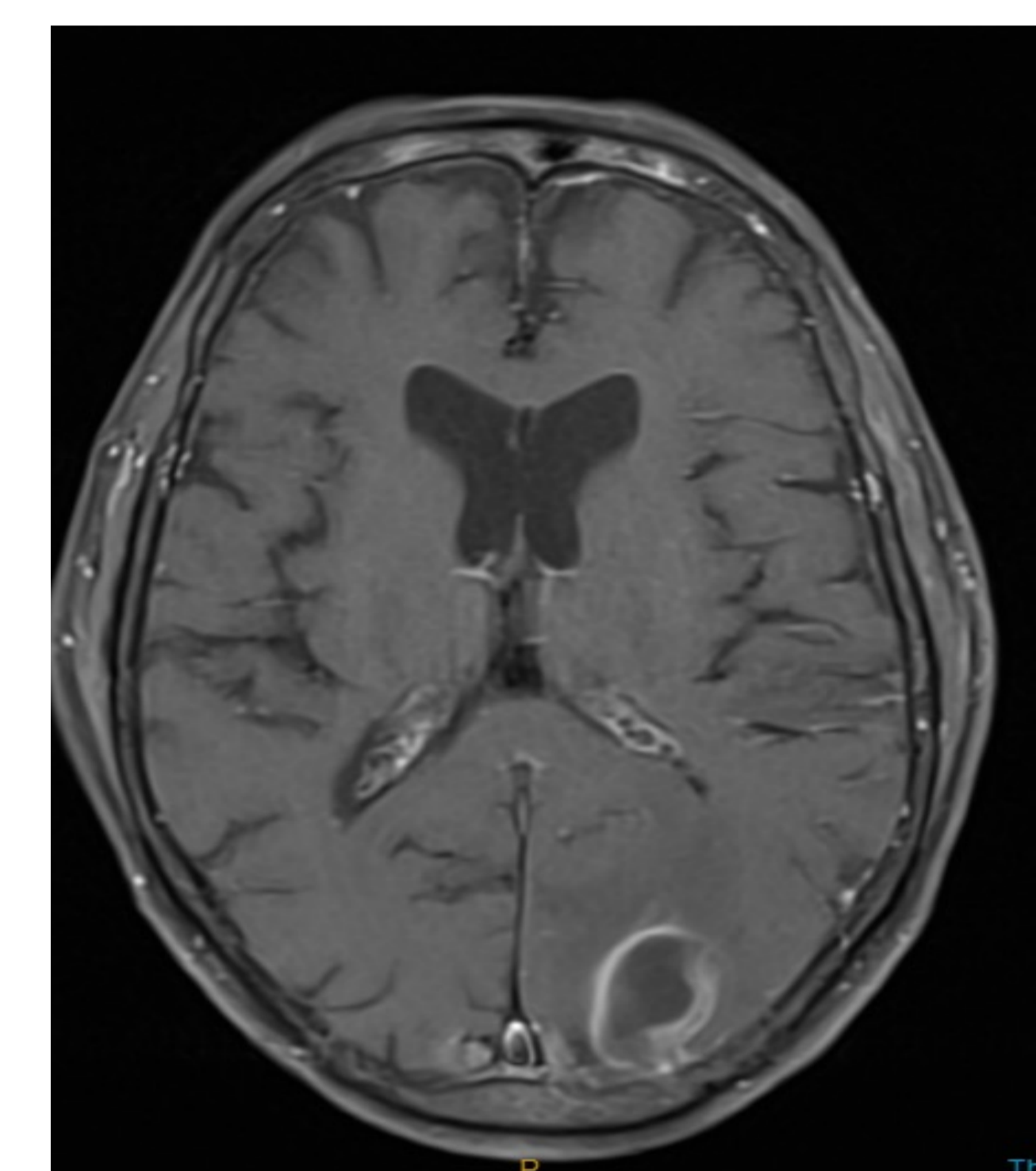


Fig 2: MRI Brain T1 weighted



Management:

Patient was initially commenced on IV ceftriaxone and azithromycin in a peripheral hospital prior to transfer to Royal Perth Hospital. Case was discussed with neurosurgery post CT findings who advised conservative management with serial neuro-imaging in conjunction with dexamethasone 4mg IV tds and leviteracetam 500mg po BD. Patient underwent a CT thorax abdomen and pelvis revealing progression of bilateral bronchiectasis and airway inflammation suggestive of an atypical infection.

On the basis of CT, MRI findings and previous colonisation history the patient's antimicrobial cover was escalated to IV meropenem 1G TDS and vancomycin on discussion with the Infectious Diseases team. Patient underwent bronchoscopy to obtain a microbiologic diagnosis presuming a possible unifying pulmonary-cerebral infection. Bronchoalveolar lavage washings isolated *Candida albicans* only however this was deemed not clinically significant. A short interval MRI demonstrated progressive enlargement of occipital lobe abscess to 44mm x 35mm x 26mm and patient underwent emergency left occipital burr hole with copious irrigation and evacuation of the cerebral abscess.

An aspirate of the cerebral abscess taken intraoperatively yielded abundant growth of *Streptococcus anginosus* sensitive to ceftriaxone and penicillin. Antibiotics were rationalised according to sensitivities and patient was commenced on IV ceftriaxone 2G BD and metronidazole 400mg PO TDS. Patient was discharged home on outpatient antimicrobial therapy and completed a total of 6 weeks IV therapy. Follow up MRI revealed significant reduction in size of abscess and mass effect. Patient continues to be followed up in clinic and remains clinically well.

Conclusions:

- Cerebral abscesses are a rare clinical entity and remain challenging to treat given their often insidious nature and the variability of drug CNS penetration.
- This case highlights the importance of considering the *Streptococci viridans* group including *S.anginosus* as a potential causative organism in patients presenting with evidence of cerebral abscess with known or suspected dental caries as a focus for contiguous spread.
- Finally, it underscores how early recognition and prompt treatment of cerebral abscess secondary to *S.anginosus* infection with appropriate antimicrobial cover and surgical source control can lead to favourable outcomes in this patient population.