

Cerebral venous thrombosis: a case report

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Section: Neuroradiology

Area of Interest: Head and neck

Procedure: Education

Procedure: Diagnostic procedure

Imaging Technique: MR

Special Focus: Ischaemia / Infarction Inflammation

Case Type: Clinical Cases

Authors: Gasim Ahmed, John McManus

Patient: 15 years, male

Clinical History:

A 15-year-old male patient presented with headache, earache, papilloedema and left upper limb monoplegia. He had no fever, rash, or seizures. Full blood count, coagulation, renal, liver, antithrombin III, protein C/S levels were normal. Vasculitic, anti-phospholipid and syphilitic screen were negative. D-Dimer was 1.25 (normal range<0.5). Otoscopy revealed right-sided otitis media.

Imaging Findings:

Chest X-ray was normal. A brain CT scan showed no acute abnormality. A contrast MRI-brain showed right-sided mastoiditis and a right transverse and sigmoid sinus non-occlusive thrombus (Fig. 1). A clinical diagnosis of a stroke secondary to cerebral venous thrombosis as a complication of mastoiditis and otitis media was made. Anticoagulation and appropriate antibiotic cover was initiated. Symptomatic and motor improvement was evident within 48 hours of therapy. At three months, normal motor examination was noted. A three months follow-up MRI-brain scan showed marked decrease in thrombus size (Fig. 2).

Discussion:

Cerebral venous thrombosis (CVT) is an uncommon but serious disorder with an incidence of 0.22-1.32/100,000/year [1, 2]. Risk factors include prothrombotic conditions, oral contraceptives, puerperium/pregnancy, malignancy and infections such as otitis, mastoiditis and sinusitis. In some cases no causes is found [3]. Female to male ratio is 3:1 [3, 4]. Although the pathogenesis is not fully understood, clinical features of CVT are related to cerebral vein or dural sinus thrombosis leading to cerebral parenchymal dysfunction and dural sinus occlusion resulting in decreased cerebrospinal fluid absorption and elevated intracranial pressure. MRI studies, mainly diffusion-weighted and perfusion-weighted, have significantly advanced the pathophysiological understanding of venous occlusion by demonstrating the coexistence of cytotoxic and vasogenic oedema in CVT [5-9].

Clinical presentation is highly variable. The disease can have an acute, subacute or chronic onset. Headache is the predominant feature and has been reported in 90% of patients with motor weakness present in 37% of cases [3].

Seizures can occur at presentation (39%) or after diagnosis (7%) [3, 10]. In a paediatric cohort, seizures at presentation occurred in 44% of patients [11]. Disturbances of consciousness and cognitive dysfunction have been reported. Sensory deficits and visual field defects are less common. It is this diversity in presentation that makes the diagnosis clinically challenging and highlights the importance of radiological evaluation.

Neuroimaging is required in patients with lobar intracerebral haemorrhage of unclear origin or with cerebral infarction that crosses typical arterial boundaries to delineate venous thrombosis and associated brain parenchymal lesions [12]. The most sensitive modality for demonstrating and age-characterising the thrombus and occluded dural sinus is MRI using gradient echo T2* susceptibility-weighted sequences in combination with MR venography [9, 13-18]. MR venography demonstrates absence of venous flow though interpretation can be confounded by normal anatomic variants such as sinus hypoplasia and asymmetric flow. Other MR techniques may be useful to distinguish these variants from venous thrombosis [12]. Although normal in 30% of cases, head CT scan can exclude other cerebral disorders and reveal classical signs of thrombosis (dense triangle, empty delta, and the cord signs) [19-22]. CT venography can visualise major dural sinuses and can be used for patients who have MRI contraindications. Limitations include low resolution of deep venous system and cortical veins, contrast reactions, and radiation exposure.

Management involves anticoagulation, epilepsy prophylaxis and antibiotics where appropriate. Endovascular interventions can be considered in severe cases [3, 12, 23-25]. Although 2% can recur and mortality rate is 4-15% [3, 26], usually CVT has a favourable prognosis.

Differential Diagnosis List: Stroke secondary to cerebral venous thrombosis complicating mastoiditis and otitis media., Cavernous sinus syndromes, Intracranial epidural abscess, Subdural empyema, Paediatric status epilepticus, Staphylococcal meningitis, Subdural empyema, Head injury, Systemic lupus erythematosus

Final Diagnosis: Stroke secondary to cerebral venous thrombosis complicating mastoiditis and otitis media.

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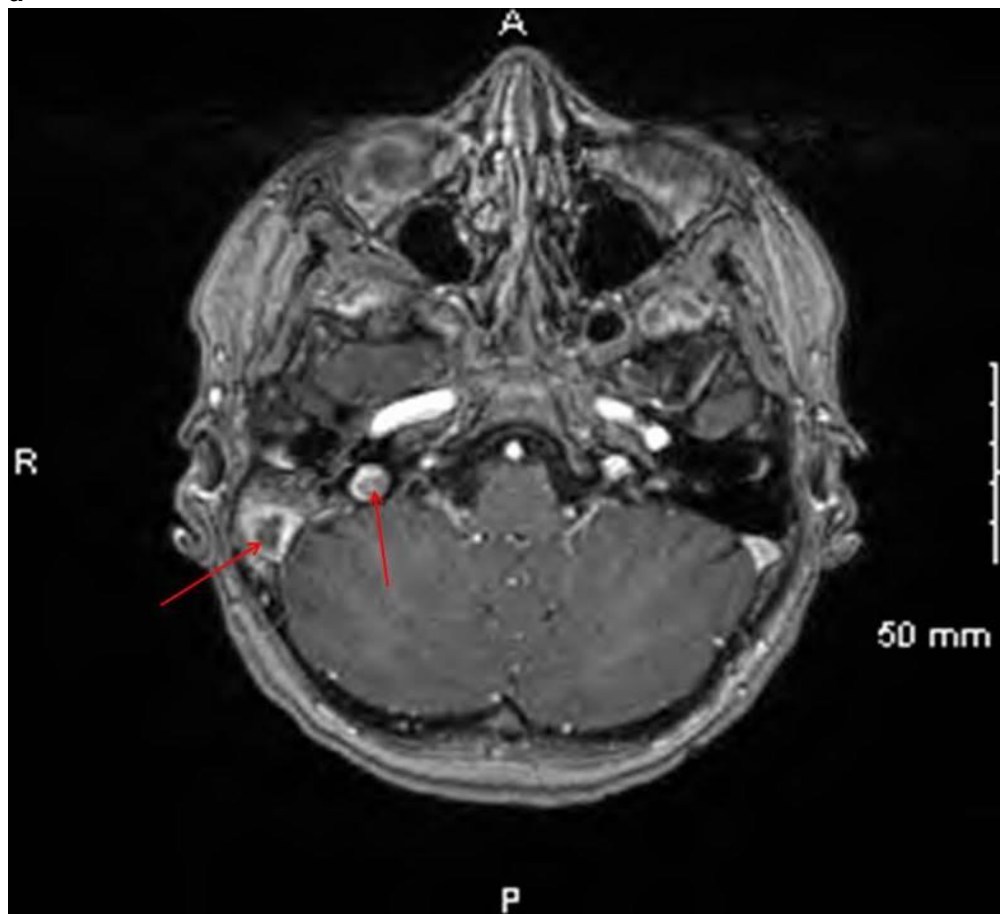
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Figure 1

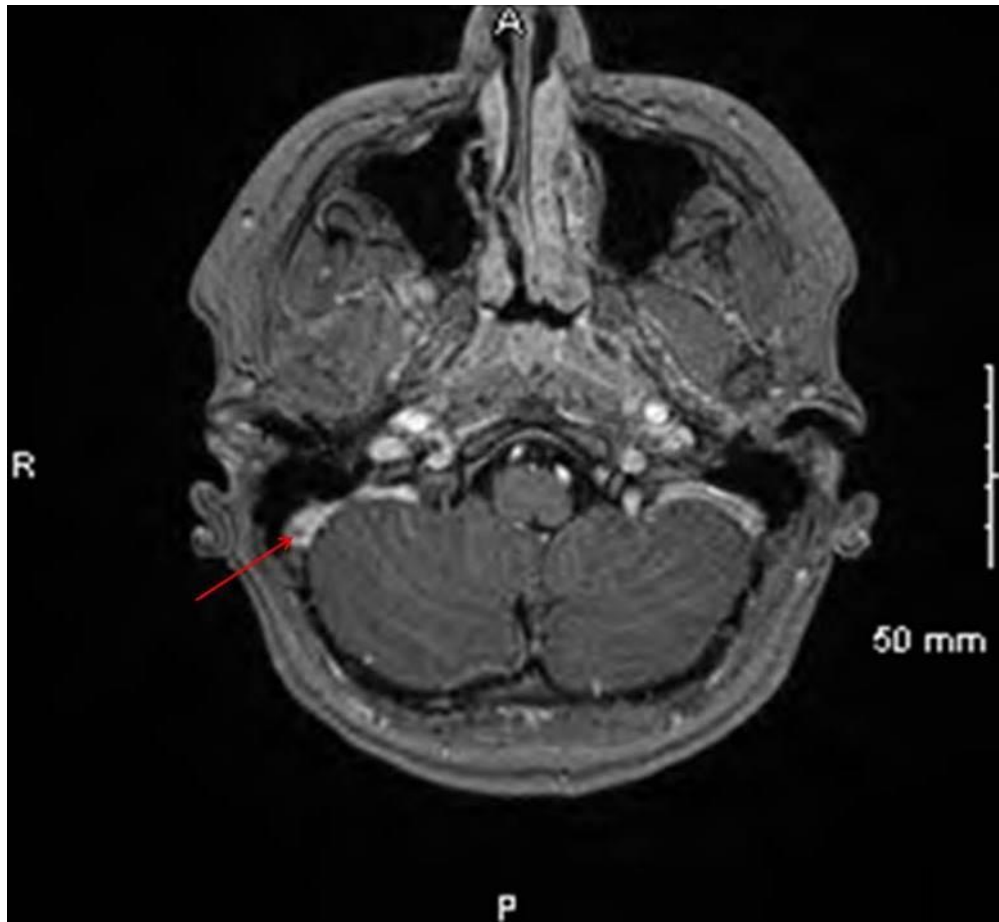
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Description: Post-contrast axial T1 MRI image showing a right transverse and sigmoid sinus filling defect with enhancement in right adjacent region. **Origin:** Radiology department, University Hospital Limerickneu

Figure 2

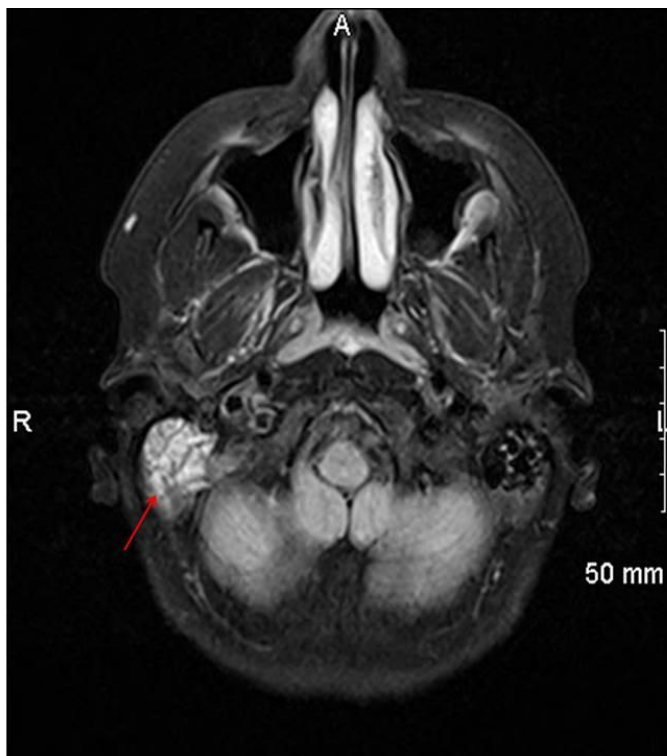
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Description: Post-contrast axial T1 MRI image showing a small residual filling defect within the right transverse sinus in keeping with a resolving thrombus at 3 months post treatment initiation. **Origin:** Radiology Department, University Hospital Limerick

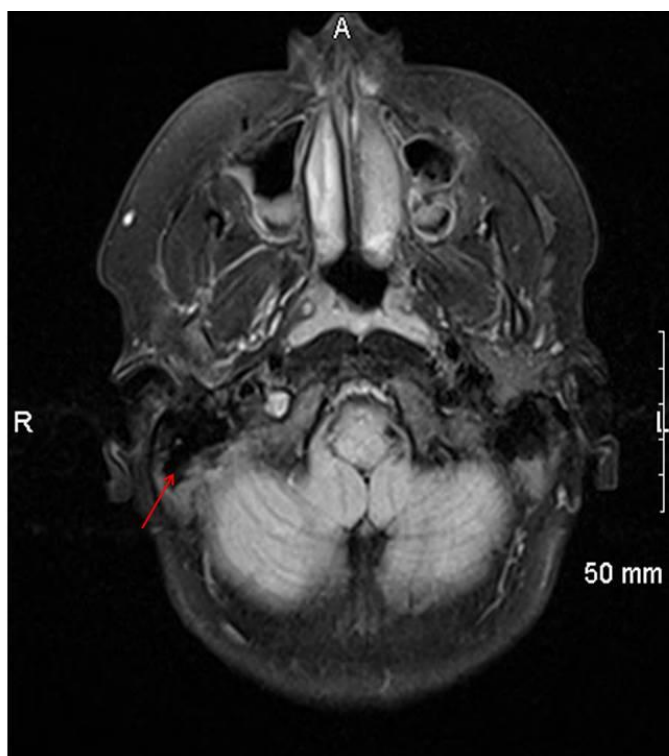
Figure 3

a



Description: Non-contrast axial T2 MRI brain image showing right mastoiditis at presentation. **Origin:** Department of Radiology, University Hospital Limerick

b



Description: Non-contrast axial T2 MRI brain image showing resolution of right mastoiditis at three months post presentation. **Origin:** Department of Radiology, University Hospital Limerick