

# Blunt Orbital Trauma Leading To Late Presentation Of Brain Abscess: A Rare Case Report

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## Abstract

**Introduction:** Brain abscesses are intraparenchymal pus collections, affecting 8% of intra-cranial masses in developing countries and 1-2% in western countries. Despite advances in neuroimaging, surgery, and antibiotic therapy, brain abscesses can be fatal. Risk factors include Congenital Heart Diseases, Sinus infections, Poor dental hygiene, Hypoxic Brain injury, immunocompromised state, neurosurgical procedures, and Orbital trauma/congenital lesions. A multidisciplinary approach is crucial for successful management and prognosis.

## Case Report:

A 9-year-old girl with eye trauma history came to the ER with left arm weakness, vomiting, and a headache. During the examination, the girl had left arm power 0/5, facial paralysis on the left side, exaggerated reflexes, and high inflammatory markers. An MRI of the brain revealed right side brain abscess. Patient underwent mini craniotomy and recovered fully.

## Conclusion

Prompt identification and treatment of brain abscess in children is vital to prevent potentially fatal complications, such as epilepsy and learning difficulties. Surgical procedures and antibiotics are crucial in achieving positive long-term outcomes.

**Keywords:** Brain Abscess, Orbital Trauma

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## I. Introduction

Brain abscesses are rare and account for 8% of intracranial mass in developing countries and 1-2% in Western countries<sup>[1]</sup>. The incidence is only 4 in 1 million people. Mortality in children ranges from 3.7 to 24%, and neurological complications occur in 19 to 34.8% of cases<sup>[2]</sup>. The development of brain abscesses is influenced by the virulence of microorganisms and the immune response of the host. Infections can come from a variety of sources, such as distant sites, nearby infected tissue, wounds, or surgical procedures. Brain abscess can lead to long-term neurological impairment through direct destruction, infarction, or compression. Despite advances in neuroimaging, neurosurgical techniques, neuro anaesthesia, microbiological isolation techniques and antibiotic therapy and treatment, bacterial brain abscesses continue to pose a risk of death or disability<sup>[3,4]</sup>. Children with congenital heart disease, sinus/ear infections, poor dental hygiene and weakened immune systems are more susceptible to brain abscesses. Children can develop brain abscesses due to eye trauma.

Early detection, accurate diagnosis, and targeted antimicrobial therapy are critical in managing and preventing serious complications.

## II. Case Report:

A 9-year-old girl came to the emergency department with complaints of left upper limb weakness for 3 days and vomiting 6-7 episode for 1 day. She had a previous history of blunt eye trauma which was treated at a local hospital 2 months back. The girl had been attending school and engaging in normal play activities without any issues. She had complaints of headache, but no other symptoms such as facial pain, visual changes, or altered mental status. Initial examination showed normal vital signs, an alert child, and left upper limb weakness with paralysis of the left lower half of the face (angle of mouth deviated to right side). Deep tendon reflex exaggerated on the left side.

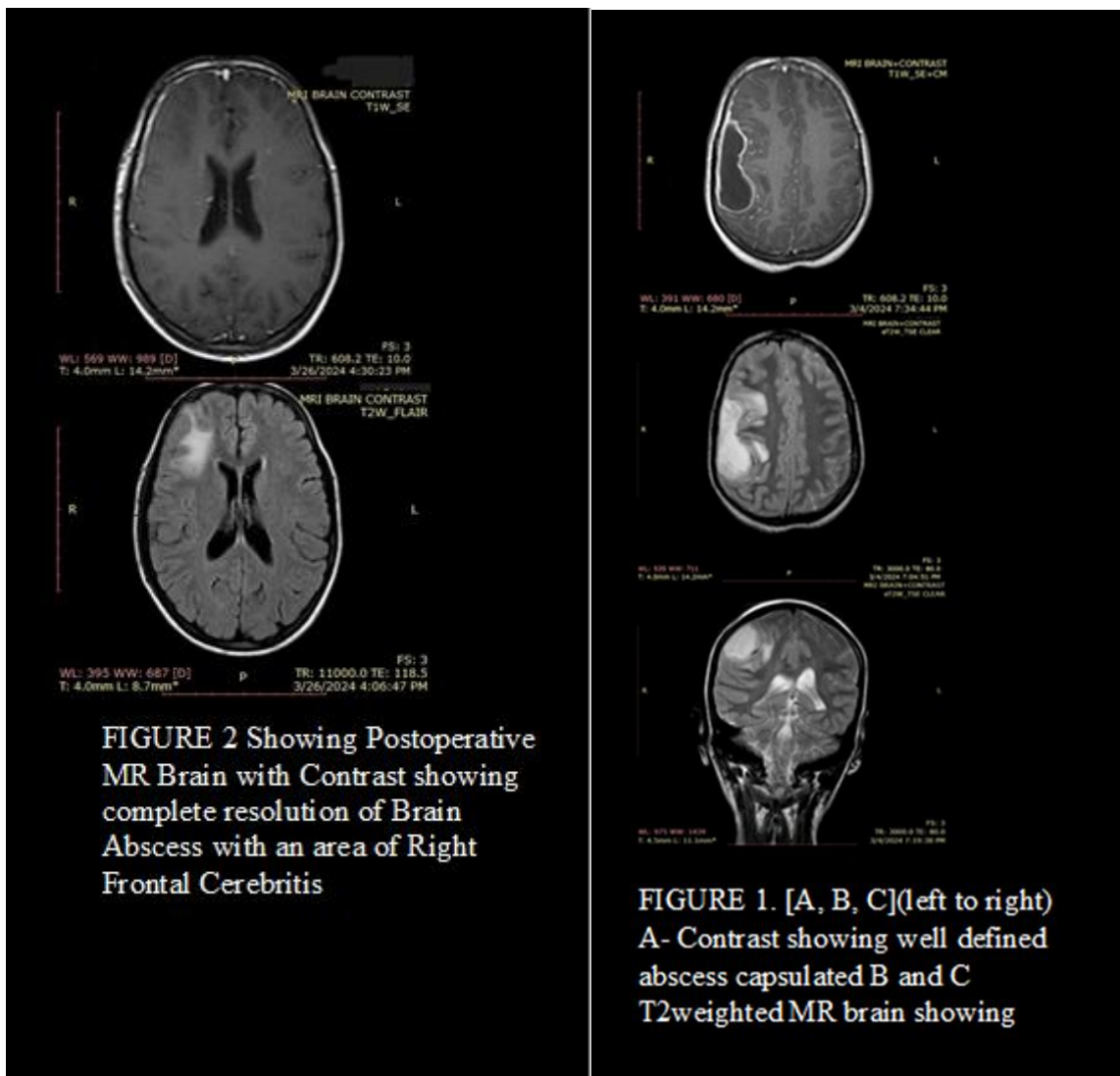
On laboratory analysis, CBC was normal, Sodium -132mEq/L, Inflammatory markers were high (CRP 12mg/dL, PCT 0.030ng/ml). Blood and urine cultures were sterile.

Differential diagnoses for our case included:

Right sided SOL in brain, right sided Infracts, Cerebellar or brainstem lesions given the acute left-sided hemiparesis. Also, there was a possibility of Acute disseminated encephalomyelitis, given the focal neurologic deficits in the setting of fever and elevated inflammatory markers.

Magnetic resonance imaging (MRI) of the brain, cervical spine, and thoracic spine with and without contrast to evaluate for CNS lesions were done. This revealed a subdural abscess with adjacent cerebral oedema and meningoencephalitis (Figure 1). These findings correlated with the predominant motor weakness of the left upper limb. The cervical and thoracic spine appeared normal on the MRI scan. The neurosurgical team consulted and recommended urgent surgical drainage with intravenous broad-spectrum antibiotics based on culture and sensitivity. A right mini craniotomy and drainage were performed. The postoperative period was uneventful.

After surgery, gait improved, facial paresthesia and deviation also improved, and left hemiplegia completely resolved. One month after surgery, an MRI showed complete resolution of a brain abscess in the right frontal and parietal regions with mild feature meningoencephalitis (cerebritis) in the frontal region (Figure 2). The pus culture and biopsy came sterile. The patient was discharged on day 25 with oral antibiotics Linezolid, levetiracetam, and Syrup glycerol and recovered fully after 6 weeks.



**FIGURE 2 Showing Postoperative MR Brain with Contrast showing complete resolution of Brain Abscess with an area of Right Frontal Cerebritis**

**FIGURE 1. [A, B, C](left to right) A- Contrast showing well defined abscess capsulated B and C T2weighted MR brain showing**

### III. Discussion

Abscesses in the brain can present in four different ways: mass expansion, intra-cranial hypertension, diffuse destruction, and neurological deficit. Common symptoms include triad of headache, changes in consciousness, high fever and also nausea, vomiting [3,5]. Cranial CT scans and MR imaging are used to quickly diagnose and locate abscesses. MR imaging is preferred and can differentiate abscesses from tumors and determine the cause (fungal or bacterial) using diffusion-weighted imaging and spectroscopy [6]. If MR imaging

is not available, a CT scan with contrast can be done. For neonates, cranial ultrasound is an alternative option [7]. Once the diagnosis is confirmed, further investigations are conducted to identify underlying factors and the source of infection. Blood cultures are rarely positive, and obtaining cerebrospinal fluid (CSF) through lumbar puncture is dangerous and life-threatening. CSF may show some changes, but culture is usually sterile unless the abscess has ruptured. Urgent decompression is recommended for patients with rapidly progressing neurological deficits. Unfavorable prognosis indicators in pediatric patients include younger age, multiple lesions, decreased consciousness, meningitis development, delayed antimicrobial therapy, large abscesses, and absence of surgical aspiration. Treatment involves personalized care, prompt surgery, and antibiotics. Ultrasonography is important during surgery. Broad-spectrum antibiotics are started initially, and specific agents are administered based on sensitivity reports. Steroids are only given for meningitis or severe edema. 1 year Seizure-free patients with no abnormalities can stop antiepileptic drugs. Larger abscesses require surgery, while smaller ones can be treated with antibiotics. Recovery can take up to six months.

#### **IV. Conclusion**

Brain abscess in children can cause epilepsy, motor deficits, visual impairments, and learning difficulties. Immediate diagnosis and treatment are crucial as it can be life-threatening. Surgical procedures like needle aspiration or craniotomy are important for younger patients. Broad-spectrum antibiotics for at least 6 weeks prevent relapse. With prompt treatment, children have a generally favorable long-term prognosis. Healthcare professionals should closely monitor and manage these cases for the best outcomes.

#### **Conflicts of Interest**

The authors declare no conflicts of interest

#### **Disclosures and Funding**

None

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