

# A Fatal Sinogenic Brain Abscess in Pregnancy: Case Report and Review of Literature

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Indian J Neurosurg 2017;6:47–49.

## Abstract

Cerebral abscess is an extremely rare complication of pregnancy. Among reported cases of pregnancy brain abscess, most patients have shown a good neurologic outcome. Herein, we present a 25-year-old pregnant woman at 28 weeks' gestation with acute loss of consciousness and sudden brain herniation. The patient underwent an emergency craniotomy and brain abscess was evacuated, but she died after surgery. Rapid deterioration and fatal brain herniation were unique among other reports of sinogenic brain abscess during pregnancy.

## Keywords

- ▶ sinogenic brain abscess
- ▶ brain dead
- ▶ pregnancy

## Introduction

Brain abscess is a localized area of suppuration, which develops within the brain parenchyma. The incidence rate of brain abscess is around 8% of intracranial masses in developing countries and 1 to 2% in the Western countries.<sup>1,2</sup>

Brain abscess has been documented as an extremely rare complication of pregnancy. It is associated with high mortality rate of 30% and considered a life-threatening condition for both mother and fetus.<sup>3</sup> Early diagnosis of the clinically silent brain abscess is essential for better management of this hazardous condition.

## Case Report

A 25-year-old pregnant woman at 28 weeks' gestation was admitted in neurosurgery emergency with loss of consciousness during a few hours. The patient's history revealed sinusitis starting 2 weeks prior to referral, which had been treated with oral antibiotics. In initial evaluation, the Glasgow Coma Scale (GCS) was 3/15 and pupils (R = 4F, L = 3F) with spontaneous breathing. Her vital signs on admission were a temperature of 38.2°C, blood pressure of 140/90 mm Hg, and a pulse rate of 90 beats/min. On the days before patient's admission, she had full consciousness and had no symptoms other than a prolonged headache. On

admission day, nausea and vomiting was followed by a sudden loss of consciousness.

The patient immediately underwent imaging assessments. Because of her condition, she underwent computed tomographic (CT) scan of the brain with abdominal protective shield. Intravenous contrast injection was not performed because she was pregnant.

Imaging examination (axial cut of CT scan of the brain) showed a large round right frontal mass and severe edema at surrounding brain tissue with midline shift and subfalcine herniation (▶ Fig. 1). In addition, right frontal sinus was filled with secretions (▶ Fig. 2).

An emergency large decompressive craniotomy was performed, and brain mass evacuated for intracranial pressure reduction. During the surgery, right frontal lobe was severely swollen, and after small corticotomy, a large amount of thick yellow and foul-smelling pus was drained. Following complete irrigation of purulent discharges, an extensive necrotic cavity in right frontal lobe was observed that rapidly collapsed because of brain edema. After the surgery, the patient was transferred to intensive care unit (ICU), and in postoperative evaluation her pupil reactivity was (R = 5F, L = 5F) and brainstem reflexes were negative. Finally, the patient died less than a day after surgery, but because of this short duration, evaluation for immunocompromised state was not possible. Purulent fluid of abscess was obtained and sent for culture and smear. According

received  
June 10, 2015  
accepted  
April 4, 2016  
published online  
February 6, 2017

DOI <http://dx.doi.org/10.1055/s-0036-1584595>.  
ISSN 2277-954X.

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**Fig. 1** A huge round right frontal mass with severe edema at surrounding brain tissue with midline shift and subfalcine herniation (axial cut of CT scan of the brain).

to laboratory report, culture result was negative, but smear was positive for gram-positive cocci. After evaluation by a consulting gynecologist due to the poor condition of the mother, the fetus was delivered by cesarean section after brain surgery. Despite great care in neonatal intensive care unit, the baby died 2 days later because of preterm delivery.



**Fig. 2** RT frontal sinus was filled with secretions (axial cut of CT scan of the brain).

**Table 1** Previous case reports of pregnancy brain abscess in medical literature

Author	Age (y)	Location	Gestational age	Infectious signs	Surgical treatment	Neurologic outcome	Preliminary sign and symptom
Braun et al (1991) <sup>12*</sup>	25	Left occipital lobe	16	Respiratory infection	Left occipital craniotomy	Not neurologic deficit	Left-sided headache, mildly confusion and right-sided neurologic signs
Baxi et al (2001) <sup>13*</sup>	36	Left temporal lobe	10	Not detected	No	Good, residual hemiparesis	Right hemiparesis, aphasia, DIC
Wax et al (2003) <sup>5*</sup>		Left temporal lobe	36	Maxillary and ethmoid sinusitis	No	Good without neurologic deficit	Headache confusion seizure
Kim et al (2006) <sup>14*</sup>	38	Pituitary	30	Sphenoid sinusitis	Transsphenoidal	Good recovery	Headache, sinus infection, meningeal sign, sudden deterioration of (VA) AT 34 W
Kiprono et al (2007) <sup>6*</sup>	36	Temporal occipital parietal lateral ventricle	28	Respiratory infection	Emergent drainage of the abscess	Good recovery residual left-sided motor deficit	Pneumonia-headache-decreased alertness-paresthesia of left-sided face comatose
Jacob et al (2009) <sup>11*</sup>	23	Left cerebellar hemisphere	35	Otitis media	Radical mastoidectomy	Good recovery	Chronic otitis media, fever, headache gait ataxia
Hobson et al (2011) <sup>10*</sup>	35	Left hemispheric	21	Odontogenic	Multiple partial lobectomies to drain recurrent brain abscess	Uneventful recovery Broca aphasia apraxia right hemiplegia	Severe headache, facial swelling, and mental status changes
Salvi et al (2010) <sup>15*</sup>	19	Right frontal	39 w		Right frontal craniotomy and abscess evacuation		
Yoshida et al (2013) <sup>3*</sup>	24	Right frontal	22	Not detected	No	Not neurologic deficit	Fever from 22th w headache and nausea

Abbreviation: DIC, disseminated intravascular coagulation.

## Discussion

Brain abscess in pregnancy is a rare event which mostly progresses to neurologic abnormalities. Bacterial brain abscess has a poor prognosis for both mother and fetus because of high mortality rate (30%).<sup>3</sup> During pregnancy, the risk of infection is elevated due to hormonal imbalance and decreased maternal immunity.<sup>3,4</sup> According to the medical literature search, a few cases of brain abscess have been documented as a neurologic complication in pregnancy.<sup>3,5,6</sup> The first manifestation of a brain abscess may be chills or fever. Also, signs of insidious meningeal irritation or nausea and vomiting and localized neurologic signs can be observed. The clinical presentation of brain abscess usually results from its mass effect.<sup>5,7,8</sup> In pregnant women, headache is the most common complaint (75%) followed by focal neurologic deficit (67%) and mental status change (58%).<sup>5</sup> A few reports have been documented as an uncommon manifestation of brain abscess with acute neurologic deficit resembling a stroke.<sup>8,9</sup> The most common locations for brain abscess are the temporal lobes (42%) followed by the cerebellum (30%).<sup>7,10</sup> Intracranial complications of sinusitis include subdural empyema, brain abscess, meningitis, and extradural empyema. Direct spread of infection occurs through preexisting communications between the sinuses and contiguous structures or extension of adjacent osteomyelitis.<sup>11</sup> In our patient, sudden loss of consciousness and acute brain herniation was seen as a unique presentation of sinogenic brain abscess.

In our search about pregnancy brain abscess (→ **Table 1**), we did not find similar case reports with this presentation. In one report of sinogenic temporal lobe brain abscess, the patient did not have sudden loss of consciousness and was successfully treated with antibiotics and delivery was performed via cesarean section.<sup>5</sup> Abscess fluid culture in our patient was negative; this might be due to the administration of oral antibiotics from 2 weeks before admission. Anaerobic organisms are predominant in brain abscess, but streptococci and *Haemophilus influenzae* species may be implicated. However, almost half of abscesses culture will be negative.<sup>11</sup> Sudden deterioration with the worst outcome is a feature that was unique among previous reports of brain abscess during pregnancy. According to our literature search, only one report of brain abscess in pregnancy led to a comatose state, but the neurologic outcome was good in that patient.<sup>6</sup>

In short, although in this case there were no neurologic symptoms that clearly indicated a brain abscess, prolonged headache associated with sinusitis even after medical treatment and physical examinations such as fundus examination for papilledema should be professed in outpatient evaluation of such patients and cause suspicion of intracranial complications of sinusitis.

## Conflict of Interest

None.

## Authors' Contributions

All authors contributed equally in planning and carrying out this project.

## Acknowledgment

The study was financially supported by Ahvaz Jundishapur University of Medical Sciences. The authors thank Molook Salehzadeh, member of Golestan Hospital Clinical Development Research Unit, for her contribution.

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