Introduction

Brain abscesses are extremely rare, potentially life-threatening events that require immediate neurosurgical evaluation. Less than 10% of brain abscesses have been attributed to be from dental infection. We describe a case of a pregnant women with twins who developed a brain abscess as a result of sinusitis due to dental caries, masked by a diagnosis of preeclampsia.

Case: 21-year-old gravida 2 para 1 at 36 weeks and 3 days with dichorionic diamniotic twins presented to labor and delivery triage with a severe headache, nausea and vomiting, diagnosed with preeclampsia with severe features and recommended to undergo delivery. Prior to delivery the patient developed altered mental status with expressive aphasia, as well as a fixed and dilated left pupil. Computed tomography revealed 6 mm left-sided holo-hemispheric subdural fluid collection with mass effect, brain edema, and midline shift. She underwent emergent craniotomy with neurosurgery with intraoperative findings consistent with subdural empyema. After further workup, the intracranial empyema was thought secondary to bacterial sinusitis, originating from persistent dental caries.

Conclusion: Dental care in pregnancy is an important, yet commonly unaddressed topic at prenatal care visits. While there are many complications that can result from poor dental hygiene, including dental caries, gingivitis and preterm delivery, brain abscess is among the most severe. This case illustrates the importance of addressing good nutrition as well as oral hygiene habits at prenatal visits and throughout pregnancy.
fluid in the left sinus, and subsequently underwent a left sinus clean
underwent a nasal endoscopy by ENT and was found to have purulent
consultation from Infectious Disease, ENT and Dentistry. She
empyema was remarkable for sinusitis and dental caries. She had
ceftriaxone, vancomycin, and metronidazole.
empyema). The empyema was then treated medically with IV
multifocal ischemic strokes (thought to be mass effect of the
and fluctuation in mental status. Subsequent CT scans revealed
postoperative day three. She initially had right hemiparesis, aphasia
and a drain was placed. She was extubated in the neuro ICU on
empyema rather than a hemorrhage. The empyema was evacuated
due to severe preeclampsia. She was intubated in the neuro ICU and
craniotomy, with the working diagnosis of subdural hematoma likely
1). Neurosurgery was consulted and recommended emergent
19 wks
Infected tooth, left
pterygoid abscess
Bacteroides fragilis,
Campylobacter gravis,
Prevotella
Ampicillin, cefotaxime,
metronidazole
Abcess I/D, multiple
lobectomies
Broca’s aphasia, apraxia,
right hemiplegia
Jendoubi et al [2] 32 wks
None
Unknown
Cefotaxime, metronidazole,
fosfomycin
Stereotactic abscess
drainage
Seizure, homonymous
hemianopia
Liu et al [13] 37 wks
Sinusitis
Beta hemolytic
streptococcus
Chloramphenicol,
metronidazole, gentamicin,
penicillin, cefotaxime
Drainage of par nasal
sinusitis and brain
abscess
Hydrocephalus, seizure,
left hemiparesis
Kim et al [14] 34 wks
Sinusitis, pilillary
abscess
Streptococcus Viridans
Ceftriaxone, amikacin
Transphenoidal
drainage
Full recovery
Our case 36 wks
Dental caries, sinusitis
Streptococcus Intermedius
Ceftriaxone, ampicillin,
metronidazole
Emergent craniotomy,
dental extraction and
sinus clean out
Minor facial palsy,
right pronator drift,
right homonymous
hemianopia

hypertension with proteinuria and a severe headache. Magnesium
sulfate was started for seizure prophylaxis and delivery was
recommended. As the twins were cephalic/cephalic, it was deemed
reasonable to attempt vaginal delivery with induction of labor and
with patient consent. Induction was initiated with Pitocin given her
favorable bishop score and she received an early epidural. There were
no severe range blood pressures requiring antihypertensive therapy.

Four hours after the induction was begun, the patient developed
altered mental status with lethargy, confusion and expressive aphasia.
The remainder of her neurological exam at that point was non-
focal. Blood pressures continued to be in the normal to mild range.
Fetal heart rate tracings were category I. The working diagnosis at
that time was worsening preeclampsia with subsequent cerebral
edema. Due to the acute change in neurological status thought from
preeclampsia, remote from delivery as her cervical exam was 6/100/-
2, cesarean section was recommended. Maternal Fetal Medicine and
Neurology were consulted, with head CT scan planned immediately
postoperatively. The cesarean section was uncomplicated and
performed with epidural anesthesia. Twins were delivered with Apgar
scores of 8/9/9 and 9/9/9. Arterial cord gases were both normal.
Estimated blood loss was 900 cc.

Postoperatively, she continued to have expressive aphasia along
with a new finding of a fixed and dilated left pupil. She developed
severe hypertension, requiring multiple IV anti hypertensives. CT
scan showed a 6 mm left-sided holo-hemispheric subdural fluid
collection with mass effect, brain edema, and a midline shift (Figure
1). Neurosurgery was consulted and recommended emergent
 craniotomy, with the working diagnosis of subdural hematoma likely
due to severe preeclampsia. She was intubated in the neuro ICU and
then taken to the OR.

Intraoperative findings from the craniotomy included a subdural
empyema rather than a hemorrhage. The empyema was evacuated
and a drain was placed. She was extubated in the neuro ICU on
postoperative day three. She initially had right hemiparesis, aphasia
and fluctuation in mental status. Subsequent CT scans revealed
multifocal ischemic strokes (thought to be from mass effect of the
empyema). The empyema was then treated medically with IV
ceftriaxone, vancomycin, and metronidazole.

Further postoperative workup to identify the source of the
empyema was remarkable for sinusitis and dental caries. She had
consultation from Infectious Disease, ENT and Dentistry. She
underwent a nasal endoscopy by ENT and was found to have purulent
fluid in the left sinus, and subsequently underwent a left sinus clean
out. Dental was consulted and found gross caries on teeth #2 and #14,
the latter of which demonstrated periapical radiolucency on imaging.
This tooth was thought to be the potential source of sinus infection
and was extracted. It was noted to have a communication with the
maxillary sinus on the left. In retrospect, the patient had not received
dental care for years and had been complaining of tooth pain over
the past several months per her husband’s report. Bacterial culture
growing from both the subdural empyema and sinuses showed
Streptococcus Intermedius. On postoperative day 4, antibiotics were
transitioned to IV ceftriaxone, ampicillin and flagyl based on cultures
and susceptibilities. These antibiotics were continued for 6 weeks.
After proven stable, she was discharged to sub-acute rehabilitation
on postoperative day 12. Over the next couple months of intensive
therapy, she regained nearly all of her normal functions. She regained
a normal mental status. Persistent deficits as of 4 months post-op are
minor facial weakness, right pronator drift and right homonymous
hemianopsia.

Discussion

The most common complications from lack of dental care in
pregnancy include dental caries, gingivitis and preterm delivery,
however one of the worst complications resulting from unaddressed
odontogenic infections are brain abscesses [1]. Using PubMed and
MESH terms “Brain abscess”, “pregnancy” less than fifteen case
reports regarding brain abscess in pregnancy were reported in
the literature and of those five were found to arise from sinus or
odontogenic sources (Table 1).

Brain abscesses are life-threatening infections that require

### Table 1: Reported cases of brain abscess in pregnancy arising from sinus or odontogenic origin.

<table>
<thead>
<tr>
<th>Author</th>
<th>Gestational age</th>
<th>Predisposing factor</th>
<th>Organism</th>
<th>Antibiotics used</th>
<th>Surgery</th>
<th>Maternal outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wax et al [11]</td>
<td>36 wks</td>
<td>Sinusitis</td>
<td>Unknown</td>
<td>Cefepime, vancomycin, metronidazole</td>
<td>None</td>
<td>Full recovery</td>
</tr>
<tr>
<td>Hobson et al. [12]</td>
<td>19 wks</td>
<td>Infected tooth, left pterygoid abscess</td>
<td>Bacteroides fragilis, Campylobacter gravis, Prevotella</td>
<td>Ampicillin, cefotaxime, metronidazole</td>
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<td>Emergent craniotomy, dental extraction and sinus clean out</td>
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immediate neurosurgical attention. A recent systematic review of case studies involving brain abscesses from oral sources found that caries with periapical involvement and periodontitis were the two most common intra-oral sources, with Streptococcus viridans (especially anginosus group). Actinomyces, peptostreptococcus, Prevotella, Fusobacterium Aggregatibacter Actinomyces comitans and Eikenella corrodens among the most common microorganisms isolated [2]. Streptococcus Intermedius is a bacterium that colonizes various mucosal sites. It is frequently involved in invasive suppurative infections including liver and brain abscess and dentoalveolar infections [3]. The most common clinical manifestations of a brain abscess are headache and fever [4]. These symptoms can be subtle, vague and last from days to weeks. As the abscess grows larger, the symptoms become more predominant and dramatic and can lead to altered consciousness, seizures and localized neurological signs [4]. Once diagnosed with imaging, immediate management is imperative to decrease morbidity and mortality and almost always includes neurosurgical intervention through craniotomy combined with long term intravenous antibiotics. When immediately identified as having a brain abscess with subsequent intervention, 70% of patients have minimal or no neurologic sequelae [4].

Dental care in pregnancy is an important, yet commonly unaddressed topic at prenatal care visits. According to the ACOG committee opinion on dental care in pregnancy, approximately 80% of obstetric providers did not use oral health screening questions in their prenatal visits and 94% did not routinely refer all patients to a dentist [4]. Diseases such as dental caries, gingivitis and adult periodontitis are extremely common in the general female population, both pregnant and non-pregnant, and have been associated with poor pregnancy outcomes [7]. These diseases are largely preventable. However, due to various socioeconomic and ethnic barriers, many women are unable or do not know how to access dental care in America. The barrier to care has become so extreme that in 2000, the Surgeon General’s report Oral Health in America stated that “a silent epidemic of oral diseases is affecting the most vulnerable citizens” [8]. Among these include minorities and those with low family income or low education level. In 2001, using PRAMS data, it was found that reports of dental care use during pregnancy ranged from 22.7 to 34.7 percent [9]. In three states, 12.2 percent to 25.4 percent of respondents reported having a dental problem of which 44.7 percent to 54.9 percent went for care, most commonly citing insurance issues and late prenatal care entry as reasons for lack of access [9]. Additionally, many health care providers in the oral health care field are not comfortable caring for pregnant patients which creates an additional barrier for this at risk population [10].

In 2013, the American College of Obstetricians and Gynecologists recommended in a committee opinion that pregnancy is a teachable moment in regards to preventative care and that health care providers should take the opportunity to help these women obtain and maintain proper dental care both during and after pregnancy [5]. According to the National consensus statement regarding oral health care in pregnancy, every provider should take an oral health history; do a thorough physical exam of the oral cavity and document findings in the woman’s medical record. There should be counseling regarding the safety of oral health care during pregnancy, and referrals to dentists who maintain relationships with prenatal care health professionals should be provided. Women should have dental visits every six months with routine X-rays. Pregnant women should practice oral hygiene which includes brushing teeth with fluoridated toothpaste twice a day, replacing their toothbrush every 3-4 months and cleaning between teeth daily with floss [10-14]. Good nutrition should also be addressed at prenatal visits and throughout pregnancy.

**References**