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Not every seizure is eclampsia – a rare case of a brain abscess in a pregnant woman caused by *Streptococcus pneumoniae* from a dental source

Ne každý záchvat je eklampsie – vzácný případ mozkového abscesu u těhotné ženy způsobeného *Streptococcus pneumoniae* z dentálního zdroje

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Summary: We present a rare case of a brain abscess in a pregnant woman due to an untreated dental abscess, initially presenting as a new-onset seizure. This article highlights the need for a broad differential diagnosis for seizures in pregnancy, extending beyond the common assumption of eclampsia, and further emphasizing the importance of thorough history-taking and physical examination. We suggest integrating routine dental care into prenatal healthcare to reduce the risk of such serious events. Informed consent was obtained, and all identifiable information has been de-identified to protect patient confidentiality.

Key word: seizure – brain abscess – pregnancy

Souhrn: Představujeme vzácný případ mozkového abscesu u těhotné ženy způsobeného neléčeným dentálním abscesem, který se původně projevil jako nově vzniklý epileptický záchvat. Tento článek zdůrazňuje nutnost širokého diferenciálního uvažování při hodnocení záchvatů v těhotenství, které by neměly být automaticky připisovány eklampsii. Dále upozorňuje na důležitost pečlivé anamnézy a fyzikálního vyšetření. Doporučujeme začlenění pravidelné zubní péče do prenatální zdravotní péče jako způsob prevence takto závažných komplikací. Informovaný souhlas byl získán a všechna identifikovatelná data byla anonymizována pro ochranu pacientky.

Klíčová slova: záchvat – mozkový absces – těhotenství

Introduction

Brain abscesses are a rare but potentially life-threatening condition with an estimated incidence between one and eight cases per 100,000 patients per year in the United States [1,2]. With an All-cause mortality from 5% to 32% [3]. Few documented cases of bacterial brain abscesses occur during pregnancy [4]. Such abscesses pose a poor prognosis for both the mother and the fetus, regardless of the stage of pregnancy [5]. Several mechanisms underlie the development of brain abscesses. Direct inoculation following neurosurgical procedures or cranial trauma accounts for approximately 10–20% of cases. Hematogenous dissemination contributes to 20–30%, facilitated by the valveless venous system of the face and oropharyngeal region, which provides direct communication between extracranial and intracranial structures. Contiguous spread from nearby anatomical cavities remains the most common route, implicated in nearly 40% of cases. Within this context, odontogenic infections are clinically significant, as the oral cavity lies in proximity to the paranasal sinuses and cranial vault, enabling dental pathogens to invade intracranial spaces [6,7]. Pregnancy itself introduces additional susceptibility as oral health

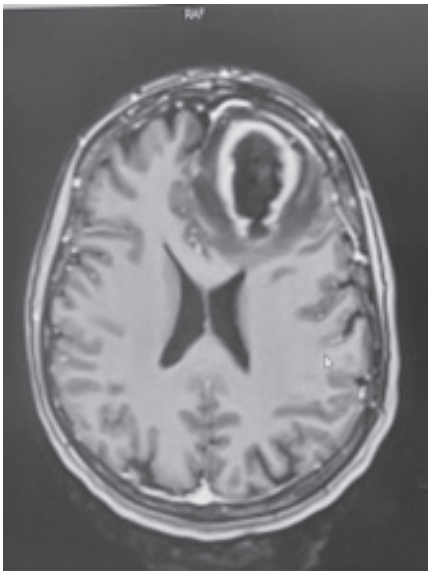

Fig. 1. Shows a T1 MRI with a contrast--enhancing lesion.
Obr. 1. Zobrazuje T1 MR s lézí se zesilující kontrastní látkou.

alterations affect up to 70% of pregnant women, manifesting as gingivitis, periodontal disease, gingival bleeding, hyperplasia, or lesions such as pregnancy-associated epulis and pyogenic granulomas. Furthermore, this period is associated with a reduction in cell-mediated immunity and a decrease in natural killer cell functionality. As a result, odontogenic infections can quickly escalate into deep-space infections [8,9]. Given these factors, early diagnosis is crucial for improving maternal and fetal outcomes, often requiring neurosurgical intervention and antimicrobial therapy [4]. This article aims to report a rare case of a brain abscess resulting from an untreated dental infection in a pregnant woman.

Case presentation

A 34-year-old woman, gravida 7, para 3+3, presented at 33 weeks of gestation with seizures and severe headaches. Her past medical and surgical history was unremarkable, and she had no chronic illnesses or ongoing medications. Obstetrically, she had three prior full-term vaginal deliveries and three first-trimester spontaneous abortions. The patient was referred from another hospital to our medical center by the emergency department after experiencing a witnessed tonic-clonic seizure at home. The seizure lasted less than one minute and resolved spontaneously without any intervention. There is no reported history of tongue biting, eye-rolling, or urinary or fecal incontinence. Two hours prior to the seizure, the patient experienced a severe headache. She denied having fever, abdominal pain, or any labour symptoms. She has never had similar symptoms in the past and has no history of migraines.

The senior obstetrician on call at the other hospital immediately evaluated the patient. On initial assessment, she was conscious and responsive to questions but disoriented. Her vital signs were as follows: blood pressure 100/60 mmHg, heart rate 80 bpm, Respiratory rate: 16/min, oxygen saturation 98% on room air, temperature 37 °C. Moreover, the abdominal examination revealed a soft, lax abdomen with no tenderness. Also, an intravenous line was inserted, and routine hematology and biochemistry samples were collected. The patient received magnesium sulfate due to a suspicion of pre-eclampsia, along with 10 mg of intravenous diazepam in the emergency room. An ultrasound was performed, which revealed a single live fetus in an advanced active position, measuring 33 weeks and with a fundal placenta; furthermore, she was referred to our hospital on the same day, where the on-call obstetrician physician reevaluated her. Upon arrival at our center, a neurological examination revealed right lower limb weakness with a power of 3/5 with no focal deficits, showing no meningeal signs; however, she had a positive bilateral Babinski sign, with glasgow coma scale (GCS) score of 15/15, thus a brain computed tomography (CT) scan was performed revealing a left frontal hypodense lesion measuring 3 × 4 cm with all blood and urine tests for laboratory analysis returned normal. As a result, the assessment showed no evidence of pre-eclampsia. Given these findings, an initial brain magnetic resonance imaging (MRI) without contrast revealed a left parafalcine frontal lesion with restricted diffusion and surrounding edema, raising suspicion for infarction vs infection, with the tumor being less likely. On the following day, MRI with contrast and magnetic resonance venography (MRV) were done and showed a large left frontal lobe brain abscess with significant vasogenic edema and mass effect, associated with meningeal enhancement and parenchymal changes, consistent with meningitis and encephalitis (Fig. 1). There was no evidence of dural sinus thrombosis.

Neurosurgery was consulted, and a craniotomy was recommended for abscess drainage; however, because the patient was 33 weeks pregnant, the procedure was deemed postponed until after delivery. Due to her condition, a cesarean section was planned at 36 weeks, as she was unable to tolerate the exertion of labour, which could have worsened her clinical status.

The patient started on a therapeutic dose of low-molecular-weight heparin (LMWH), and intravenous (IV) Dexamethasone was administered to decrease brain edema. Empirical antibiotics, including IV vancomycin, ceftriaxone, and metronidazole, were initiated, as the suspected infectious source was odontogenic. The patient had not received dental care for years and had been experiencing tooth pain for several months, particularly since developing an untreated dental abscess a month ago. The patient's condition dramatically improved after empirical antibiotics administration and continued for 3 weeks until a cesarean section was performed at 36 weeks, and a healthy infant was delivered. On day 2 post-cesarean, a craniectomy was performed with A burr hole placed in the left parietal area, and approximately 40 cc of pus was drained

(Fig. 2). A pus culture was sent for analysis, revealing the presence of *Streptococcus pneumoniae*.

The following day, the Obstetrics and Gynecology department evaluated the patient. Upon examination, she was alert, with a Glasgow Coma Scale (GCS) score of 15 out of 15. She was afebrile and demonstrated entire limb movement, with muscle strength rated at 5 out of 5. There were no apparent cranial nerve deficits or focal neurological abnormalities.

The maxillofacial surgery team assessed the patient the following week, during which a dental extraction was performed on the affected tooth, identified as the most likely source of the brain abscess.

Discussion

Seizures during pregnancy or the post-partum period are a medical emergency, with eclampsia being the most common and life-threatening cause, along with acute cerebral events such as hemorrhagic stroke, contributing to an estimated 60,000 deaths worldwide each year [10,11]. A study by Sharma et al. found that up to one-third of seizures in pregnant or postpartum women are due to causes other than eclampsia, including epilepsy, cerebral venous thrombosis, and central nervous system infections [12]. Our patient's presentation was atypical for eclampsia. She was normotensive and lacked other signs of pre-eclampsia, such as proteinuria or significant laboratory abnormalities. This absence of hallmark features was a critical clue that prompted a more exhaustive diagnostic search, a point also emphasized by Jendoubi et al. in a similar case [13], where a brain abscess mimicked eclampsia. In their case, as in ours, the lack of response to magnesium sulfate and the presence of focal neurological deficits guided clinicians toward neuroimaging, ultimately revealing the brain abscess. This case reinforces the principle that when a pregnant patient with seizures does not fit the classic clinical picture of eclampsia, alternative diagnoses must be aggressively pursued.

Standard clinical features of brain abscess include headache, altered mental status, nausea and vomiting, and focal neurological signs. Among pregnant women, headache is the most frequently reported symptom, present in up to 75% of cases, followed by focal neurological deficits in 67% and mental status changes in 58% [14]. Given that many of these symptoms, particularly headache and nausea, are common and often benign complaints during pregnancy, a high index of suspicion is paramount to avoid diagnostic delays.

Oral microorganisms may gain access to the cranium through various routes, including hematogenous and lymphatic spread, direct extension, or indirectly via extraoral odontogenic infections [15]. In our case, the presence of a documented dental abscess is consistent with previously reported cases in which dental pathology served as the source of intracranial infection. These comparable cases, including various dental origins of brain abscess, are summarized in Tab. 1. [16–18].

Moazzam et al. systematic review [19] identified that the microbiological profile of brain abscesses is frequently polymicrobial, with the following microorganisms being the most commonly implicated in intracranial infections originating from the oral cavity: *Streptococcus viridans*, particularly the anginosus group, and *Actinomyces* species. Often isolated anaerobes are *Peptostreptococcus, Prevotella*, and *Fusobacterium*, whereas among gram-negative organisms, *Aggregatibacter actinomycetemcomitans* and *Eikenella corrodens* are commonly encountered. In our case, pus culture revealed the presence of Streptococcus pneumoniae, which is an unusual finding in comparison to Moazzam et al. finding.

In pregnancy settings, while CT is often more readily available in an emergency setting, MRI with gadolinium contrast is the modality of choice, as MRI offers superior soft-tissue contrast, allowing for better characterization of the lesion, including the detection of early cerebritis, the identification of a well-formed capsule, and the assessment of surrounding edema, without exposing the fetus to ionizing radiation [20]. Once a brain abscess is confirmed by imaging, prompt management is critical to reducing morbidity and mortality. Standard therapy typically combines neurosurgical drainage, most often via craniotomy, with prolonged intravenous antibiotic administration. The likely source of infection, common causative pathogens, and local antimicrobial resistance patterns guide the choice of agents. For a community-acquired brain abscess of unknown or suspected odontogenic or sinogenic origin, the standard-of-care empirical regimen typically includes a third-generation cephalosporin combined with metronidazole [20,21]. When a brain abscess is identified early and appropriately managed, approximately 70% of patients experience minimal or no long-term neurological deficits [2]. In our case, the patient received

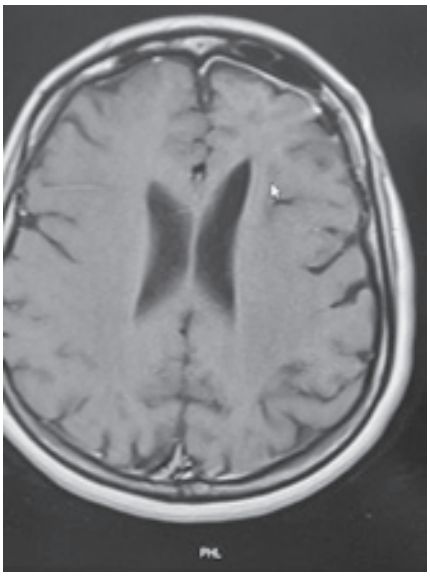

Fig. 2. Shows the post-operative MRI.
Obr. 2. Zobrazuje pooperační MR snímek.

Tab. 1. A summary of comparable reported cases of brain abscesses during pregnancy resulting from dental infections.
Tab. 1. Souhrn srovnatelných hlášených případů mozkových abscesů během těhotenství v důsledku zubních infekcí.

Case reference	Patient demographics	Source	Clinical presentation	Diagnostic findings	Identified pathogen(s)	Management strategy	Maternal outcome
Hobson et al., 2011 [16]	age: 35, G3P0, 19 weeks of gestation	infected left maxillary third molar, post-extraction	mental status changes, headache, facial swelling	CT: left pterygoid muscle abscess progressing to brain abscess	*Bacteroides fragilis, Wolinella species, Campylobacter gracilis, Prevotella buccae*	dexamethasone and intravenous ampicillin, cefotaxime, and metronidazole were started and continued for six weeks **neurosurgery:** multiple partial lobectomies for recurrent abscesses **obstetric:** pregnancy continued to term, caesarean delivery.	Broca's aphasia and apraxia with right hemiplegia
McKenna et al., 2019 [17]	age: 21, G2P1, 36 weeks of gestation (twins)	gross caries in tooth #14 with periapical radiolucency, leading to sinusitis	headache, nausea, vomiting, diarrhea progressing to aphasia, and a fixed, dilated left pupil.	CT: 6 mm left-sided holo-hemispheric subdural empyema with mass effect and midline shift	*Streptococcus intermedius*	**neurosurgery:** emergent craniotomy for empyema evacuation **dental:** extraction of tooth #14 and sinus clean out **antibiotics:** 6 weeks IV ceftriaxone, ampicillin, metronidazole **obstetric:** emergent caesarean delivery.	minor facial palsy, right pronator drift, right homonymous hemianopsia
Zhang et al., 2023 [18]	age: 38 primipara, 8 weeks of amenorrhea	dental caries noted retrospectively on CT scout view	fever vomiting, progressing to sudden loss of consciousness and fixed pinpoint pupils	MRI: right parietal-temporal lobe abscess with rupture into the ventricle, midline shift, and severe cerebral edema	*Actinomyces meyeri*	**neurosurgery:** craniotomy, mass removal, decompressive craniectomy, EVD placement **mannitol, dexamethasone, and antibiotics:** ceftriaxone, linezolid, meropenem, ornidazole **obstetric:** Induced labor	the patient developed hydrocephalus requiring a shunt. Remained in a coma vigil state
our case	age: 34, G7P3+3, 33 weeks gestation	an untreated dental abscess for one month, with a history of tooth pain for several months.	seizures (tonic-clonic), headaches, right lower limb weakness	MRI: large left frontal lobe brain abscess with significant vasogenic edema and mass effect	*Streptococcus pneumoniae*	**neurosurgery:** craniotomy with burr hole drainage post-delivery **dental:** extraction of affected tooth **dexamethasone and antibiotics:** IV vancomycin, ceftriaxone, metronidazole **obstetric:** caesarean section at 36 weeks	full recovery

broad-spectrum antibiotic therapy, including IV vancomycin, ceftriaxone, and metronidazole, which were initiated according to local antimicrobial resistance patterns as the suspected infectious source was odontogenic for three weeks prior to undergoing a cesarean section. Following delivery, she underwent a craniectomy with placement of a burr hole in the left parietal region to facilitate abscess drainage. Comparable management strategies from previously published case reports have been summarized in Tab. 1.

Prenatal screening and maintaining good oral hygiene are essential to preventing adverse complications during pregnancy. Despite the established safety of providing dental care to pregnant patients, dentists, physicians, and patients persist in their lack of confidence [22]. The second and early third trimesters are considered the safest periods for routine dental procedures, as the embryonic stage with its higher teratogenic risk has already passed [23]. This case emphasizes that not every seizure during pregnancy should be attributed to eclampsia, particularly when hallmark features such as hypertension, proteinuria, or laboratory abnormalities are absent. Clinicians should maintain a broad differential diagnosis and promptly pursue neuroimaging when atypical features are present. Furthermore, our case highlights the importance of oral health during pregnancy, a critical yet frequently neglected aspect of maternal care. Integrating routine dental assessments and preventive dental care into prenatal protocols may play a vital role in reducing the risk of rare but serious complications such as brain abscess.

Conclusion

Our case study highlights that clinicians should maintain a broad differential diagnosis when evaluating seizures during pregnancy, with early, comprehensive assessment significantly improving outcomes for both mother and fetus.

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