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### Risk of brain abscess in the nonfenestrated Fontan circulation

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# Brain abscess in a non-fenestrated Fontan patient

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Don't forget about brain abscess!

## BACKGROUND:

- Brain abscess is a rare cause of headache in children but can lead to severe impairment or even death if untreated.
- Abscesses form by direct inoculation or hematogenous spread of bacteria
- Patients with palliated congenital heart disease are at increased risk since microbes may bypass the filtering effects of the lungs via right to left shunting prior to systemic dissemination.

## CASE:

A 15 year old with single ventricle congenital heart disease status post nonfenestrated extracardiac Fontan presented with five days of throbbing, frontal headache and malaise. Neurologic exam in the emergency room was normal and there was no laboratory evidence of infection. Headache improved with acetaminophen and she was discharged. After 48 hours, she returned with similar symptoms, was treated for migraine headache and was discharged after overnight observation. Five days later she returned with recurrent headache and lethargy. Oxygen saturations ranged from 82-93% during each of these visits.

## DECISION-MAKING:

Upon arrival she was febrile, tachycardic and obtunded. Noncontrast head CT showed a right temporal lobe mass with vasogenic edema and midline shift. MRI showed a ring-enhancing lesion and emergent craniectomy confirmed a purulent abscess. Cultures grew *Streptococcus intermedius* which was successfully treated with eight weeks of IV ceftriaxone and oral metronidazole. Dental extractions had been performed two months prior to presentation, but no dental caries were noted on exam during admission. Both TTE and TEE were negative for endocarditis. The patient was known to have venovenous collaterals and pulmonary AV malformations and remained mildly desaturated during admission.

## RESULTS/CONCLUSIONS:

Conventional teaching is that partially palliated cyanotic heart disease resulting in right to left intracardiac shunting contributes to an increased risk of brain abscess formation. In a nonfenestrated Fontan circuit where complete separation of the systemic and pulmonary circulations is expected, it is important to remember that extracardiac right to left shunts such as venovenous collaterals and pulmonary arteriovenous malformations may also allow bacteria direct access to the systemic circulation and may be clinically evident as mild desaturation. While rare, brain abscess should remain on the differential for any Fontan patient with headache and neurologic changes, especially one who has unexplained hypoxia.

