

CentraCare Health DigitalCommons@CentraCare Health

Articles

Posters and Scholarly Works

6-2016

Cerebral Venous Engorgement in Hydrops Fetalis

Adnan I. Qureshi

CentraCare Health, qureshia@centracare.com

Thomas Kohl

University Hospital Giessen

Follow this and additional works at: <https://digitalcommons.centracare.com/articles>

 Part of the [Neurology Commons](#)

Recommended Citation

Qureshi, Adnan I. and Kohl, Thomas, "Cerebral Venous Engorgement in Hydrops Fetalis" (2016). *Articles*. 105.
<https://digitalcommons.centracare.com/articles/105>

This Article is brought to you for free and open access by the Posters and Scholarly Works at DigitalCommons@CentraCare Health. It has been accepted for inclusion in Articles by an authorized administrator of DigitalCommons@CentraCare Health. For more information, please contact schlepers@centracare.com.

Cerebral Venous Engorgement in Hydrops Fetalis

Adnan I. Qureshi, MD¹ and Thomas Kohl, MD²

¹Zeenat Qureshi Stroke Institute and Departments of Neurology and Neurosurgery, University of Minnesota, and CentraCare Health, St. Cloud, MN, USA

²German Center for Fetal Surgery and Minimally-Invasive Therapy (DZFT), University Hospital Giessen, Giessen, Germany

Keywords

Cerebral venous engorgement; fetal ultrasound; hydrops fetalis; minimally invasive therapy

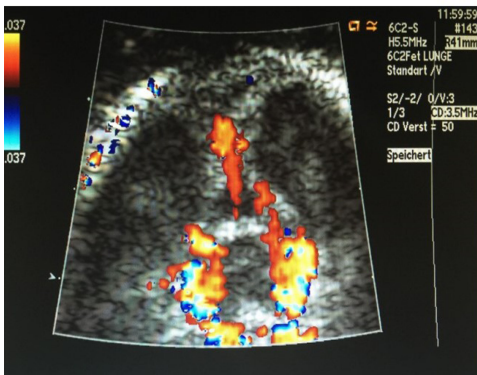


Figure 1A.

A 34-year-old gravida was diagnosed with hydrops fetalis, hydrothorax with cardiac compression, hygroma, ascites, and subcutaneous edema at 20 weeks of gestation. The peak systolic umbilical artery and middle cerebral artery velocities were 30 cm/sec and 28 cm/sec, respectively. The umbilical vein demonstrated a low-amplitude blunted waveform. The cerebral venous sinuses were imaged by color Doppler ultrasonographic at low Nyquist limits in transverse planes at the level of cisterna magna (1). The tentorial venous sinuses (not visualized routinely) and confluences of sinuses were both prominent (Figure 1A). Pulsed-wave Doppler interrogation at the confluence demonstrated a low-amplitude blunted pulsatile waveform composed of a systolic component and a forward early diastolic component (Figure 1B).

The patient underwent thoracoamniotic shunt insertion for hydrothorax, the removal of ascites, aspiration and

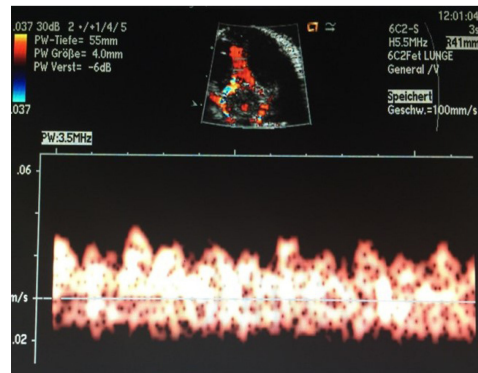


Figure 1B.

alcohol ablation of the hygroma, and amniotic fluid drainage. Follow-up ultrasound on the day after surgery demonstrated near complete resolution of hydrothorax. Postprocedure peak systolic umbilical artery and middle cerebral artery velocities were 30 cm/sec and 37 cm/sec, respectively. The umbilical vein demonstrated a pulsatile waveform with a higher velocity after the procedure, compatible with acute cardiac improvement from improved filling.

On the day after fetal chest drainage, the tentorial venous sinuses were no longer visualized (Figure 2A). Color Doppler imaging at the confluence of sinuses demonstrated an increase in signal amplitude and a normalization of waveform characteristics with forward flow in early and reverse flow with atrial contraction in late diastole; the peak systolic velocity increased from 3.5 cm/sec to 10 cm/sec (Figure 2B).

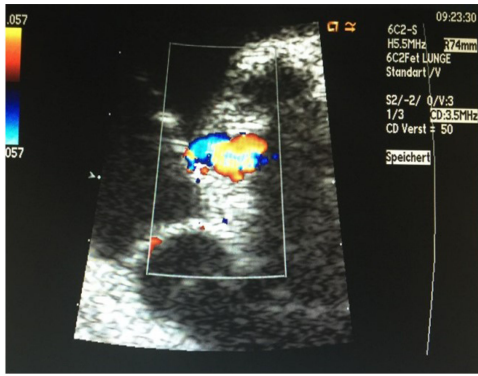


Figure 2A.

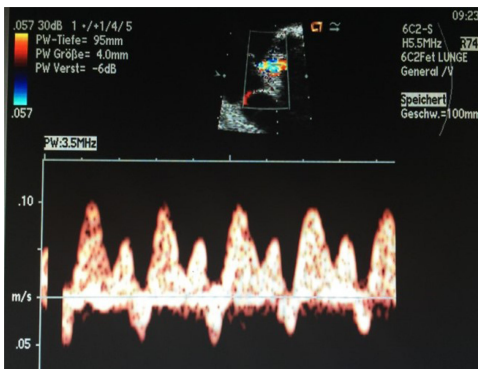


Figure 2B.

The improvement in waveform amplitude and characteristics may be attributable to the resolution of cerebral

venous engorgement by the reduction of intracranial venous outflow resistance toward the chest and heart from thoraco-amniotic shunting as the procedure lowers central venous pressures and improves cardiac filling (2). This effect on brain hemodynamics is clinically important as cerebral venous engorgement may contribute to the occurrence of bilateral thalamic and brainstem necrosis seen in hydrops fetalis (3).

References

1. Laurichesse-Delmas H, Grimaud O, Moscoso G, Ville Y. Color Doppler study of the venous circulation in the fetal brain and hemodynamic study of the cerebral transverse sinus. *Ultrasound Obstet Gynecol* 1999;13(1):34–42.
2. Tongsong T, Tongprasert F, Srisupundit K, Luewan S. Venous Doppler studies in low-output and high-output hydrops fetalis. *Am J Obstet Gynecol* 2010;203(5):488e1–6.
3. Szekessy DP, Bamberg C, Blechschmidt C, Kaindl AM, Stoltenburg-Didinger G. In utero development of symmetric thalamic and brainstem necrosis in a preterm hydropic stillborn. *Clin Neuropathol* 2010;29(6):365–71.