**Real-time Ultrasound Guidance Increases Success of Umbilical Venous Cannulation**

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**Supplemental Digital Content – Video Media Legend:**

**Videos can also be viewed here (password is “USUVC”):** [**https://vimeo.com/showcase/8652773**](https://vimeo.com/showcase/8652773)

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**Supplemental Video 1: Assessing patency of the ductus venosus with ultrasound.** This video demonstrates ultrasound visualization of the ductus venosus by 2D transhepatic imaging in the sagittal plane. It then demonstrates two techniques for confirming patency of the ductus venosus – color Doppler imaging and agitated saline contrast. Copyright by Benjamin Kozyak MD, used with permission under Creative Commons. Duration: 00:48, File Size: 116.5 MB

**Supplemental Video 2: Umbilical venous catheter malposition in the left and right portal veins.** This video demonstrates ultrasound recognition of the most common reasons for failure during attempted insertion of an umbilical venous catheter, specifically, UVC malposition in both left and right portal veins is demonstrated. Copyright by Benjamin Kozyak MD, used with permission under Creative Commons. Duration: 1:29, File Size: 113.2 MB

**Supplemental Video 3: Alignment of vessels and cannulation of the ductus venosus.** Titrated liver pressure, applied using either one’s imaging hand or with the help of an assistant, improves the vascular alignment of the portal sinus and ductus venosus. It also compresses the undesired left portal veins anteriorly and makes the posterior and inferior turn toward the right portal veins more acute and therefore less favorable. This technique significantly improves the success of ductus venosus cannulation. Copyright by Benjamin Kozyak MD, used with permission under Creative Commons. Duration: 1:36, File Size: 139.8 MB

**Supplemental Video 4: Dual-catheter technique for ultrasound-guided umbilical venous cannulation**. This video demonstrates ultrasound-enhanced dual-catheter technique for inserting umbilical venous catheters. If a portal vein is difficult to avoid and recurrently traps the catheter, the catheter may be left there, occupying that undesired channel while a second catheter is inserted and passed beyond it into the ductus venosus, utilizing the techniques described above. Copyright by Benjamin Kozyak MD, used with permission under Creative Commons. Duration: 1:06, File Size: 121.4 MB