Computed Tomography Angiography and Bicaval Dual-Lumen Catheter Positioning

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We report the successful use of electrocardiograph (ECG)-gated computed tomography angiography (CTA) of the chest for confirmation of a bicaval dual-lumen catheter (BCDLC) placement for venovenous (VV) extracorporeal membrane oxygenation (ECMO). Precise positioning is needed for VV ECMO using the BCDLC with placement often challenging due to directing the reinfusion jet towards the tricuspid valve (TV). Placement of the BCDLC is often done in the operating room with radiographic visualization using fluoroscopy and transesophageal echocardiography. Transthoracic echocardiography (TTE) can also be used to assess cannula position to assist placement at the bedside.

An 8-year-old child (136 cm, 28 kg) with acute respiratory distress syndrome was transferred to our facility on VV ECMO with a 27F BCDLC that was cannulated by fluoroscopy. Upon arrival, TTE suggested right ventricular (RV) dysfunction; therefore, CTA was performed to assess cardiac function. Although the TTE indicated proper BCDLC positioning, the CTA incidentally found the side port of the BCDLC 12 mm below the level of the TV, which was likely contributing to cardiac dysfunction. The BCDLC was repositioned and anchored to the internal jugular vein. Three weeks later, CTA was repeated for overt RV failure and hypotension. Figure 1 demonstrates sagittal views of the CTA of the chest, initially demonstrating the side port 12 mm below the level of the TV (Fig 1A) and side port at the level of the TV (Fig 1B) 3 weeks later with excellent cannula positioning (RA = right atrium; RV = right ventricle). Based on these experiences, CTA was useful in determining correct BCDLC-side port positioning.

Fig 1.

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