What's New in MCS

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Reviews:

Postimplant left ventricular assist device fit analysis using three-dimensional reconstruction.
Truong TV, Stanfield JR, Chaffin JS, et al. ASAIO J. 2013 Nov-Dec;59(6):586-92.

This article looked at the difference between the actual position of the HeartMate LVAD cannula and the planned (optimal) position. Hypothetically, the ideal cannula position is directed towards the mitral valve, which many surgeons identify as 45 degrees rightward and posterior from the apex. Using 3-diemnsion modeling from CT scans where the position of the mitral valve is marked, the cannula should be positioned 34 +/- 8 degrees rightward and 15 +/- 7 degrees posteriorly. In the sample of 24 patients, only 8% (2 patients) had cannulas in this position. The actual position of the cannula averaged 22 +/- 15 degrees rightward and 21 +/- 12 degrees posteriorly. Interestingly, there was a higher mortality seen in patients with more rightward (towards the septum) or more anterior (towards the anterior free wall) that patients with posterior or lateral deviation. Another interesting finding is that in patients with serial CT scans, there was little change in the position of the cannula over time.

This study is limited in that it is based on a small sample size and there was not routine scanning at baseline. Thus, the scans obtained were usually for cause, and theoretically after some shifting could have occurred between the OR and scanning due to reverse remodeling. However, it is very important to help us understand the importance of cannula position in outcomes, and to realize that there may be some cannula malpositions that are better tolerated than others. This study should be taken together with Taghavi et al (Ann Thorac Surg 2013;96(4):1259-65) which looked at angulation of the inflow cannula and position of the pump in the pocket as predictors of pump thrombosis. As demonstrated in this current article, cannula malposition is common, but hopefully surgeons will be able to better predict a safe cannula position with the limited data available intraoperatively as more data becomes available.

Weaning of extracorporeal membrane oxygenation using continuous hemodynamic transesophageal echocardiography.
Cavarocchi NC, Pitcher HT, Yang Q, et al. J Thorac Cardiovasc Surg. 2013 Dec;146(6):1474-9.

As more patients with severe cardiopulmonary failure are being treated with ECMO, it is becoming more important to be able to decide when a patient can be successfully weaned from support or when a transition to a more durable form of support is necessary. In this study, Dr. Cavarocchi et al. describe the use of hemodynamic TEE (hTEE) in these patients as well as a protocol for determining when weaning is likely to be successful. Through the use of the protocol described in this article, 21 patients on VA ECMO were assessed for the potential for successful weaning. Seven patients could not complete the protocol due to severe biventricular failure and subsequently expired. The remaining patients (n = 14) completed the full weaning protocol. Of these, 8 underwent LVAD implantation for persistent LV failure with recovered RV function, and half of these were discharged alive. The

remaining 6 patients were felt suitable for weaning from ECMO. Four of these were discharged from the hospital alive.

The hTEE probe is a small device that is inserted similarly to an oro-gastric tube and is designated for single-patient use. The major benefit of this device in this setting is that it can be used for prolonged periods of observation, such as an ECMO wean, without requiring the continued presence of an echocardiographer or traditional TEE equipment at the bedside for the duration of the weaning process. This allows the intensivist to conduct a full weaning trial in the ICU setting with minimal impact upon other hospital services and equipment.

Citations:

ASAIO Journal:

Rupprecht L, Flörchinger B, Schopka S, et al. Cardiac decompression on extracorporeal life support: a review and discussion of the literature. ASAIO J. 2013 Nov-Dec;59(6):547-53.
Affronti A, di Bella I, Carino D, et al. Levosimendan may improve weaning outcomes in venoarterial ECMO patients. ASAIO J. 2013 Nov-Dec;59(6):554-7. *

Camboni D, Rojas A, Sassalos P, et al. Long-term animal model of venovenous extracorporeal membrane oxygenation with atrial septal defect as a bridge to lung transplantation. ASAIO J. 2013 Nov-Dec;59(6):558-63.

Takeda K, Naka Y, Yang JA, et al. Timing of temporary right ventricular assist device insertion for severe right heart failure after left ventricular assist device implantation. ASAIO J. 2013 Nov-Dec;59(6):564-9. *

Stulak JM, Maltais S, Cowger J, et al. Prevention of percutaneous driveline infection after left ventricular assist device implantation: prophylactic antibiotics are not necessary. ASAIO J. 2013 Nov-Dec;59(6):570-4.

Chamogeorgakis T, Rafael A, Shafii AE, et al. Which is better: a miniaturized percutaneous ventricular assist device or extracorporeal membrane oxygenation for patients with cardiogenic shock? ASAIO J. 2013 Nov-Dec;59(6):607-11. *

Buscher H, Vaidiyanathan S, Al-Soufi S, et al. Sedation practice in veno-venous extracorporeal membrane oxygenation: an international survey. ASAIO J. 2013 Nov-Dec;59(6):636-41.

Srivastava AV, Hrobowski T, Krese L, et al. High rates of false-positive hepatitis C antibody tests can occur after left ventricular assist device implantation. ASAIO J. 2013 Nov-Dec;59(6):660-1. *

Missov E. Left ventricular assist device inflow cannula thrombus: characterization with two-dimensional transthoracic echocardiography. ASAIO J. 2013 Nov-Dec;59(6):662-3.

Umakanthan R, Haglund NA, Stulak JM, et al. Left thoracotomy HeartWare implantation with outflow graft anastomosis to the descending aorta: a simplified bridge for patients with multiple previous sternotomies. ASAIO J. 2013 Nov-Dec;59(6):664-7.

Cheng A, Swartz MF, Massey HT. VADoscopy: a novel intraoperative technique to evaluate HeartMate II left ventricular assist device inflow obstruction and thrombosis. ASAIO J. 2013 Nov-Dec;59(6):671-4.