The SynCardia Total Artificial Heart (SynCardia Systems, Inc, Tucson, Arizona) is a biventricular, pneumatic, pulsatile pump that replaces the patient’s native ventricles and all four cardiac valves; this device is currently implanted in patients with end-stage heart failure as a bridge to transplant. Herein, we report the case of a 45 year old, 56, 98 kg woman who was transferred to our institution after initial presentation to an outside hospital with an acute ST elevation myocardial infarction and cardiogenic shock. Cardiac catheterization upon transfer to our institution revealed stenosis of the left anterior descending (LAD, 80%) and right (RCA, 100%) coronary arteries, for which a bare metal stent was placed only in the proximal LAD. Ventriculogram revealed severe left ventricular systolic dysfunction (EF 25%, anterior and anteroapical dyskinesis/hypokinesis) and right ventricular (RV) dysfunction. The patient was noted to have significant pulmonary hypertension as well (73/41 (53), wedge 40-50). An intraaortic balloon pump (IABP) was placed at this time. Initial transthoracic echocardiogram demonstrated left ventricular hypertrophy and severe global hypokinesis (EF 15%). The patient remained in persistent severe cardiogenic shock after IABP placement, and subsequently developed respiratory failure, requiring emergent bedside placement on veno-arterial extracorporeal membrane oxygenation (ECMO). The patient remained on ECMO and significant vasopressor support for seven days awaiting transplantation with no evidence of improvement of biventricular dysfunction. The surgical team considered implantation of biventricular assist devices as a bridge to transplantation, but declined because of persistent RCA occlusion and high likelihood of further RV dysfunction while awaiting availability of a rare blood-type-compatible donor heart. The patient was, however, determined to be a candidate for the SynCardia Total Artificial Heart (TAH). This device places unique demands on the anesthesia team caring for the patient undergoing total artificial heart implantation. And, although severely limited by artifact, transesophageal echocardiography is critical in the intra-operative management of this device, as the TAH is preload sensitive and compression of the vena cava and/or pulmonary veins can lead to hemodynamic collapse.