Commentary: Disappointments are often the positive stepping stones towards success: Expanding the use of total artificial hearts to infants

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The article by Woods and colleagues¹ describes their experience in applying an ambitious strategy of total artificial heart (TAH) support to a smaller, more complex patient population than previously described. Since the advent of total artificial heart support, its popularity has grown and its indications broadened due to the contributions of similar articles. In describing not only successes, but also failures, articles such as this allow our community to truly learn from our experiences.

Since the first human TAH implantation in 1969, the device has grown significantly in technological advancement and in its use in everyday practice.² From starting as a substitute for heart transplantation to serving as a stable bridge to transplantation to now even acting as a salvage operation to support critically ill patients, the TAH strategy has matured.³ The authors have furthered this with a new method of providing TAH support in small children and infants with both biventricular and single-ventricle circulations. What is notable is the authors' willingness to change their strategies in the face of new obstacles. This was, for example, evident in regard to the modification made to the platform for centrifugal pumps. These modifications were initially made to account for thermal loss and risk of air embolism; however, it was noted that due to the pump being placed immediately next to the patient, the patient's mobility was inhibited. For this reason, the authors used pulsatile pumps in patients expected to mobilize. This is just a small example of a recurring theme in the article of reflecting on both positive and negative experiences and suggesting immediate solutions for improvement.

In regard to the specific cases, we commend the authors for employing the TAH and achieving success in bridging

Karthik Thangappan, MD (left), and David L.S. Morales, MD (right)

Central Message

Despite some disappointments, the authors' efforts to expand the use of TAHs to small children are positive stepping stones toward comprehensively understanding its possibilities and limitations.

See Article page 1075.

to transplantation in 3 critically ill patients. Despite the disappointing outcome in 2 patients, who each died due to postoperative progression of pre-existing end-organ damage, the authors have shown that through deliberate attempts to learn from previous experiences and willingness to adapt standard practices to changing conditions, the TAH may be beneficial for our smaller patients who do not have a consistently successful support strategy. However, like almost all new devices and strategies, this experience suffered from applying a new technique in very ill patients, in whom their outcome is most likely inexorable. Thus, the novel technique is not legitimately assessed.

The authors should be commended for this imaginative technique and for reporting not only positive outcomes, but also negative outcomes and reflecting on how these "disappointments are often the positive stepping stones" toward expanding TAH support to our smallest patients.

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