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Commentary: Potts palliation for pulmonary hypertension: What's next?

Emre Belli, MD

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CENTRAL MESSAGE

Potts palliation for PH in children has made itself a place in our therapeutic armamentarium. It seems to be more appropriate to concentrate children with PH in centers with specific expertise.

Pulmonary hypertension (PH) in children, adolescents, and young adults is a rare but complex clinical condition. Despite significant improvements in medical therapy, outcomes remain poor. Lung transplantation was the only surgical therapeutic option before we proposed the Potts alternative for medication-refractory patients as a novel palliative approach.[1,2] The initial experience included exclusively patients presenting with idiopathic PH between ages 3 and 15 years. Then, percutaneous transcatheter Potts was also performed in 5 patients. In addition, 1 patient benefited from a surgical unidirectional valved Potts anastomosis.[3] All procedures were performed without cardiopulmonary bypass or extracorporeal membrane oxygenation support. The outcomes demonstrated the technical safety and, despite 3 out of 24 with early mortality, no late mortality, improved clinical condition, and functional capacity, or left ventricular diastolic and right ventricular systolic function. One child underwent double lung transplantation because of refractory hemoptysis anticipated by percutaneous closure of her Potts shunt performed 6 years earlier.

Lancaster and colleagues[4] started their Potts palliation program for PH in 2013. They favorably compared their series with noncontemporary lung transplant patients. Their experience opened 4 new dimensions for Potts in PH settings:

- Potts palliation (other than idiopathic PH) for Eisenmenger and Shone complex patients;
- Emergency Potts in acutely decompensated children;
- Frequent (or preference for) conduit and also valved conduit Potts anastomosis; and
- Frequent extracorporeal membrane oxygenation/coronary pulmonary bypass support.

Major complications were not uncommon (35%) and their experience discredited the emergency Potts option. They considered Potts palliation as an effective alternative but also a bridge for subsequent lung transplantation by improvement of the patient's clinical condition, and also, despite not being stated in the article, allowing children to reach larger size and thus suitable for adult lung donors, which are by definition more available.

Among the major dangers concerning the efficiency of any particular surgical technique, especially in the case that the later is palliative, seems to be its abuse. Despite small cohorts, Potts palliation affirmed its safety as a lifesaving technique in children with poorly tolerated idiopathic PH. Its application in other etiologic forms of PH must still be considered with caution. And above all, it seems now to be necessary for precisely defining indication criteria and the optimal timing for Potts palliation in children with PH. The application of Potts in the setting of Eisenmenger might justify its use in this particular group of patients, not only after, but also concomitant with, the closure of intracardiac defects?

Potts palliation for PH in children has made a place for itself in our therapeutic armamentarium. As in cases of any rare diseases and its management, it seems to be more appropriate to concentrate children with PH in centers with specific expertise.

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Commentary: Repair or replace—Potts shunt versus lung transplantation for refractory pediatric pulmonary hypertension

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Like killing a cylinder, Potts shunts restore balance while avoiding the underlying issue.

CONG

CENTRAL MESSAGE

Potts shunts equilibrate right and left ventricular pressures to improve the functional status in patients with refractory pulmonary hypertension, although long-term results remain largely unknown.

Patients presenting with medically refractory pulmonary hypertension are traditionally listed for lung transplantation. Historically, the availability of suitable donor lungs, particularly for pediatric patients, led to long waitlist times and increased morbidity and mortality. Lancaster and colleagues[1] review their success using Potts shunts as an alternative to lung transplantation in this population over the past 6 years, discuss key learning points, and demonstrate their technique for a valved Potts shunt.

Engines today are commonly built in a V-configuration (eg, V4, V6, V8), wherein an equal number of cylinders are present on either side of an engine block, orientated away from one another like a V. The configuration decreases the length of the engine block relative to an inline configuration, although it requires all cylinders to fire symmetrically for the engine to remain balanced. If a cylinder misfires, or becomes asymmetric, there is a reduction in power, increased noise, and a shutter due to the lack of balance within the engine. If left untreated, this can progress to engine failure. In a majority of cases, this issue can be fixed by replacing a spark plug or gasket. Although in other cases, the cylinder itself is warped and car owners are faced with the decision of repairing the engine block or replacing the engine entirely.

In a similar fashion, patients with refractory pulmonary hypertension develop cardiac dysfunction and activity restriction that can carry fatal long-term consequences unless managed through a Potts shunt or lung transplantation as described by Lancaster and colleagues[1] in this issue of the *Journal*. In their retrospective study, the authors compare outcomes for patients historically undergoing lung

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