Second stage following initial hybrid palliation for Hypoplastic left heart syndrome: Arterial or venous shunt?

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Objective:
Hybrid palliation for Hypoplastic Left Heart Syndrome (HLHS) has been developed as an alternative to neonatal Norwood surgery. At the second stage, a source of pulmonary blood flow has to be established; typically in the form of superior cavopulmonary connection. Concerns have been raised considering the significant challenge in the reconstruction of branch pulmonary arteries and the less development of the pulmonary arteries at the time of Fontan completion. In this study we compare 2 groups of patients; those who received an arterial modified Blalock Taussig shunt (2 stage Norwood I) or a venous superior cavopulmonary shunt (comprehensive Norwood I&II).

Methods:
We retrospectively reviewed patients who received second stage palliation following initial hybrid. Patients were stratified according to the source of pulmonary blood supply into arterial shunt (n=17 patients) or venous shunt (n= 26 patients). We compared results considering mortality, morbidity and findings at the pre-Fontan MRI.

Results:
Age and weight at operation were lower in the arterial group (104.9±57.6Vs184±108.3 P=0.001, 4±1.6Vs5.5±1.7 P=0.001 respectively). All recorded surgical times were shorter in the arterial group. Considering post-operative stay, only mechanical ventilation times were in favour of the venous group (9.9±5.5Vs7.1±5.3 P=0.043). There was no difference in mortality (2/17 Vs5/26 P=0.685) or incidence of complications. In the immediate post-operative period, there was tendency toward higher need for intervention on branch pulmonary arteries in the venous group while there was a higher tendency for interstage branch pulmonary artery intervention in the arterial group, however neither did reach significance. The arterial group has shown better development of branch pulmonary arteries with a higher lower lobe index (158.3±39.4Vs114.9±43.96 P=0.037). There was no difference in the EF or indexed EDV (57.00±8.29 Vs59.80±10.93 P=0.541 and 92.7±19.3Vs75.3±25.2 P=0.112 respectively)

Conclusion:
Both arterial and venous shunt are viable options with mortality and morbidity results comparable to literature. The two stage Norwood I seems to be non inferior to the comprehensive/combined Norwood I&II with better development of branch pulmonary arteries at the time of Fontan completion.