Use of the Internal Thoracic Artery as a Suitable Conduit for Systemic-Pulmonary Shunt

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Abstract

There are a number of systemic-to-pulmonary artery shunts being performed by various surgeons. Currently the most widely used systemic-pulmonary shunt is the modified Blalock-Taussig shunt. This shunt is highly effective even in neonates with small pulmonary arteries. We report the case of a 15-years-old girl in whom the internal thoracic artery was used to create a systemic-pulmonary artery shunt after the failure of a previous Blalock-Taussig shunt. This is the first report of such a case in which the internal mammary artery was used to establish systemic to pulmonary arterial flow in Iran ***(Iranian Heart Journal 2004; 5(3):67-69).***

Key words*:* Blalock-Taussig shunt■ systemic-pulmonary shunt

Palliative shunts have been highly effective in improving the well-being of cyanotic patients. The use of the internal thoracic artery as a systemic-pulmonary artery shunt was first reported by Cobanoglu and co-worker in 1984.[1] We report the case of a 15-year-old girl in whom the internal thoracic artery was used to create a systemic-pulmonary artery shunt after the failure of a previous Blalock-Taussig shunt.

Case report

A 15-year-old girl was admitted to our Center for severe cyanosis and severe polycythemia (SaO2 ≤53% and hemoglobin=26 g/dl). Cardiac catheterization revealed severe tetralogy of Fallot with pulmonary atresia and diminutive pulmonary arteries and under-developed peripheral pulmonary branches and non-functional previous shunt. Aortography revealed a well-developed right internal thoracic artery (Fig 1). A left modified Blalock-Taussig shunt had been performed 8.5 years ago.

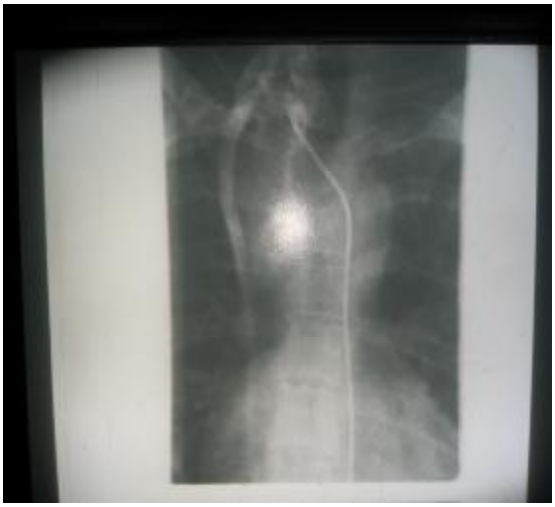

Fig. 1. Aortography with well-developed and large size RIMA.

The patient was scheduled for right modified B-T shunt. During operation through a right thoracotomy, there were adhesions and multiple small vessels on the right inominate and subclavian artery, so we mobilized the right internal thoracic artery as long as possible, using a similar technique to that used in preparation of the internal thoracic artery for CABG with sternotomy. The internal thoracic artery

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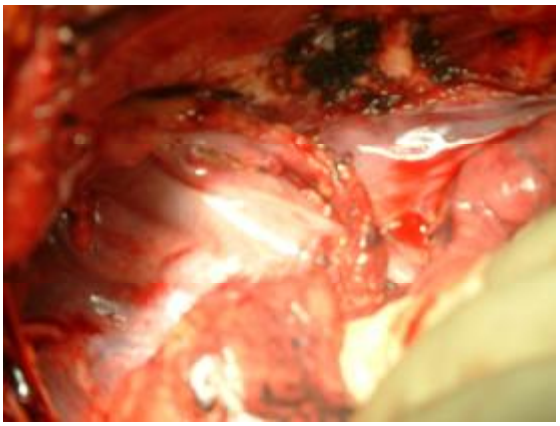
was 5mm in diameter, the same size as the right pulmonary artery diameter (Fig. 2).

Fig. 2. RIMA after harvesting.

Heparin was infused as 1mg/kg dose and a tension-free, end-to-side anastomosis was performed between the right pulmonary artery and pediculated right internal thoracic artery with 7-0 monofilament polypropylene suture Figs.3, 4).



Figs. 3, 4. End of operation.

Postoperative course was uneventful and a significant improvement in clinical status and exercise intolerance was achieved and SaO2 rose to 89%.

Discussion

In cyanotic heart disease, current trends are to urge early total correction as soon as possible at any time to avoid the necessity of a second operation. However, shunts are still necessary for some complex cyanotic heart defects that are not correctable. The indication for shunt operation in some complex cyanotic heart defects is the presence of severe cyanosis (Sao2 less than 70% to 75%), while other causes of cyanosis, such as reversible lung disease, anemia, and obstructive pulmonary venous connection, are ruled out. There are numerous techniques to create systemic-to-pulmonary artery shunts[2], currently the most widely used systemic-pulmonary shunt being the modified Blalock-Taussig shunt. Recently, the use of the internal thoracic artery for systemic-pulmonary shunt has been reported with excellent results.[1,3] This procedure may offer advantages over standard methods in selected patients with extremely small pulmonary arteries. The pliability, favorable anatomical position, and growth capability of the IMA reduces chances of complications such as stenosing, kinking, and stretching of the pulmonary artery, and consequently distortion of the structure which makes definitive repair difficult. Internal thoracic artery to LAD graft has a 10-year patency of over 90% and there are reports of continued patency at 15, 20, 25 and 30 years postoperatively.[4] we believe that the internal thoracic artery to pulmonary artery graft should have the same patency rate. Harvesting of the internal thoracic artery with a thoracothomy incision is simple with similar technique to that used in preparation of the IMA for CABG. In

review of the literature, there are less than 15 published cases of internal thoracic arteries used for systemic-pulmonary shunt[5-12] In Iran there are no reports of such operation published so far. We suggest this technique may have distinct advantages in selected cases and should be considered as an alternative during investigation of the children who require a systemic-to-pulmonary artery shunt.

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