

TOTAL CORRECTION FOR TETRALOGY OF FALLOT AFTER BROCK-TYPE OPERATION*

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SUMMARY: Yurdakul Y, Arsan S, Peker O, Yücekaya E, Özkutlu S. (Department of Thoracic and Cardiovascular Surgery, Hacettepe University Faculty of Medicine, Ankara, Turkey). Total correction for tetralogy of Fallot after Brock-type operation. Turk J Pediatr 1994; 333-336.

We present a case of tetralogy of Fallot who had previously undergone a graded Brock-type operation. The post-operative development of pulmonary arteries and pulmonary trunk after the Brock operation were very suitable for total correction, which was then performed successfully. In contrast to shunt, in Brock-type operations enlargement of the outflow tract induces symmetrical growth of hypoplastic pulmonary arteries without the risk of acquired pulmonary obstruction or peripheral stenosis at the site of anastomosis. After palliative operations, the repair can be deferred until the pulmonary arteries are of a suitable size. *Key words: tetralogy of Fallot, hypoplastic pulmonary arteries, two-stage repair, Brock-type operation.*

Patients with tetralogy of Fallot and unfavorable anatomy of the right ventricular outflow tract or hypoplastic pulmonary arteries may require primary palliation and subsequent repair (two-stage repair). The concept of palliation includes improvement of the pulmonary arterial perfusion and reduction of systemic hypoxia, usually by means of some type of arterio pulmonary arterial shunt or, rarely, a Brock-type operation¹. Brock-type operations carry the risk of pulmonary hypertension, however the increase of pulmonary blood flow may stimulate the growth of primarily hypoplastic pulmonary arteries and train the frequently smaller-than-normal left ventricle¹. In contrast to a shunt, enlargement of the outflow tract induces symmetrical growth of hypoplastic pulmonary arteries without the risk of acquired pulmonary obstruction or peripheral stenosis at the site of anastomosis².

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Case Report

The patient was a 14-year-old girl whose previous medical history included two operations and three catheterizations. In 1981 at the age of two years, a catheterization showed that the pulmonary artery diameter was one-fourth of the aortic diameter. Exploratory surgery was performed by left posterolateral thoracotomy, revealing many collaterals but no pulmonary artery, and the thoracotomy was closed.

In 1990 when the patient was 11 years old, she underwent another catheterization. The pulmonary arteries and trunk were found to be very hypoplastic (Fig. 1), and the decision was made to do a Brock operation. Intraoperatively, infundibular band resection and pulmonary valve commissurotomy were performed. Here, we performed graded enlargement of the outflow tract. In 1992 a third catheterization displayed well-developed pulmonary arteries and pulmonary trunk (Fig. 2), with a pulmonary artery pressure of 18 mmHg. In January 1993, total correction was performed. We used a patch for the ventriculotomy and outflow tract. The postoperative status of the patient was very good, requiring the use of no positive inotropic agent, and the patient was discharged on the eighth postoperative day.



Fig. 1: The angiographic film of the pulmonary arteries before Brock-type operation.

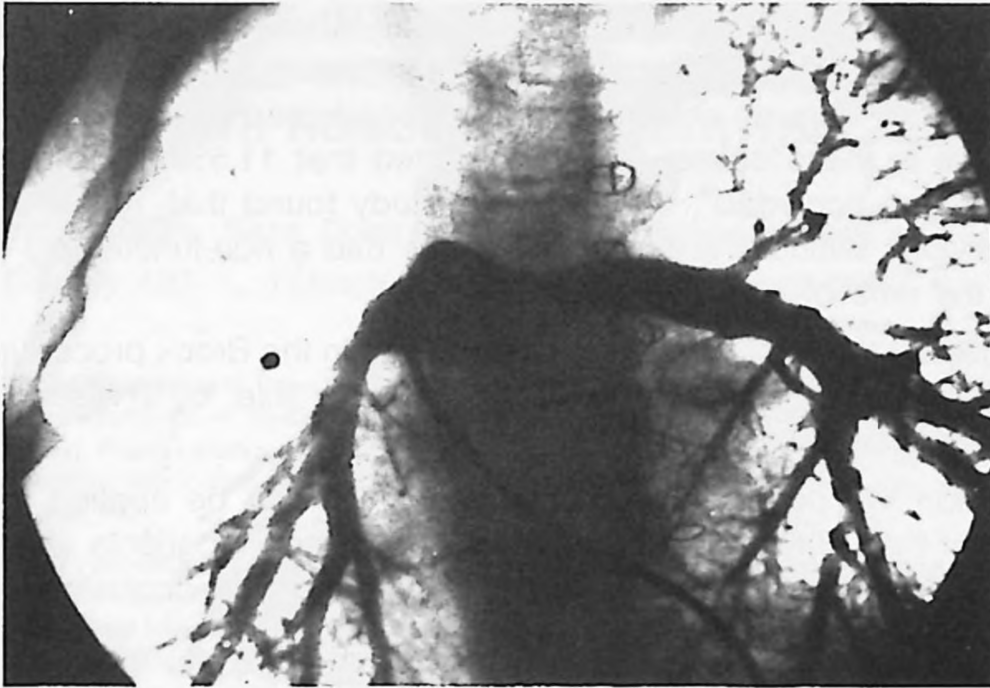


Fig. 2: The angiographic film of the pulmonary arteries before total correction.

Discussion

Several teams have published their experiences regarding the growth of pulmonary arteries after one method or palliation³. In this case report we review a patient who had a two-stage operation: Brock operation followed by total correction. After Brock-type palliative operations, no specific surgical problems are typically anticipated at definitive repair except for dissection of the intrapericardial adhesions; however, a previously constructed aortopulmonary shunt must be closed before starting total correction¹.

After Blalock-Taussig operation, the ipsilateral pulmonary artery predominantly increases in size without significant growth of the pulmonary vascular ring and pulmonary trunk. The Brock procedure induces a significant and symmetrical growth of the pulmonary arterial system by improving proximal flow in the pulmonary vascular system². The repair can be deferred until the pulmonary arteries are of a suitable size. The relative diameter of the right pulmonary artery should be at least 30 percent of the diameter of the ascending aorta⁴.

Palliative operations should not only reduce the symptoms of hypoxia but should also induce the growth of the pulmonary vascular tree, thereby creating improved anatomy for complete repair².

In patients with critically hypoplastic pulmonary arteries, we prefer the graded enlargement of the outflow tract because of its beneficial effects on pulmonary vascular growth². We do not prefer shunt procedures because of the high risk of occlusion in these cases. One report cited that 11.5% of Blalock-Taussig shunts became occluded⁴, while another study found that 18.4% of patients with a previous Blalock-Taussig anastomosis had a non-functioning occluded shunt at the time of definitive repair¹.

Enlargement of the right ventricular outflow tract in the Brock procedure should be to approximately one-half of the appropriate size, otherwise pulmonary hypertension may develop.

In conclusion, we prefer shunt procedures which can be applied to patients more easily than Brock-type procedures. However, in patients with critically hypoplastic pulmonary arteries and a high risk of shunt occlusion, we prefer Brock-type operations.

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