Brief communication - Congenital

Neo-coarctation after the arterial switch operation

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Received 7 January 2011; received in revised form 19 May 2011; accepted 20 May 2011

Abstract

Neo-coarctation following arterial switch operation (ASO) for transposition of the great arteries (TGA) is a complication that is not regularly described, but may occur. We describe five patients who developed a neo-coarctation after operation. They were diagnosed with TGA, either with or without ventricular septal defect without signs or symptoms of a coarctation. Except for one patient, all patients were reoperated for a neo-coarctation within one year after the ASO. Several explanations are discussed as a possible cause for this phenomenon.

Keywords: Coronary heart disease; Arterial switch; Coarctation; Reoperation

1. Introduction

The arterial switch operation (ASO) for patients with transposition of the great arteries (TGA) has been carried out for more than 30 years. Coarctation of the aorta following ASO in patients with TGA, who were not diagnosed with coarctation preoperatively, is an uncommon late complication rarely described in literature [1]. We describe five patients who developed a neo-coarctation of the aorta after ASO.

2. Patients, methods and results

Between 1977 and 2007, 332 patients have undergone ASO for TGA in our center of which five developed a neo-coarctation. Median age at ASO was 11 days (range four to 42 days) and median weight was 3.3 kg (range 1.7–3.5 kg). Even if a Rashkind procedure was performed, prostaglandin therapy was continued. Other patient characteristics concerning the primary surgery are described in Table 1.

Four patients were reoperated for neo-coarctation within a year after ASO and one patient was reoperated almost five years after the initial ASO. None of the patients had any clinically detectable aortic arch abnormalities prior to the initial surgery. None of these cases were clustered in any way. Median time between the ASO and the reoperation for coarctation was four months (range 0.5–53.7 months).

The diagnosis was made whenever an important stenosis in the distal arch was found that needed surgical therapy. The coarctation in these patients was always juxta-ductal.

There was no evidence of isthmic hypoplasia. Coarctation repair was performed through a limited left posterolateral thoracotomy using an end-to-end anastomosis in all patients. The excised specimens were not sent for histopathological research. There was no early or late mortality. Median follow-up was five years (range one month to eight years). In two patients, a mild gradient was present in the aortic arch during echocardiographic follow-up, however, no reoperation or transcatheter intervention has been necessary.

3. Comment

One of the most common reoperations after ASO concerns the right ventricular outflow tract. Also, reoperation for neo-aortic regurgitation has been described, as well as reoperation for recurrent arch abnormalities [2, 3]. However, the incidence of a developing neo-coarctation is not high. Still it may occur after the ASO, as has been described by Mulder et al., who have reported two patients developing a neo-coarctation, with no previous signs of a preoperatively existing coarctation [1].

In our series, five of 332 patients (1.5%) developed a neo-coarctation. None of the patients had any clinical evidence of arch hypoplasia or pre-existing coarctation pre-ASO. However, all but one were described to be dependent on their fairly large, prostaglandin mediated, patent ductus arteriosus (PDA). Even when an atrial balloon septostomy was performed and judged successful, prostaglandin therapy was continued. In patients with localized coarctation it has been shown that ductal tissue may encircle the aorta as a ductal sling which can aggravate the coarctation with closure of the patent ductus after birth [4]. Several case
abnormalities of the periductal aortic wall might play a role in the occurrence of recoarctation after repair.

In our patient group, all patients were reoperated for a neo-coarctation. One of the patients did not have a PDA at the time of initial surgery, however, in this case we still speculate that the above-presented theory may have played a role in the occurrence of the neo-coarctation.

4. Conclusion

A neo-coarctation after the ASO is a rare finding and is not being described regularly in literature. Nevertheless, we emphasize that in patients with TGA and a large, prostaglandin-dependent PDA, a neo-coarctation can form some time after the ASO, even without clinical or echocardiographic signs of coarctation before or during initial surgery.

References