Successful repair of intraoperative type-A dissection in an infant


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Abstract

A case of intraoperative type-A aortic dissection caused by partial displacement of the aortic cannula in a 6-month-old infant is presented, which was successfully managed by reapproximation of the dissected layers of the ascending aorta. At 1 year of follow-up the imaging studies show a normal appearance of the operation site. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

A 6-month-old infant with Rastelli type-A atrio-ventricular canal and trisomy 21 underwent elective repair. The operation was planned to be performed in deep hypothermic circulatory arrest (DHCA). Cardiopulmonary-bypass (CPB) was established with ascending aortic and single right atrial cannulation (‘Ziemer’ aortic cannula 10 Fr, Jostra Medizintechnik GmbH and Co. KG, Hirrlingen, Gernany; Stockert pediatric venous cannula 20 Fr, Stockert AG, Munich, Germany). The bypass was commenced uneventfully and the patient showed uniform cooling with normal perfusion parameters.

At 22°C rectal temperature, after 14 min of cooling, a cardioplegia cannula (22G needle) was introduced through a purse string in the aortic root. Shortly thereafter the perfusion pressure fell, the perfusionist noting an increase in the arterial line resistance. The external aspect of the aorta at that point was not suggestive of aortic dissection. By minimal adjustment of the position of the aortic cannula the perfusion pressure returned to acceptable level and cooling was continued for some further 2 min, when again the perfusion pressure disappeared, and the aorta showing then a bluish tint. By that time the rectal temperature had fallen below 20°C.

The circulation was arrested, the aortic cross clamp was applied and a transverse aortotomy was performed at the level of the cardioplegia cannulation site. Upon exploration an extended dissection was noted in the aorta (Fig. 1A), which comprised the anterior two-thirds of the circumference. The dissection did not involve the coronary ostia and the aortic valve. Under these conditions the clamp was removed and a longitudinal aortotomy was performed on the anterior aspect of the ascending aorta, extending further into the aortic arch, permitting the assessment of the origin of the neck vessels, which appeared normal.

The two layers of the dissected aorta were reapproximated with a double layer of running 5/0 Prolene (Ethicon, Johnson and Johnson) suture, commencing at the most distal point of the aortotomy (Fig. 1B). The repair of the atrioventricular canal defect was then performed through the right atrium, using standard techniques [1]. Upon completion the aortic cannula was reintroduced in a more lateral position (in a place not affected by the dissection), tied down by an ‘U’ shaped purse string stitch incorporated in the former transverse aortotomy (Fig. 1C). CPB was reestablished. Rewarming and weaning from the extracorporeal circulation were uneventful, with normal resistances and flows.

The CPB time was 108 min and the combined myocardial ischemic time/duration of DHCA was 42 min.

The infant was returned, in stable hemodynamic condition, to the intensive care unit, and deep sedation and paralysis were continued for 72 h, heparin administration being avoided postoperatively, in order to help the sealing of the aortic layers. Subsequently, the patient made a full recovery, without any neurologic sequelae. A magnetic resonance scan was performed prior to discharge, on postoperative day 15 and it showed a normal looking aorta without any sign of residual dissection.
2. Discussion

Intraoperative, iatrogenic aortic dissection is a very dreaded but fortunately very rare complication of cardiac surgery. Several reports exist describing the management in the adult group, where obviously the pre-existent aortic pathology plays an important role [2,3]. In the pediatric age group aortic lacerations from cannulation seem to be exceedingly rare. Scarcity of literature makes one assume that the outcome is usually fatal. In this particular case we speculate that the initial event took place at the aortic cannulation site, the oblique tip of the cannula having been dislodged into an intramural position, and producing a limited dissection. The final precipitating event, which produced extension, was presumably the manipulation of the aortic cannula, when introducing the cardioplegia cannula, which placed the tip of the arterial cannula into the false lumen.

Addressing aortic dissection in small children is more complex than it is in adults, where prosthetic replacement of the ascending aorta is considered mandatory. The necessity for growth potential forced us to consider repair by reapproximating the dissected layers and excluding the entry. By advancing the aortotomy distally we excluded the possibility of a retained hematoma in the aortic wall as well.

The postoperative management was conducted in such a way that prolonged sedation prevented the hemodynamic oscillations and the complete avoidance of heparin postoperatively has helped the “healing” of the dissected layers by thrombotic adhesion.

References

