Complex multistage endovascular repair of dissection of the arch, thoracic, and abdominal aorta in a pediatric patient

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Aortic dissection coexisting with a large pseudoaneurysm is a rare entity in pediatric patients, [1]. Usually, such dissections are seen in Marfan syndrome, anatomical anomalies of the aortic arch, or accompanying blunt chest injuries [1, 2]. Here we present a case of such an aortic dissection in an 11-year-old girl. Fourteen months earlier, this patient had undergone surgical aortic valve replacement with St. Jude valve and Galweave aortic prosthesis due to aortic dissection of unknown non-Marfan origin. At that time, the aortic dissection extended from the ascending to abdominal aorta, and the false lumen diameter was 20–32 mm. Due to a coexisting dissection of the left subclavian artery, she underwent stent implantation at the level of this dissection. Still, this procedure solved the problem only partially and made future reconstructions even more challenging.

Considering progressing enlargement of the dissections and severe dysphagia resulting from compression of the esophagus, we decided to attempt endovascular repair of this complex vascular lesion. On admission, the patient presented with a large aortic dissection, beginning about 4 cm proximally from the brachiocephalic trunk and extending to the level of the celiac trunk. The dissection was the widest next to the left subclavian artery: 61 mm (Figure 1A); throughout the descending aorta, it had a diameter of 40–50 mm. Entry points to the false lumen were situated at the levels of the brachiocephalic trunk, left subclavian artery (LSA), in the upper part of the descending aorta, and above the celiac trunk. The LSA was also dissected, and this dissection extended to the distal part of the brachial artery. In addition, this patient presented with a dominant left vertebral artery while the right vertebral artery was occluded in the V3 segment.

Due to the unfavorable anatomy of the vertebral arteries, we decided to address the dissection of the LSA first and to close dissections and entry points to the false lumen thereafter (Figure 1B). In the first step, we implanted a covered stent in the proximal part of the LSA, closing the dissection of this artery. Then, using the kissing-stent technique, smaller covered stents were implanted in the distal part of the LSA and the left vertebral artery. In the second stage, we implanted covered stents in the brachiocephalic trunk, right subclavian and right common carotid arteries. Then, the aortic dissection was closed with two covered stents, which were fixed with two self-expanding stents. The entry point to the false lumen at the level of the LSA was closed with the Amplatzer Vascular Plug, and the false lumen was embolized with 5 coils. Since this endoleak was still present at follow-up (Figure 1C), during the next procedure it was closed with Onyx glue and several additional coils. The follow-up 12 months after the last procedure revealed complete closure of dissections and good inflow to the aortic branches (Figure 1D). The aortic true lumen had a diameter of 27 mm. This case demonstrates that even very complex aortic dissections in vulnerable pediatric patients can be successfully managed if the procedure is staged and different endovascular devices are used.

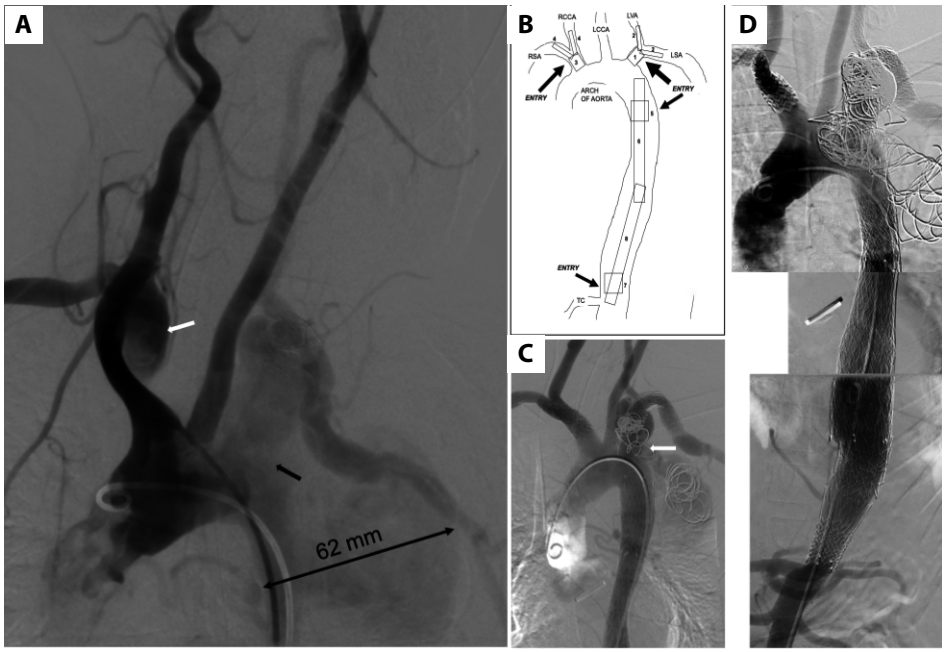

Figure 1. A. Procedural aortography: the white arrow points to the endoleak to the false lumen at the level of the left subclavian artery; the black arrow indicates the endoleak to the false lumen at the level of the brachiocephalic trunk. **B.** Scheme of endovascular repair: 1: covered stent in left subclavian artery, 2: covered stents in the left subclavian and left vertebral arteries, 3: covered stent in the brachiocephalic trunk, 4: covered stents in the right common carotid and right subclavian arteries, 6 and 8: covered stents in the aorta, 5 and 7: self-expanding stents in the aorta. **C.** Residual endoleak at the level of the left subclavian artery (arrow), coils in the false lumen. **F.** Final result of the repair

Abbreviations: LCCA, left common carotid artery; LSA, left subclavian artery; RCCA, right common carotid artery; RSA, right subclavian artery; TC, celiac trunk

Article information

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