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IMAGES IN INTERVENTION

Acute Aortic Dissection as a Rare Complication of Percutaneous Closure Using the Amplatzer Vascular Plug II for a Tubular and Enlarged Patent Ductus Arteriosus in an Elderly Patient

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A 74-year-old man with progressive breathlessness was diagnosed as having heart failure due to patent ductus arteriosus (PDA) (Figure 1). Percutaneous PDA closure was performed transvenously using a 16-mm Amplatzer Vascular Plug II (St. Jude Medical, St. Paul, Minnesota). His blood pressure was strictly controlled with a continuous injection of nicardipine; the final aortogram confirmed no residual shunt (Figure 2). Fluoroscopic findings, however, showed that the pulmonary retention disc was not completely released compared with the aortic retention disc, suggesting residual mechanical stress on the device in longitudinal direction (Figure 3).

On the following day, the patient suddenly reported severe back pain. Emergent computed tomographic angiography demonstrated type A aortic dissection, extending from the contact site of the aortic retention disc to the aortic wall. Furthermore, computed tomographic angiography revealed that the deformed pulmonary retention disc became as thin as the aortic retention disc, which partially migrated

FIGURE 1 Computed Tomographic Angiography Revealing Patent Ductus Arteriosus

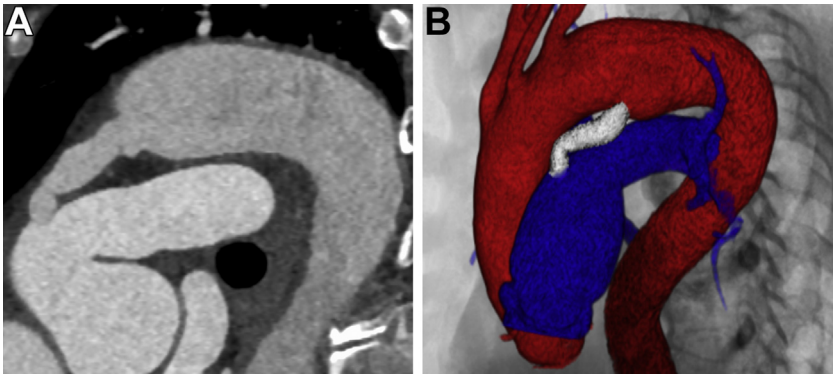

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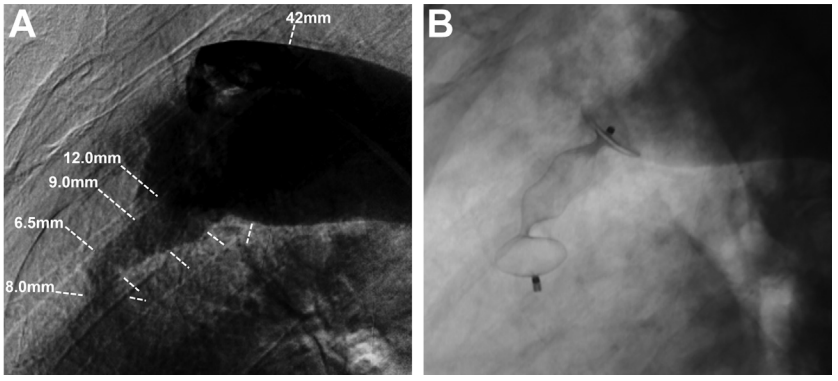
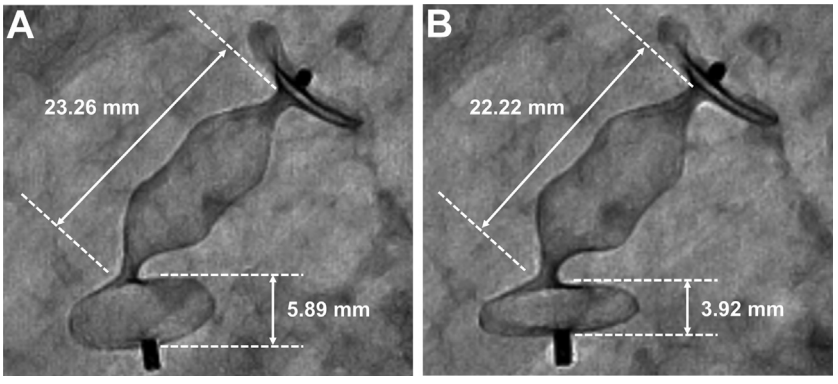
FIGURE 2 Aortography Before and After Implantation



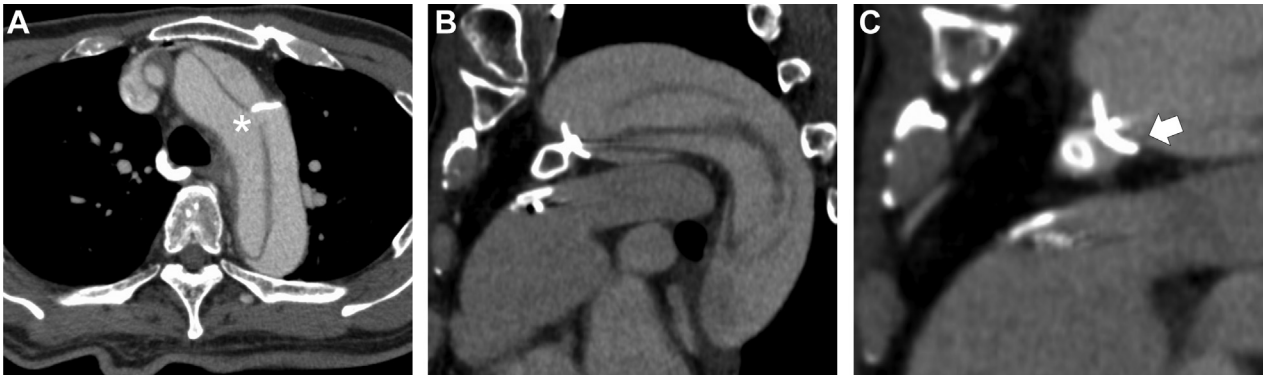
(A) Before patent ductus arteriosus closure. **(B)** After implantation.

FIGURE 3 Fluoroscopic Images of Amplatzer Vascular Plug II



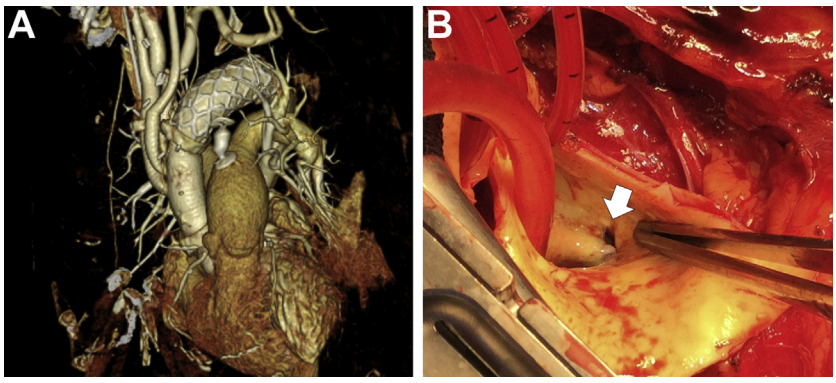
(A) Diastolic phase. **(B)** Systolic phase.

FIGURE 4 Computed Tomographic Angiography Showing Aortic Dissection



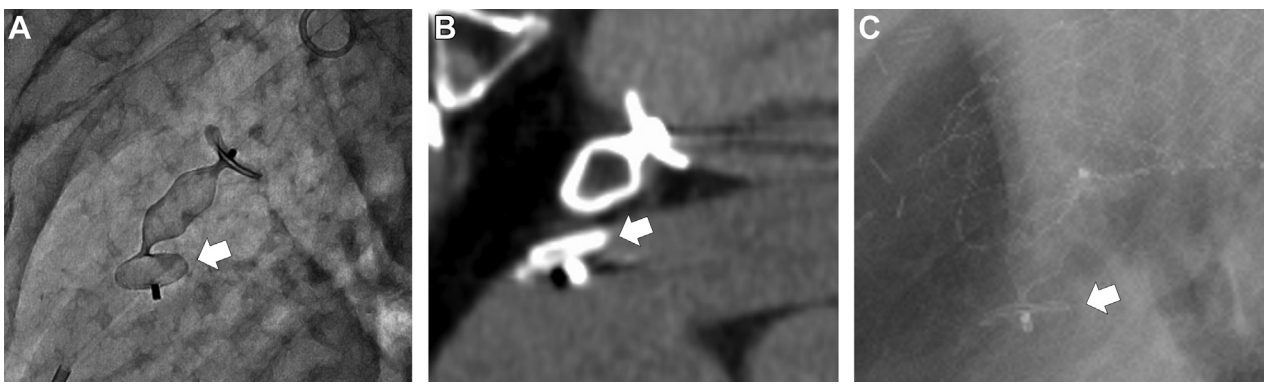
(A,B) Asterisk indicates entry of the aortic dissection. **(C)** The aortic retention disc has migrated into the patent ductus arteriosus **(white arrow)**.

FIGURE 5 Post-Operative Computed Tomographic Angiography and Intraoperative Findings



(A) Post-operative computed tomographic angiography. **(B)** A cavity is in the lesser curvature of the aortic arch **(white arrow)**.

FIGURE 6 Morphological Changes of Pulmonary Retention Disc



(A) Fluoroscopic image immediately after Amplatzer Vascular Plug II implantation. **(B)** Computed tomographic angiography immediately after aortic dissection onset. **(C)** Fluoroscopic image post-operatively. **White arrow** indicates pulmonary retention disc.

into the PDA (Figure 4). Emergent ascending aortic replacement and stent graft implantation over the PDA were performed. Intraoperative findings confirmed that the dissection indeed initiated from the contact site of the aortic retention disc to the aorta (Figure 5).

Although speculative, potential mechanisms for aortic dissection include mechanical stress at the transition of PDA and aorta with possible vulnerability of the enlarged aortic arch (42 mm). Post-procedural fluoroscopy showed that the Amplatzer Vascular Plug II had dynamic morphological changes with heartbeat, with significant elongation in the diastolic phase followed by shortening in the systolic phase (Figure 3). Emergent computed tomographic angiography and post-operative fluoroscopy showed that the pulmonary retention disc became as thin as the aortic retention disc after aortic dissection onset (Figure 6), supporting our speculation. Appropriate device selection with morphological evaluation after Amplatzer Vascular Plug II implantation might be important, especially in elderly patients with large PDAs.

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