Percutaneous transcatheter closure of a descending aorta to vertebral venous plexus fistula using an Amplatzer Vascular Plug 2: a case report

Amplatzer Vasküler Plug 2 kullanılarak perkütan transkateter inen aorta vertebral venöz pleksus fistül kapatılması: Olgu sunumu

Mustafa Orhan Bulut, M.D., İlker Kemal Yücel, M.D., Şevket Ballı, M.D., Ahmet Çelebi, M.D.

Department of Pediatric Cardiology, Dr. Siyami Ersek Chest and Cardiovascular Surgery Training and Research Hospital, Istanbul

Summary– A descending aorta to vertebral venous plexus fistula is an extremely rare form of arteriovenous fistula. A 10-month-old infant was referred to the hospital for evaluation of a murmur. On examination, a continuous murmur was heard in the entire back. Transthoracic echocardiography revealed left heart chamber dilatation in the presence of preserved left ventricle systolic function. Computerized tomography angiography with 3-dimensional reconstruction, and lateral projection aortography revealed a descending aorta-vertebral venous plexus fistula measuring 4.8 mm in the aortic orifice. The fistula was embolized using an Amplatzer Vascular Plug 2.

Özet– İnen aorta vertebral venöz pleksus fistülü son derece nadir görülen arteriyovenöz fistüldür. On aylık bebek, bir üfürüm değerlendirilmesi için hastaneye sevk edildi. Muayenede, tüm sırtta sürekli üfürüm duyuldu. Transtorasik ekokardiyografide sol kalp boşluklarında dilatasyon görüldü; kalp fonksiyonları normaldi. Üç boyutlu bilgisayarlı tomografi anjiyografisi inen aorta vertebral venöz pleksus arasındaki fistülü gösterdi. Lateral projeksiyonda aortografi inen aorta vertebral venöz pleksus arasında aortik tarafı 4.8 mm çapında olan fistülü gösterdi. Fistül Amplatzer Vasküler Plug 2 kullanılarak kapatıldı.

A descending aorta to vertebral venous plexus fistula is very uncommon form of arteriovenous fistula, resulting from an abnormal communication between the descending aorta and vertebral venous plexus. The first case in the literature was published in 1987.[1] To our knowledge, the present case is the second to be reported. Porstmann was the first to describe transcatheter blood vessel closure in 1967.[2]

The present case report describes a 10-month-old infant with a descending aorta to vertebral venous plexus fistula. Transcatheter embolization of the fistula was performed using an Amplatzer Vascular Plug (AVP) 2.

Abbreviations:

AVP *Amplatzer Vascular Plug*

CASE REPORT

A 10-month-old infant was referred to the hospital for evaluation of a murmur. On examination, a continuous murmur was heard in the entire back. Other physical examination findings were normal, except for a cleft palate. His weight was 7.2 kg (<3p), pulse rate 125/minute, and blood pressure 95/60 mmHg. Electrocardiography and telecardiography were normal. Transthoracic echocardiography revealed left heart chamber dilatation in the presence of preserved systolic function. Computerized tomography angiography with 3-dimensional reconstruction confirmed the diagnosis. The fistula was extremely tortuous with highly acute angles (Figure 1a). Due to somatic developmental delay and left heart chamber dilatation, it was decided to perform transcatheter closure. Cardiac catheterization was planned and the procedure performed under deep general anesthesia. Lateral projection aortagraphy with pigtail catheter

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Correspondence: Dr. Şevket Ballı. Dr. Siyami Ersek Göğüs Kalp ve Damar Cerrahisi Eğitim ve Araştırma Hastanesi, Çocuk Kardiyolojisi Kliniği, 34600 İstanbul.
Tel: +90 216 - 542 44 44 e-mail: drsevketballi@hotmail.com

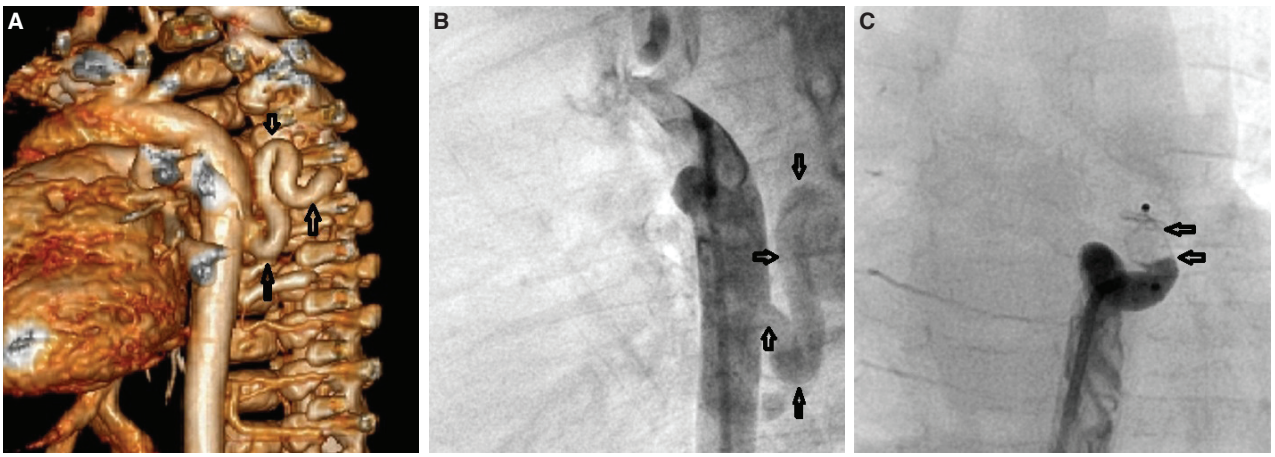

Figure 1. (A) CT angiography with 3D volume rendering showing the fistula (arrows) between behind the descending aorta and vertebral venous plexus. **(B)** Thoracic aortic angiography using a pigtail catheter showing the tortuous fistula (arrows) between behind the descending aorta and vertebral venous plexus (arrows). **(C)** Angiography confirming excellent device position (arrows) and complete occlusion.

illustrated the descending aorta to vertebral venous plexus fistula measuring 4.8 mm in the aortic orifice (Figure 1b). The 5 Fr JR guiding catheter was advanced over the wire into the fistula and its position confirmed with contrast injection. A 6mm AVP 2 (St. Jude Medical, Inc, St. Paul, Minnesota, USA) was advanced into the fistula using the delivery cable, and once the correct position of the device was assured, the AVP was released. Angiography confirmed excellent device position and complete occlusion (Figure 1c). No procedure-related or access site complication occurred and the patient was discharged the following day.

DISCUSSION

Descending aorta-venous fistulas are rare congenital malformations, and thoracic placement of an arteriovenous fistula is extremely rare.[3,4] Nevertheless, in patients with a continuous murmur it should be considered in the differential diagnosis. A continuous murmur may occur due to a patent ductus arteriosus, rupture of a sinus of Valsalva aneurysm, an aorta-pulmonary window, peripheral pulmonary artery stenosis, and a systemic or pulmonary arteriovenous fistula. An arteriovenous fistula usually causes high-output heart failure because of the decreased resistance and high blood flow in the lesion. Its clinical presentation is closely related to the size, duration and location of collaterals. If the resistance in the fistula is low enough, the fistulous tract steals from the distal arterial supply, causing a reversal of arterial flow in the segment distal to the fistula. The blood flow into the venous circulation causes turbulence, which is responsible for the murmur.

Angiography is the most important method in investigating arteriovenous fistulas, and at the same time provides for therapeutic interventions. It is an excellent method in delineating the number, location and extent of arteriovenous connections. While in the past surgery was the recommended therapy for arteriovenous fistulas, transcatheter embolization of vascular malformations has now become an exceedingly valuable option. The AVP is an effective transcatheter occlusion device in the embolization of a wide variety of vascular lesions.[5,6] Gianturco and detachable coils have also been used to occlude arteriovenous malformations.[7,8] The AVP is a cylindrical self-expanding device made of nitinol wire mesh and indicated for arteriovenous embolizations in the peripheral vasculature. The selected plug should be 30–50% larger than the diameter of the target vessel. The device appears to be operator-friendly and simple to use in tortuous vessels, enabling more precise occlusion and verification of positioning prior to release. The advantages of this device are a reduction in migration risk, easy release and a reduction in cost because of complete occlusion with a single plug in the case of large fistulas. Coils and gel foam carry a high risk of embolization, especially in high-flow situations.[9]

The first case of aorta to vertebral venous fistula

was detected in 1987.[1] In one case report, a caroticoazygous fistula was closed using an AVP 1.[10] To the best of our knowledge, this is first report on transcatheter embolization of a descending aorta to vertebral venous plexus fistula using the AVP 2.

In conclusion, while an aorta-vertebral venous plexus fistula is an exceptionally rare malformation, it should be considered in patients with a continuous murmur. Vascular fistulas can be effectively occluded using AVP devices, which are available in larger diameters than coils, and thus are particularly indicated in fistulas of large diameter.

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Anahtar sözcükler: Anjiyografi; arteriyovenöz fistül; kalp kateterizasyonu; kalp septal defekti, ventriküler/tedavi; enstrümantasyon.