

CASE REPORT

Balloon angioplasty of severe aortic coarctation in a newborn, using axillary artery access: The first experience in Turkey

Ciddi aort koarktasyonu olan bir yenidoğanın aksiller arter yoluyla balon anjiyoplastisi: Ülkemizdeki ilk tecrübe

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Summary– Axillary artery access for demanding interventions in newborns is rarely described, in spite of the many clear advantages. This access route in newborns with critical congenital heart disease is a real alternative to the more commonly used femoral or carotid artery routes. In brief, axillary access is an attractive alternative approach in newborns with complex heart diseases. It is advisable to stop an elective procedure if axillary access is not successful. Presently described is the use of axillary artery access for balloon angioplasty in a newborn with critical aortic coarctation. To the best of our knowledge, it was the first instance in Turkey.

Özet– Yenidoğanda aksiller arter yaklaşımı ile girişimsel tedavi avantajlarına rağmen nadir bir uygulamadır. Yenidoğan döneminde ciddi aort darlığı ve aort koarktasyonunun kateter yoluyla tedavisinde aksiller arter, daha sık kullanılan femoral ya da karotis arter yaklaşımına seçenektir. Karmaşık kalp hastalıklarının girişimsel tedavisinde aksiller arter yaklaşımı seçenek olarak düşünülmelidir. Elektif işlemlerde aksiller arter ponksiyonu başarılı değilse girişimi durdurmak tavsiye edilmektedir. Bu yazıda, ülkemizde ilk olduğunu düşündüğümüz kritik aort koarktasyonu olan bir yenidoğanın aksiller arter yaklaşımı ile balon anjiyoplastisi sunuldu.

In spite of the many evident advantages, axillary artery access for demanding interventions in newborns is rarely described. A main type of congenital heart disease that may be treated, with an improved success rate, using axillary access is duct-dependent pulmonary blood flow in newborns with critically or totally obstructed ventricular-pulmonary connection, particularly those with a tortuous duct at the inner curve of the aortic arch, opposite the origin of the left or right subclavian artery. Another is critical aortic valve stenosis with or without aortic coarctation, in neonates or even premature newborns.

Presently described is the case of a newborn with critical aortic coarctation, treated via axillary artery access. To our knowledge, this is the first instance to be reported in Turkey.

CASE REPORT

A 7-day-old male infant was referred to pediatric cardiology due to cardiogenic shock. He had been born in the 39th gestational week to a 29-year-old healthy mother (G5P2) and a 31-year-old healthy father. Both parents were of Turkish descent and were not related. Medical history of the mother was negative for folic acid intake, drug abuse, alcohol consumption, or smoking. There was no parental history of congenital anomaly. The pregnancy had a normal course. At the 39th week, the infant was delivered via spontaneous vaginal birth, with a 1st- and 5th-minute Apgar score of 8 and 10, respectively. Birth weight was 3050 g, head circumference was 34.5 cm, and height was 50 cm, all appropriate for gestational age at delivery. Physi-

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cal examination revealed systolic ejection murmur (grade 2/6) in the upper right sternal border. Femoral pulses were non-palpable. There were no additional abnormalities, and the phenotype was not suggestive of known genetic syndromes.

Transthoracic echocardiography showed a bicuspid aortic valve, mild aortic stenosis, severe aortic coarctation, patent foramen ovale, and patent ductus

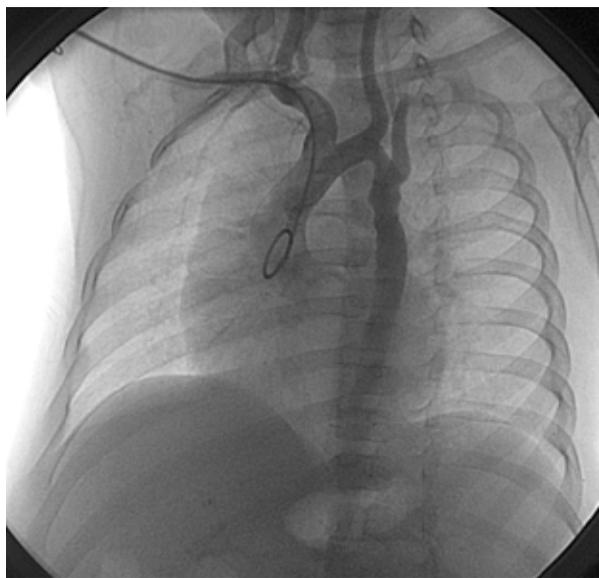


Figure 1. After the axillary artery was accessed, the catheter was sent to ascending aorta.

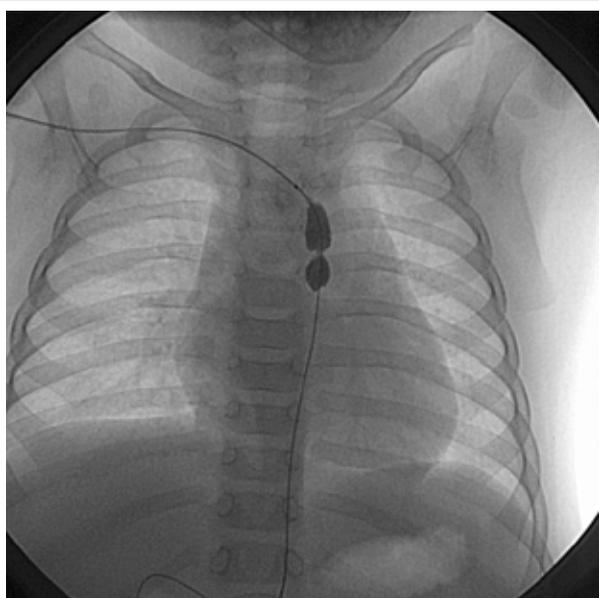


Figure 2. Balloon angioplasty was performed with a 6 mm x 2 cm Tyshak balloon.

arteriosus. Blood count, electrolytes, renal function tests, liver enzymes, thyroid hormones, and cranial ultrasound were normal. Balloon angioplasty was performed in the clinic by axillary artery approach in the neonate, who then weighed 3000 g and had critical aortic coarctation, patent ductus arteriosus, and atrial septal defect. The femoral artery, then the right axillary artery, were accessed with a 4-F sheath. A multipurpose catheter was used to cross the coarctation, with the help of a soft-tipped guidewire, which was positioned in the ascending aorta. End-hole catheter was then exchanged for an angiographic pigtail catheter. Hemodynamic measurements were taken. An initial 40-mmHg gradient was noted between the descending and ascending aortas. Aortography in the left anterior oblique projection was performed using pigtail catheter, which was advanced to the distal of the coarctation. A standard 0.21-in guidewire was placed through the 4-F catheter. A 6-mm x 2-cm Tyshak balloon (NuMED, Inc., Hopkinton, NY, USA) was advanced to the coarctation region. Balloon angioplasty was performed, after which there was radiographic reorganization, and no pressure gradient was present. The patient was discharged 3 days after the procedure.

DISCUSSION

Axillary access for intervention in newborns with critical congenital heart diseases is a real alternative

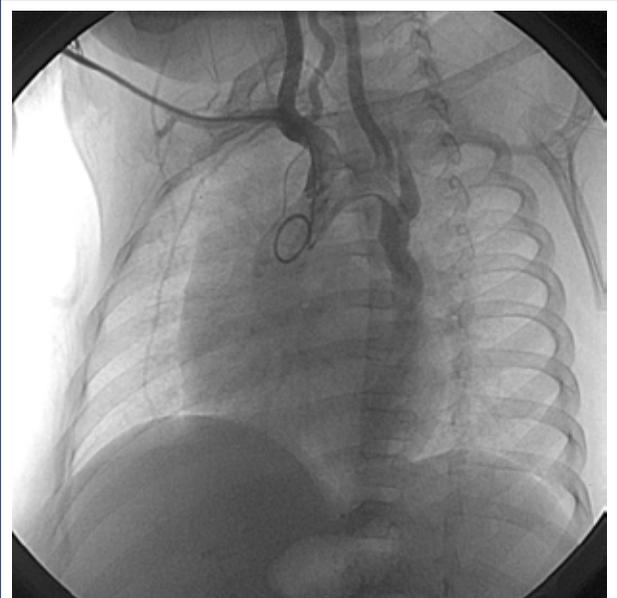


Figure 3. After angioplasty was performed, there was radiographic reorganization and there was no pressure gradient.

to the more commonly used femoral or carotid artery access routes. The many obvious advantages to axillary access have rarely been described.^[1-3] The most important advantage is that the axillary artery is not an end artery, and therefore does not have the disadvantage of cannulation.^[4] When the axillary artery is used, the arm continues to be perfused by the second intercostal artery and the acromial artery. Moreover, the axillary artery is easier to feel in smaller patients, including premature newborns,^[5] particularly those suffering from critical coarctation, with low cardiac output and nonpalpable femoral pulses. In this subset of patients, there is a high risk of vascular complication after puncture and cannulation, due to low flow.

Though complications of axillary approach include arterial dissection, formation of hematoma, excessive bleeding, and nerve palsy, these can be minimized with increased experience.^[6]

Conclusion

Axillary access is an attractive alternative approach in the treatment of newborns with complex heart diseases.

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REFERENCES

1. Schneider M, Zartner P, Sidiropoulos A, Konertz W, Hausdorf G. Stent implantation of the arterial duct in newborns with duct-dependent circulation. *Eur Heart J* 1998;19:1401-9.
2. Michel-Behnke I, Akintuerk H, Thul J, Bauer J, Hagel KJ, Schranz D. Stent implantation in the ductus arteriosus for pulmonary blood supply in congenital heart disease. *Catheter Cardiovasc Interv* 2004;61:242-52. [Crossref](#)
3. Boshoff DE, Michel-Behnke I, Schranz D, Gewillig M. Stenting the neonatal arterial duct. *Expert Rev Cardiovasc Ther* 2007;5:893-901. [Crossref](#)
4. Maeno Y, Akagi T, Hashino K, Ishii M, Sugimura T, Takagi J, et al. Carotid artery approach to balloon aortic valvuloplasty in infants with critical aortic valve stenosis. *Pediatr Cardiol* 1997;18:288-91. [Crossref](#)
5. Piotrowski A, Kawczynski P. Cannulation of the axillary artery in critically ill newborn infants. *Eur J Pediatr* 1995;154:57-9.
6. Moore JW, Kirby WC, Lovett EJ, O'Neill JT. Use of an intravascular endoprosthesis (stent) to establish and maintain short-term patency of the ductus arteriosus in newborn lambs. *Cardiovasc Intervent Radiol* 1991;14:299-301. [Crossref](#)

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Anahtar sözcükler: Anjiyoplasti, balon, koroner; aksiller arter; aort koarktasyonu.