

# SELF-EXPANDABLE STENT FOR REPAIRING COARCTATION OF THE LEFT-CIRCUMFERENTIAL AORTIC ARCH WITH RIGHT-SIDED DESCENDING AORTA AND ABERRANT RIGHT SUBCLAVIAN ARTERY WITH KOMMERELL'S DIVERTICULUM

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## CASE REPORT

A 21-year-old male patient was admitted to the Rajaei Heart Center complaining about headache. He did not have chest pain or dyspnea. The patient had a history of high blood pressure and dyslipidemia. Examination revealed blood pressure difference between upper arms, 190/110 mmHg in the left arm and 130/80 mmHg in the right arm. The patient was well oriented with normal skin color and normal temperature. Distended jugular veins at the base of the neck was observed. Pulse rate was 75 per minute. Pulse in the right arm was weaker than the left arm. Normal heart sound with III/VI holosystolic murmur at left sternal border was heard on auscultation. Patient was receiving 12.5 mg of Losartan once daily and 25 mg of Methoral twice daily. Computed tomography (CT) angiography was performed to check for aortic coarctation. Aorta was examined with nonionic contrast medium and saline chaser injected via dual injector through intravenous route. Multiple axial, coronal and sagittal images with maximum intensity projection, multiplanar reconstruction, and volume reconstruction were taken. Multislice spiral CT angiography of the thoracic and abdominal aorta and other organs with the reconstructed views (with dynamic contrast medium) revealed aortic coarctation, left circumferential aortic arch, and aberrant right subclavian artery with Kommerell diverticula (Fig. 1). The place of coarctation was 18 mm before the origination of the aberrant left subclavian artery and 25 mm next to the aberrant right subclavian artery. The diameter of the aorta was 15 mm at distal portion to the coarctation. The diameter of the ascending aorta was 29 mm. Other dimensions are depicted in Figure 1. Collateral arteries were also observed. There was no compressive effect on trachea and esophagus and the patient had no symptoms related to vascular ring compression. Examinations provided evidence of aortic coarctation with aberrant aortic orientation and transposition of the branching arteries. The patient was indicated for stenting and interventional opening of the coarctation. After wiring the coarctation area, direct stenting was performed with self-expandable sinus-XL Stent (Optimed, Ettlingen, Germany) with the stent size of 20 mm \* 60 mm. Then, post dilation was performed with Zelos PTA-Balloon Catheter (Optimed) with the size of 18 mm \* 40 mm with good results (Figs. 2). Pressure gradient was 60 mm Hg before intervention and reduced to zero post intervention. Six months of follow-up by regular visits demonstrated complete correction of blood pressure gradient and the patient had no complaints about his health.

## DISCUSSION

We performed endovascular intervention and applied self-expandable nitinol stent to repair the aortic coarctation in a patient with left circumferential aortic arch and right-sided descending aorta with aberrant right subclavian artery with Kommerell's diverticulum. Right-sided descending aorta with coarctation of the aortic arch is a rare condition. No evidence on the repair of stenosis in patients with aortic arch anomalies was found by thorough literature search. Self-expandable stents act by inducing persistent moderate pressure on the aortic wall thus reducing the probability of the physical trauma and tearing the aortic wall structure. Its use does not alter the biological properties of the aortic wall and therefore reduces the risk of subsequent aneurysmal malformations of the vessel wall. In sum, it appears that deployment of self-expandable stents offers a viable option for the management of aortic coarctation in patients with aortic arch anomaly such as left-circumferential aortic arch and right-sided descending aorta. To our knowledge, this the first case report of coarctation stenting in this vascular ring pathology with successful result. It is a minimally invasive approach with reduced potential for tearing of the aortic wall and subsequent re-coarctation and aneurysm formation.

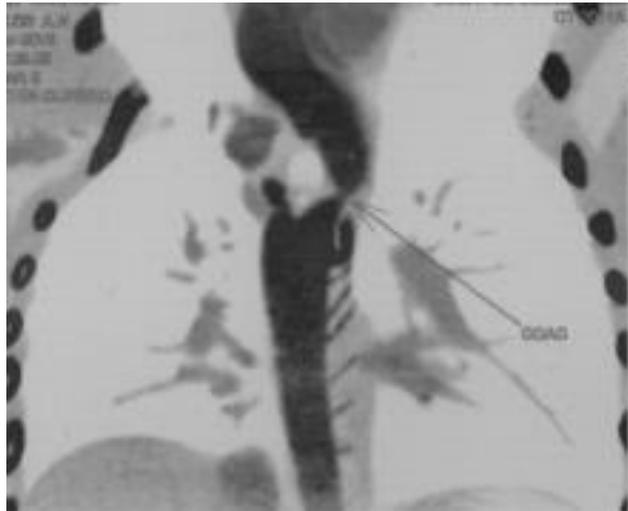


Fig. 1. CT image depicts the coarctation of the rightsided aortic arch. Diameter of the aorta at coarctation (COAC) site is 4 mm. Kommerell's diverticulum (arrow) can be seen at the origination of the right subclavian artery.

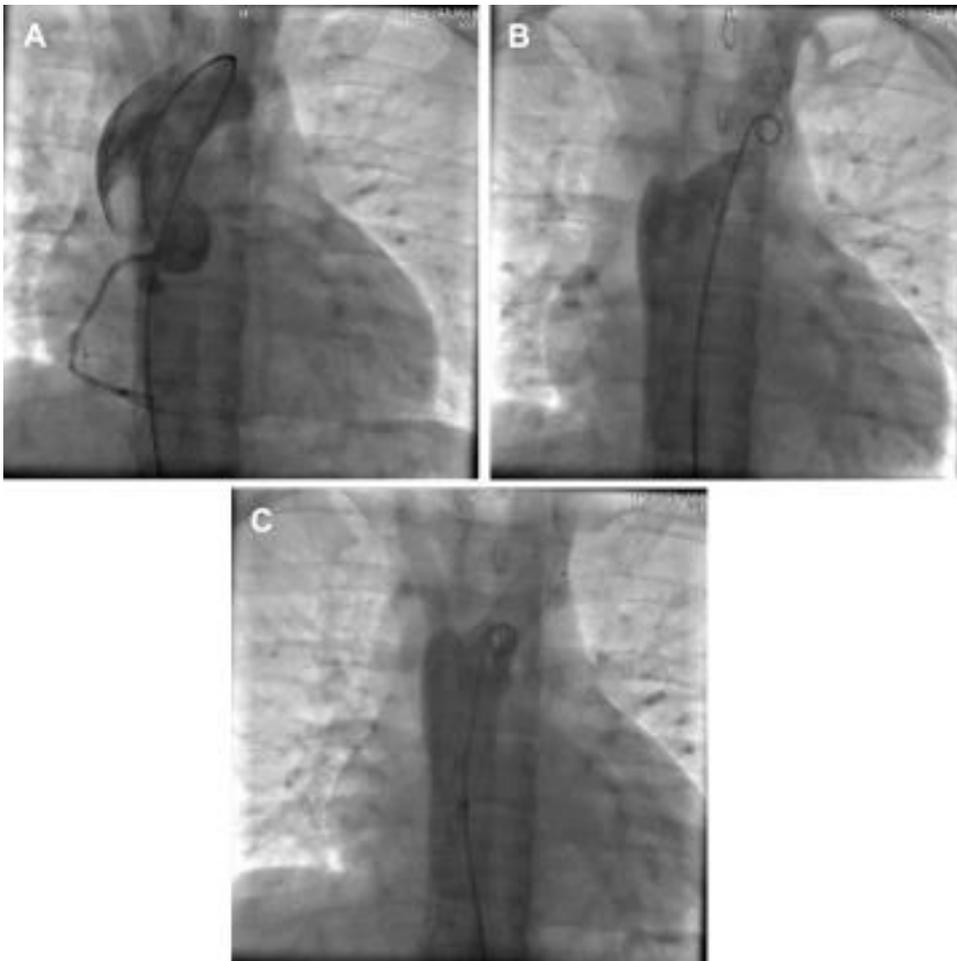


Fig. 2. Radiographic images showing (A) wiring of the aorta, (B) pigtail catheter insertion to the coarctation site, and (C) stent placement and expansion in the coarcted area.