

Unusual complication of stent placement in the treatment of coarctation

Serhat Koca^{1*}, Ayşenur Paç¹, Vedat Kavurt², Ajda Mihçioğlu³, Denizhan Bağrul¹

¹Department of Pediatric Cardiology, Yuksek Ihtisas Heart-Education and Research Hospital, Ankara, Turkey

²Department of Pediatric Cardiology, Diyarbakir Children Hospital, Diyarbakir, Turkey

³Department of Pediatric Cardiology, Sadi Konuk Education and Research Hospital, Istanbul, Turkey

ABSTRACT

Stent placement is the first line treatment for coarctation of aorta in adolescent and adult patient population. Complications during this procedure due to aortic wall and the technique were reported previously. Here we present a pediatric patient who developed a complete AV (atrio-ventricular) block during stent implantation which required temporary cardiac pacemaker and anti-inflammatory therapy.

Key Words: Coarctation of aorta, Complete atrioventricular block, Stent implantation

Introduction

Aortic balloon angioplasty and stent implantation has been used for treatment of coarctation of aorta (1,2). However, nowadays, stent implantation is being used as the first line treatment of coarctation of aorta in adolescent and adult patients (3). Complications due to aortic wall (intimal tear, aortic rupture, aortic aneurism) and technical issues (stent migration, balloon rupture, peripheral vessel damage) were previously reported (3). To our knowledge, complete atrioventricular block has not been reported as a complication during stent implantation to coarctation of aorta. Here we present a pediatric patient who developed a complete AV (atrio-ventricular) block during stent implantation which required temporary cardiac pacemaker and anti-inflammatory therapy.

Case report

A 9 year-old girl with MVP (mitral valve prolapse) who was referred to our hospital with coarctation of aorta that is diagnosed during her regular follow-up echocardiography. During her physical examination, both femoral pulses were found weak and blood pressure measured from the lower extremity (96/58) was detected lower than the upper extremity (150/100). Echocardiography revealed an aortic coarctation causing systolic

maximum 60 mmHg gradient due to stenosis at 8 mm distal from proximal end of subclavian artery. Catheter angiography was planned for stent implantation, after confirming the coarctation of aorta with MRI (magnetic resonance imaging) angiography (Figure 1). Systolic peak to peak gradient was 80 mmHg. Aortic diameters were measured as 5.7, 10 and 13 mm at narrowest point, proximal point of coarctation and descending aorta, respectively. Stent implantation to coarctation aorta was planned. First, a 0.35 inch sized extra stiff guide was placed to left subclavian artery but it could not be stabilized there and fall in to ascending aorta. Then, a guide was placed to left ventricle and a covered stent at 22 mm length were planted to the coarctation site by a balloon in balloon at 14 mm/2.5 cm size. Peak to peak gradient between proximal and distal ends of coarctation was measured as 0 mmHg after procedure (Figure 2, 3).

Complete AV block developed during stent implantation to patient (Figure 4) that required a temporary cardiac pacemaker. Patient was treated with 1 mg/kg dexamethasone and 80 mg/kg aspirin administration daily. At second day occasional P wave conduction to QRS wave on ECG (electrocardiogram) was detected. Patient was temporarily paced until normal sinus cardiac rhythm was detected at 9th day of treatment. Patient was discharged home and now is being followed at outpatient clinic without any problem.

*Corresponding Author: Serhat Koca, MD, Department of Pediatric Cardiology, Yuksek Ihtisas Heart-Education and Research Hospital, Ankara, Turkey, Phone: +90 312 306 11 36, Fax: +90 312 312 41 20, E-mail: drserhatkoca@gmail.com

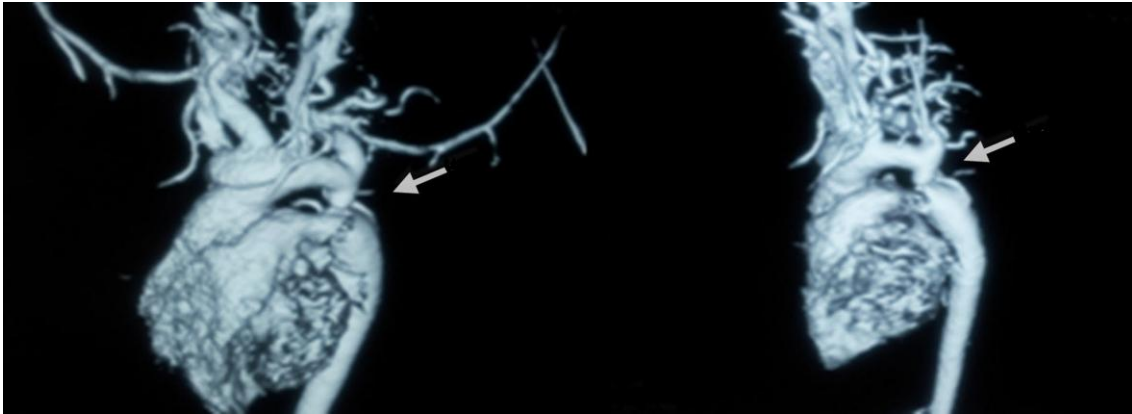


Fig. 1. MRI- Angiography showing coarctation at 8 mm distal from proximal end of subclavian artery.

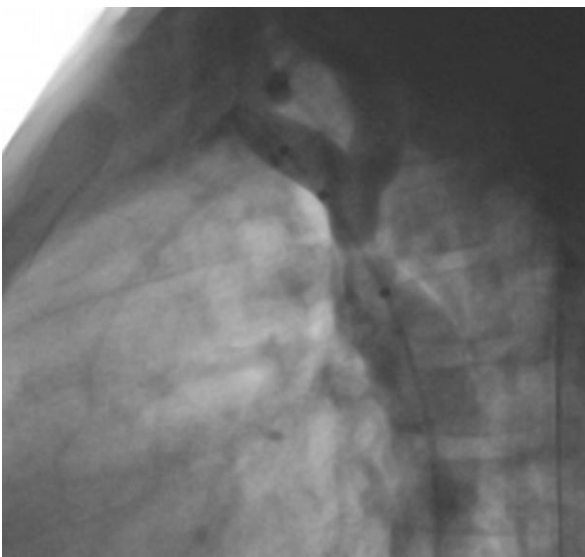


Fig. 2. Aortography before stent implantation.



Fig. 3. Antero-posterior view of the patient and aortography after stent implantation.



Fig. 4. Complete AV Block with narrow QRS that developed during stent implantation.

Discussion

Although stent implantation has satisfied results in treatment of coarctation of aorta, there may be some complications during this procedure. In a large study with 565 patients from 17 different institutions; complications due to aortic wall (intimal tear, aortic rupture and aortic aneurism) and technical issues (stent migration, balloon rupture, peripheral vessel damage) were reported as 3.7% and 12.1%, respectively (4).

Development of complete AV block as a complication is more commonly observed during closure of ASD (atrial septal defect) or VSD (ventricular septal defect) using device. Damages to AV conduction structure caused by discs of intra-cardiac device or edema developed at conduction tissue are accepted as the reasons of this complication (5-10).

Various anti-inflammatory treatment modalities are suggested for treatment of complete AV block that developed during cardiac invasive procedures. One modality is suggesting 1 week administration of Prednisolone (2 mg/kg/d at 3 doses, max 80 mg/day) and Aspirin (100 mg/kg/d at 3 doses, max 2 gr/day) that is followed by 2 more weeks of treatment at reduced doses (11). The other modality, which we followed in this case, Dexamethasone (1 mg/kg/day for 2 weeks followed by another 3 weeks at reduced doses) and Aspirin (80 mg/kg/day for 1 week, followed by reduced to anti-aggregating dose in 4 weeks and continued for another 6 months) are suggested (12).

In the presented case, despite not use of intra-cardiac device, traumatic effect of stiff fiber that is placed in to the left ventricle during implantation of aortic stent can be shown as the reason of development of complete AV block. We think that this effect can be circumvented by placing stiff fiber in to the ascending aorta or subclavian artery. In other words as this case shows us, stiff fiber placement in to the left ventricle should be avoided in order not to develop an AV block.

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Statement of Human Rights: Informed consent for all the procedures were taken from the family of the patient. Formal consent was also obtained from the patient's family for purpose of publication without patient's identity.

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