Transcatheter treatment of interrupted arcus aorta in two adolescents

İki adölesanda kesintili arkus aortanın transkateter yöntemle tedavisi

Introduction

With increasing experience and the advent of covered stents, stent implantation has gradually become the treatment of choice for recurrent coarctation, coarctation with patent ductus arteriosus, coarctation and aneurysm (1-5).

We present two cases with a completely obstructed descending aorta just distal to the isthmus, referred to as a blind coarctation or aortic isthmus atresia, that were treated using the covered CP Stent (Cheatam Platinum; Numed Inc. Hopkinton, New York).

Case Report

A 14-year-old boy and a 16 year-old girl referred to our center with hypertension. Both patients had upper limb hypertension and their lower limbs' pulses were non palpable. Echocardiographic examination could not reveal exactly whether the patients had coarctation or interruption.

Since we could not advance any catheter and guidewires retrogradely from the descending to the ascending aorta, radial artery puncture was performed and a catheter was placed antegradely at the distal of the left subclavian artery. Angiograms clearly showed that there was no luminal continuity with the membranous atresia in both cases (Fig. 1a. Video 1- See corresponding video/movie images at www.anakarder.com).

The atretic segment was retrogradely perforated with the stiff end of the nitinol guidewire in first case. In addition to the previously placed nitinol guidewire, a coronary guidewire with a soft tip was fed through the same catheter and advanced along the descending aorta into the ascending aorta. The first balloon dilatation was performed with a 4x20 mm coronary balloon. Than dilatation was repeated with an 8x20 mm Tyshak balloon (Numed Inc. Hopkinton, New York).

The atretic segment was perforated with the stiff end of a 0.035 guidewire fed through the retrogradely placed JR4 catheter in second case (Fig. 1b). Over this guidewire, the catheter was advanced to the ascending aorta. A 0.018 nitinol guidewire was fed through this catheter to perform predilatation with a 6x20 mm Tyshak balloon.

Angiographies were repeated after predilatation to get the measurements of the balloons and the stent sizes and also to check for intimal disruption or extravasations. A 28 mm CP stent mounted on 12 mm x3 cm Zymed II (Numed Inc. Hopkinton, New York) balloon in first, and 28 mm CP stent that was mounted on a 14 mm x3 cm balloon-in-balloon catheter was preferred in second case (Fig. 1c).

At the end of procedure control angiograms and pullback measurements were performed (Video 1- See corresponding video/movie images at www.anakarder.com). The stents were in good positions and was no gradient.

Both patients were put on acetylsalicylic acid (3-5 mg/kg/day) for 6 months, and since the first patient remained hypertensive he was also put on metoprolol (1 mg/kg/day).

Discussion

Both anatomic continuity and luminal patency of the aorta are preserved in coarctation of aorta. In aortic arch atresia, either there is a local complete obliteration of the lumen or a segment of the aortic arch is converted into a fibrous cord, with a big gap instead of a distal connection. In the absence of a part of the aortic arch segment it is impossible to treat it by transcatheter methods, but in cases with membranous atresia transcatheter treatment as described in this text is possible (6, 7).

Antegrade recanalization of the atresia via brachial approach or transseptal approach could be effective as well (8). We preferred the retrograde approach due to our lack of experience with brachial or transseptal approaches. Additionally, since the catheter could be advanced over the guidewire, there would be no need to snare and exteriorize the guidewire to form an arteriovenous loop.

False lumen creation, vessel wall injury or disruption, and acute vessel compromise are all potential complications of this procedure (5, 9). These risks could be minimized by precise direction of the wire across the lesion and gentle manipulations with the wire. An antegradely placed catheter could help as a reference mark during perforation. This type of procedure must be done both with the presence of a covered stent in the catheterization laboratory and a surgical team on standby in the theatre.

Conclusion

Blind coarctation has been traditionally treated by surgery. However, in patients with membranous atresia the pathology is also treatable by transcatheter methods. After the perforation of atresia and balloon dilatation, a covered stent could be implanted safely.

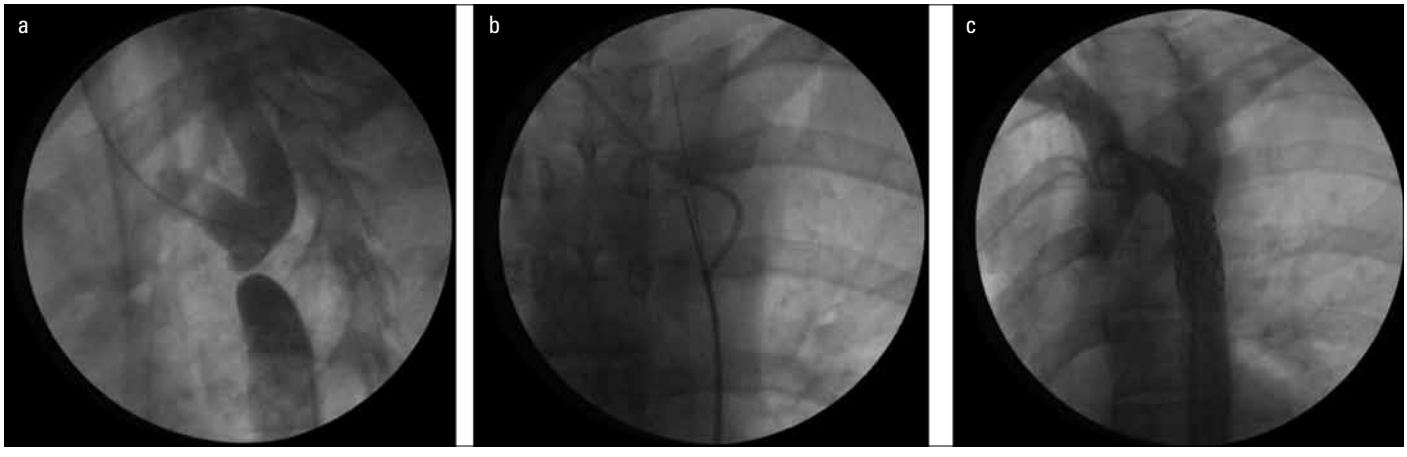

Figure 1. a) Angiography view of membranous atresia in case 2, b) Guidewire passing from descending aorta to ascending aorta, c) Last angiographic appearance of case 2 after stenting

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Catheter ablation of atrial fibrillation in a patient with unusual pulmonary vein anatomy involving right upper pulmonary vein

Sağ tavan pulmoner venini içeren olağan dışı pulmoner ven anatomili hastada atriyal fibrilasyonun kateter ablasyonu

Introduction

Available electro-anatomic mapping systems have gained applicability of radiofrequency catheter ablation (RFCA) in atrial fibrillation (AF) as a curative option in current practice. Accumulating experience emphasizes importance of imaging of left atrium and pulmonary vein (PV) anatomy prior to ablation procedures. Researches implementing sophisticated imaging methods have indicated that PV anomalies are considerably frequent. In the era of catheter ablation, these PV anomalies may complicate AF ablation procedures by resulting procedural difficulties and may be related to recurrences if they are overlooked. Hereby, we present an AF ablation procedure performed in a patient with unusual PV anatomy.

Case Report

We performed AF ablation in a 35-year-old male patient with recurrent episodes of paroxysmal AF refractory to antiarrhythmic therapy. Electro-anatomic mapping of the patient was concordant with preceding multidetector 3-dimensional computerized tomography imaging which depicted an unusual PV anatomy involving a common trunk on the left side, a supernumerary middle right PV and a right top (measured osteal diameter 10 mm) PV anomaly (Fig. 1). Cannulation of the right top PV by mapping catheter revealed PV potentials (Fig. 2). Therefore, we performed circumferential pulmonary vein isolation of the right top PV in addition to isolation of left and right sided PVs. The procedure was accomplished uneventfully by electrical isolation of all of the PVs (Fig. 2) and in the short- term follow-up the patient was asymptomatic without any complication.

Discussion

Recent evidence (1) revealing 24% rate of PV anomaly has shown that PV variants are more than expected in patients with AF. Generally, additional supernumerary PVs are more frequent on the right side, whereas the common trunk is the most seen anomaly on the left. The right top PV anomaly is relatively a peculiar anomaly detected in about 2.2% of patients whom a pulmonary computed tomography scan performed for different reasons (2) and in 4% of patients undergoing AF ablation (1). Moreover combination of these PV variants may exist too (2% of AF patients have 2 PV variants) (1). Detailed description of PV anomalies, PV ostium sizes and the branching patterns are of great importance to avoid PV stenosis associated with RFCA. Also diagnosis of additional PV variants somewhat influence long term success. If these anomalous veins are overlooked, complete isolation of PVs cannot be achieved and recurrences may occur related to active foci in these overlooked PVs. Circumferential ablation around the right top PV as a single anomaly was reported before (3), but above presented case uniquely represents successful RFCA of AF in a patient with unusual PV anatomy involving an additional active focus in right top PV.

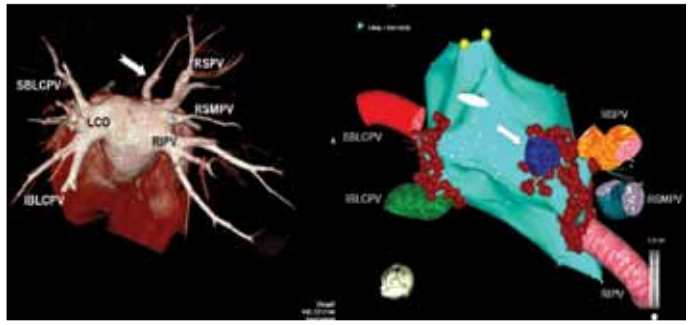

Figure 1. Three dimensional computed tomography image (left panel) and the electroanatomic mapping image (right panel) of the left atrium and pulmonary veins from superior aspect with slight posterior angulation. White arrow indicates "Right top pulmonary vein", whereas left atrial appendage is shown by yellow dots

IBLCPV-inferior branch of the left common pulmonary vein, LCO-common ostium of left pulmonary veins, RIPV-right inferior pulmonary vein, RSMPV-right supernumerary middle pulmonary vein, RSPV-right superior pulmonary vein, SBLCPV-superior branch of the left common pulmonary vein