

Percutaneous coronary intervention in a patient with situs inversus and dextrocardia

Situs inversus ve dekstrocardili hastada perkütan koroner girişim

Introduction

Situs inversus with dextrocardia is a rare congenital malposition of heart and thoraco-abdominal viscera. Although it is a rare clinical phenomenon, the association with coronary artery disease (CAD) is at the same frequency as in the general population (1). Few cases of situs inversus and dextrocardia complicated with CAD were reported before. The coronary angiography and percutaneous coronary intervention (PCI) in these patients is technically difficult and requires some modification, such as mirror image angiographic angulation, proper catheter selection and catheter manipulation for selective cannulation of the coronaries. Here we report a male case with dextrocardia and CAD successfully treated by bare metal stent implantation for a mid-lesion of the circumflex (Cx) artery.

Case Report

A 65-year-old man presented to our institution with the chief complaint of intermittent retrosternal and right anterior chest tightness for 1 month. He was a known case of situs inversus with dextrocardia. His symptoms were reproducible with mild to moderate exertion. Physical examination was unremarkable except for findings consistent with dextrocardia. He had no history of diabetes mellitus, hypertension and coronary artery disease. All routine biochemical tests were normal. Electrocardiogram (ECG) showed the with right-axis deviation of the P wave (negative in aVL and lead I and positive in aVR) and of the QRS complex indicating left to right activation and low voltage in the left precordial leads. Chest X ray was remarkable for dextrocardia and right-sided stomach bubble (Fig. 1). Two-dimensional echocardiogram

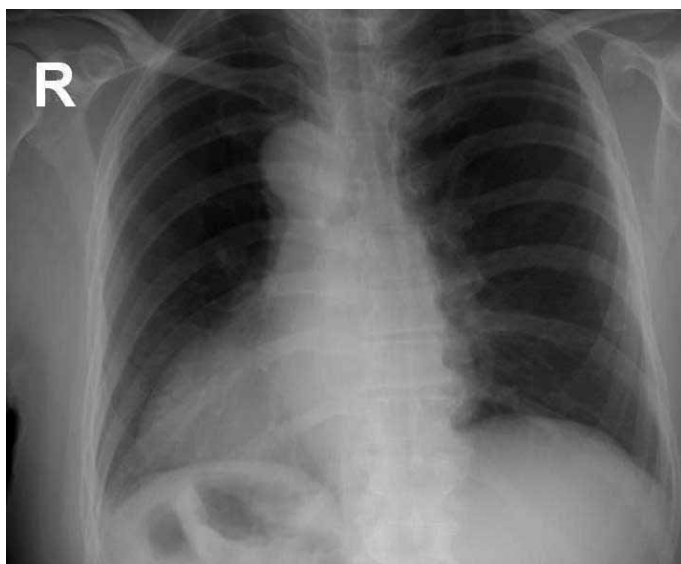


Figure 1. Chest radiographic image confirming dextrocardia with right-sided aortic arch and right-sided gastric bubble

showed a left-sided liver and dextrocardia and a mild hypokinetic movement in the posterolateral region of the left ventricular wall.

Cardiac catheterization was performed from the right femoral artery. Selective coronary angiogram was performed using left and right 6-French 4 cm Judkins diagnostic catheters by counterclockwise rotational movements and torquing (Fig. 2, 3). Coronary angiography revealed 70% lesion mid segment of Cx artery, which was the presumed cause of the patient's angina (Video 1-See corresponding video/movie images at www.anakarder.com). There was no significant lesion in left

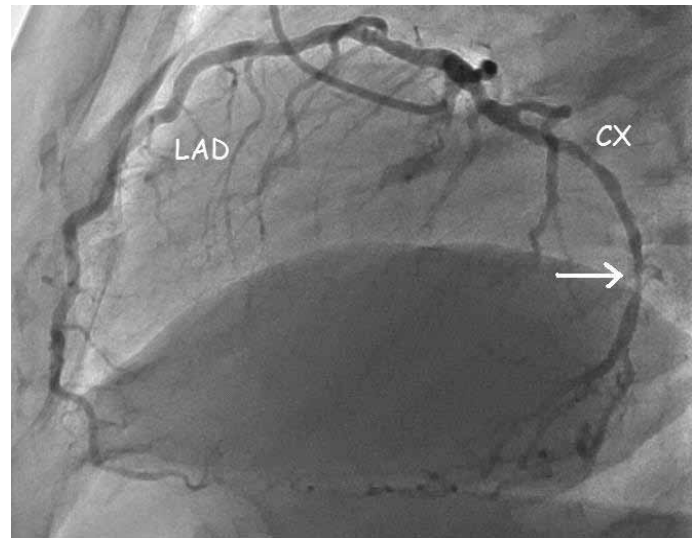


Figure 2. Coronary angiography image of a 70% stenotic lesion in the mid portion of the Cx artery

Cx - circumflex coronary artery

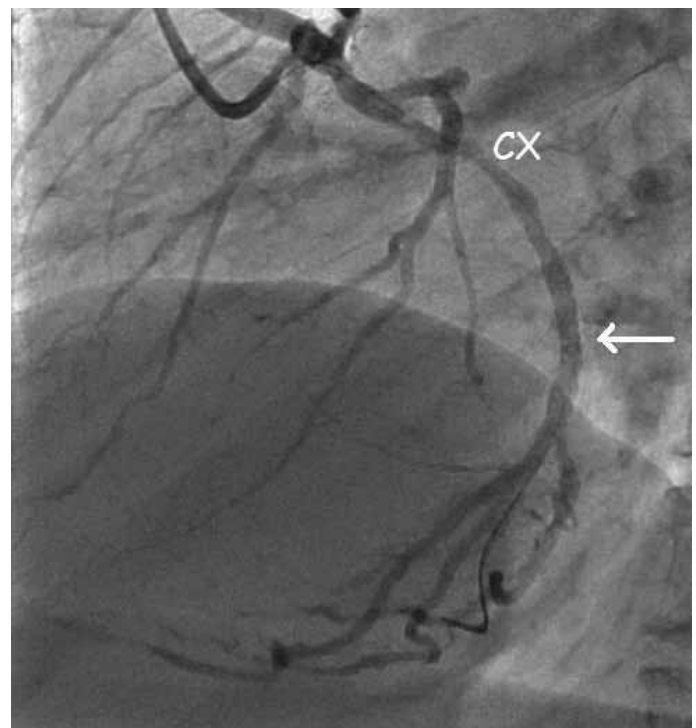


Figure 3. Coronary angiography image of the Cx artery after stent implantation

Cx - circumflex coronary artery

anterior descending artery (LAD) and right coronary artery (RCA). We performed PCI and stenting (3.0x14 mm) this lesion using a 6 French coronary Judkins left guiding catheter (Video 2-See corresponding video/movie images at www.anakarder.com). The patient's post-PCI course was uneventful. The patient was discharged on carvedilol, ramipril, atorvastatin and clopidogrel. We followed the patient approximately three months and found no ischemic symptom.

Discussion

Dextrocardia, usually termed as the location of the heart mainly in the right chest and with the cardiac long axis directing to the right and inferiorly, occurs rarely with a frequency of 1/10 000 in general population. Coronary angiography for dextrocardia was first reported in 1974 in a patient who underwent left ventricular aneurysmectomy (2). Coronary artery bypass surgery in a patient with dextrocardia was described in 1982 (3). Percutaneous coronary intervention in dextrocardia with situs inversus was first reported in 1987 (4).

In conditions when aorta is in the right side position as situs inversus and dextrocardia, most important modifications of angiography and PCI procedures are counterclockwise rotation of Judkins catheter and mirror image angiographic angles. Thus, they maintain their standard relationships to the coronary ostia. Catheters can be passed using standard technique, except that catheters are rotated in the opposite site direction. In other words, the left Judkins catheter can be used to cannulate the right-sided morphologically left coronary artery. Similarly, the right Judkins catheter manipulated to the mirror of its usual position can cannulate the left-sided morphological RCA with right-sided aortic arch. Moreyra et al. (4) who first reported case of percutaneous transluminal coronary angioplasty in dextrocardia with situs inversus, advocated using multipurpose catheters because their flexible tips allowed for easy manipulation into the coronary ostia. However, in our case both the left and right coronaries were successfully cannulated with Judkins catheters.

As unlike normally positioned hearts, right precordial pain may represent in patients with situs inversus and dextrocardia. This atypical pain in patients with situs inversus has been only described by Hynes et al. (5) in 1973. The reason for this atypical presentation is not known. Situs inversus has been previously shown to be associated with abnormal neural axis development and this may lead to variant visceral pain perception (6). Our patient also the pain was located in the retrosternal and right anterior chest.

Few cases with situs inversus and dextrocardia were reported up to date in literature previously (7, 8). However, there is only one previous case report of performing PCI in situs inversus and dextrocardia in Turkey. Barış et al. (9) reported that a coronary intervention successfully carried out on a severe stenosis at the proximal RCA with situs inversus and dextrocardia.

Conclusion

Standard angiographic techniques described above using opposite-direction catheter rotations and mirror-image views are useful for both angiography and angioplasty procedures in dextrocardic patients. Our experience in this case demonstrates that coronary angiography and intervention can be performed in cases of dextrocardia with using simple standard catheterization techniques.

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Video 1. Coronary angiography (LAO caudal) views of a 70% stenotic lesion in the mid portion of the Cx artery

Cx - circumflex coronary artery, LAO - left anterior oblique

Video 2. Post PCI coronary angiography (LAO cranial) views of a TIMI 3 flow in the Cx artery after stenting

Cx - circumflex coronary artery, LAO - left anterior oblique, PCI - percutaneous coronary intervention

References

1. Dhanjal TS, Davison P, Cotton JM. Primary percutaneous coronary intervention for acute myocardial infarction in a patient with dextrocardia. *Cardiol J* 2009; 16: 168-71.
2. Richardson RL, Yousufuddin M, Eubanks DR. Ventricular aneurysm, arrhythmia, and open heart operation in a patient with dextrocardia. *Am Surg* 1974; 40: 666-9.
3. Irvin RG, Ballenger JF. Coronary artery bypass surgery in a patient with situs inversus. *Chest* 1982; 81: 380-1. [CrossRef]
4. Moreyra AE, Saviano GJ, Kostis JB. Percutaneous transluminal coronary angioplasty in situs inversus. *Cathet Cardiovasc Diagn* 1987; 13: 114-6. [CrossRef]
5. Hynes KM, Gau GT, Titus JL. Coronary heart disease in situs inversus totalis. *Am J Cardiol* 1973; 31: 666-9. [CrossRef]
6. Tubbs RS, Wellons JC 3rd, Salter G, Blount JP, Oakes WJ. Intracranial anatomic asymmetry in situs inversus totalis. *Anat Embryol* 2003; 206: 199-202.
7. Papadopoulos DP, Athanasiou A, Papazachou U, Dalianis NV, Anagnostopoulos S, Benos I, et al. Treatment of coronary artery disease in dextrocardia by percutaneous stent placement. *Int J Cardiol* 2005; 101: 499-500. [CrossRef]
8. Zhang Q, Zhang RY, Hu J, Shen WF. Percutaneous drug-eluting stent implantation in dextrocardia: case report. *Chin Med J (Engl)* 2007; 120: 248-50.
9. Barış N, Kırımlı O, Özpelit E, Akdeniz B. Right coronary artery intervention with mirror image in a patient with dextrocardia. *Anadolu Kardiyol Derg* 2005; 4: 340-1.

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Available Online Date/Çevrimiçi Yayın Tarihi: 16.05.2012

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doi:10.5152/akd.2012.129

Angina and origin of three major coronary arteries from independent ostia in right coronary sinus

Anjin ve sağ koroner sinüsten, üç majör koroner arterin bağımsız ostiyumlardan çıkışı

Introduction

Coronary artery origin abnormalities are low frequent findings in adult patients without congenital heart disease who undergo a coronary angiography (ranges from 0.3% to 1.3% in the longest registry) (1). Although more than a half of the cases are referred for angina, most of them are a discovery not related to this symptom.