

## **Coronary artery bypass grafting in a case with dextrocardia and situs inversus**

*Dekstrocardi ve situs inversuslu bir olguda koroner bypass greftleme cerrahisi*

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Situs inversus totalis is a rare anatomic variant characterized by a complete mirror image of the thoracic and abdominal viscera. There are few reports of myocardial revascularization in such patients. We report herein the case of a 47-year-old male patient with dextrocardia and situs inversus totalis who underwent coronary artery revascularization with cardiopulmonary bypass by the use of the right internal thoracic artery graft to the anterior descending coronary artery, and two saphenous vein grafts to the other two coronary arteries. The mirror image anatomy does not pose an unusual technical challenge in surgical myocardial revascularization.

**Key words:** Coronary artery bypass grafting; dextrocardia; internal mammary artery.

Situs inversus is a rare anatomic variant in which the position of the thoracic and the abdominal viscera are exchanged from the left to the right sides. Situs inversus with dextrocardia occurs in approximately one in 10.000 patients. Of these patients, 15% have Kartagener's syndrome (immotile cilia syndrome), which is inherited as an autosomal recessive trait and affects approximately one in 68,000.<sup>[1]</sup> The rate of coronary heart disease in situs inversus totalis is similar to that of the general population.<sup>[2]</sup> The first reported coronary artery bypass surgery in a patient with dextrocardia was in 1980.<sup>[3]</sup>

The mirror image anatomy of dextrocardia may sometimes pose technical difficulties, either in percutaneous coronary interventions or surgical procedures for clinicians.

### **CASE REPORT**

A 47-year-old man was admitted to our hospital with complaints of angina radiating to the right arm for the last two months. He was known to have dextrocardia

Situs inversus totalis nadir görülen bir anatomik varyant olup tüm torasik ve abdominal organların ayna görüntüsü şeklinde konumlanmaları ile karakterizedir. Bu hastalarda miyokard revaskülarizasyonu ile ilgili çok az bildirim mevcuttur. Bu yazıda dekstrocardisi ve situs inversus totalisi bulunan ve kardiyopulmoner bypass altında ön inen koroner artere sağ internal torasik arter grefti, diğer iki koroner artere ise iki safen ven greftiyle koroner arter revaskülarizasyonu uygulanmış olan 47 yaşındaki bir erkek hastaya ilişkin olgu sunuldu. Anatominin ayna görüntüsünde olması cerrahi miyokard revaskülarizasyonunda sıra dışı bir teknik zorluk yaratmamaktadır.

**Anahtar sözcükler:** Koroner arter bypass greftleme; dekstrocardi; internal mammaryan arter.

and situs inversus totalis for the last five years. He had no predisposing risk factor for ischemic heart disease. On physical examination, his apex beat was right-sided. The liver was left-sided and the spleen was on the right also. Chest radiography confirmed the presence of a right sided stomach gas bubble and a right-sided aortic knuckle (Fig. 1). There was no intracardiac defect on echocardiography. Coronary angiography showed stenosis of the left anterior descending, circumflex and the right coronary arteries (Fig. 2a, b).

The patient underwent coronary artery revascularization with cardiopulmonary bypass. The right internal thoracic artery (RITA) and the saphenous vein from the right lower leg were harvested. The distal coronary anastomoses were made with the surgeon standing on the left side of the patient. The RITA was grafted to the left anterior descending artery (LAD), and the reversed saphenous vein graft was anastomosed to the first obtuse marginal artery and the posterior descending branch of the morphologic right coronary artery. The cross-clamp



**Fig. 1.** Chest radiograph confirming the presence of a right sided stomach gas bubble and a right sided aortic knuckle.

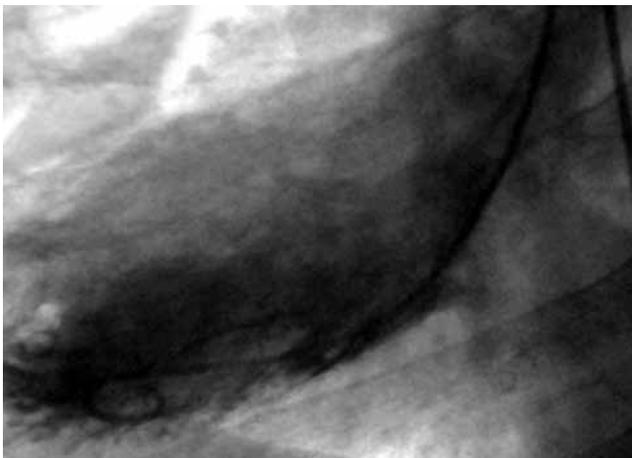
time was 47 minutes and total bypass time was 71 minutes. The patient was weaned from bypass without any complications. His postoperative recovery was uneventful. He was discharged on the 6<sup>th</sup> postoperative day.

## DISCUSSION

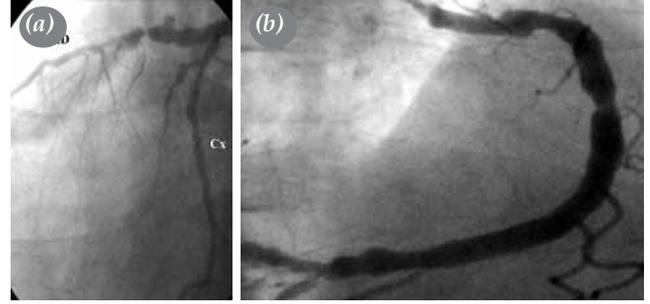
Hieronimus Fabricius first described situs inversus in 1606, while Marco Severino described dextrocardia in 1643.<sup>[4]</sup> Although the exact etiology is unclear it is thought to be autosomal recessive. Situs inversus totalis with dextrocardia is rare but the incidence of atherosclerotic heart disease is known to be similar to that in the general population.<sup>[2]</sup>

However, coronary artery bypass grafting in dextrocardia is rare. There are only a few case reports of myocardial revascularization in such patients with no big series.<sup>[5]</sup>

In patients with dextrocardia and situs inversus totalis presenting with ischemic heart disease either percutaneous coronary interventions or surgical revas-



**Fig. 3.** Left ventriculography with the apex towards the right.



**Fig. 2.** (a) Coronary angiography showing the left anterior descending (LAD) and the circumflex (Cx) coronary arteries, and (b) the right coronary artery.

cularization is applicable just like in patients with situs solitus. There are also reports of off-pump coronary revascularization.<sup>[6]</sup> In patients scheduled for surgical intervention, both the left and the right internal thoracic arteries can be used as usual. But in this case the right internal thoracic artery should of course be the preferred graft for the LAD.

We anastomosed the right internal thoracic artery to the left anterior descending artery on cardiopulmonary bypass. The operative technique was similar to that for on-pump coronary artery bypass grafting for situs solitus. The procedure was greatly facilitated by the surgeon standing on the left side of patient; otherwise we did not encounter any technical difficulty.

In conclusions, we suggest that myocardial revascularization in dextrocardia with situs inversus can be successfully achieved with right internal thoracic artery bypass grafting to the left anterior descending coronary artery.

The operative technique was similar to coronary artery bypass grafting for situs solitus in dextrocardia with situs inversus. The mirror image anatomy does not pose an unusual technical challenge in surgical myocardial revascularization.

## Declaration of conflicting interests

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