

## Coronary Artery Bypass Grafting in a Case of Situs Inversus totalis with Dextrocardia and Kartagner's Syndrome: a Case Report and Review of Literature

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### Abstract

We report our experience of a patient suffering from severe coronary artery disease and situs inversus totalis with dextrocardia and Kartagner's syndrome. The Surgeon was standing on the left side of the patient, performed coronary artery bypass grafting by harvesting the right internal mammary artery and Saphenous Vein grafts and the patient survived the procedure without any complications. We conclude that coronary artery bypass grafting (CABG) is not contraindicated in case of Kartagner's syndrome with dextrocardia and it can be done safely from the left side of the patient.

**key words:** *Situs inversus totalis; Dextrocardia; CABG; Kartagner's syndrome*

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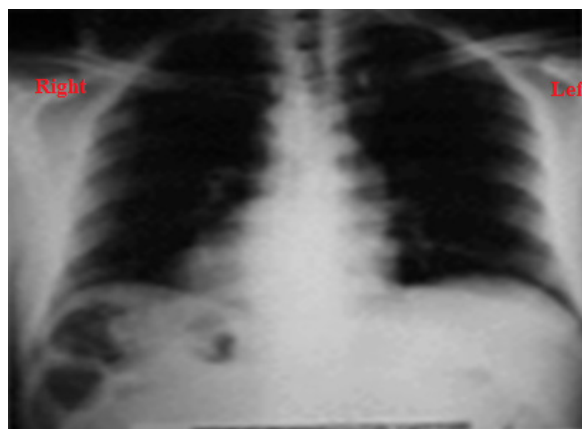
### Introduction

Situs inversus, short form of the Latin "situs inversus viscerum", is a term used to describe the inverted position of chest and abdominal organs. It is called situs inversus totalis when there is a total transposition of abdominal and thoracic viscera (mirror image of internal organs normal positioning) [1]. It is associated with Dextrocardia (true mirror image) in 5% of cases and associated with Kartagner's syndrome in 20% of cases [2]. Situs inversus totalis with dextrocardia was first described by anatomist surgeon Marco Aurelio in 1643 [1,3]. An approximate prevalence of this anomaly is about 1-2/10,000 normal population, although it is thought to be autosomal recessive. Kartagener syndrome consists of congenital bronchiectasis, dextrocardia and sinusitis and sometimes sterility in male patients due to sperm abnormality [2]. The rate of atherosclerotic heart disease in people with this condition is similar to the general population [3]. Several cases of surgical coronary revascularization in patients with dextrocardia have been reported in the literature, but about only one case was reported by Bougioukas and his co-workers as CABG in a patient with Kartagener's syndrome. We present our experience with one case of situs inversus totalis with dextrocardia and Kartagner's syndrome done in our center [4]. The patient, who had coronary artery disease, underwent CABG with the surgeon standing on the left side of the patients and the right internal mammary artery (RIMA) harvested for bypass grafting instead of the left internal mammary artery (LIMA).

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## Case Description

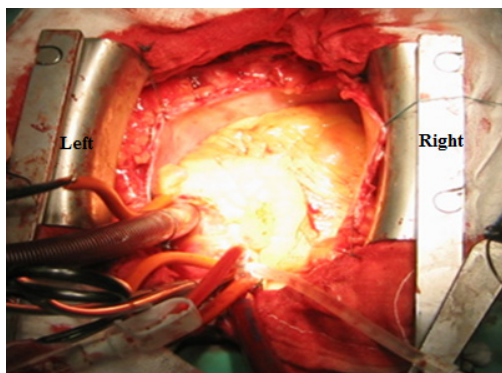
A 48-year-old man, who had anterior myocardial infarction (MI) one year previously, presented with post MI angina. He is already diagnosed to have situs inversus totalis with dextrocardia, he had a history of diabetes, hypertension, and hypercholesterolemia [Figure 1]. The preoperative Body CT-Scan shows a typical situs inversus totalis accompanied with Kartagner's syndrome [Figure 2]. His dextrocardia with situs inversus didn't present a problem for angiography and standard Judkins catheters were used. The aorta was right sided. Aortic valve was competent without any stenosis or gradient. Left ventricular function was moderately impaired. There was anterior hypokinesis with an estimated ejection fraction of 50%. Coronary vessels were an exact mirror image of coronary circulation. The morphological left anterior descending coronary artery (LAD) was blocked at origin, showing a tubular atherosclerotic lesion in the proximal part with partial filling. The diagonal vessel shows a proximal lesion. Mid portion of the left circumflex (LCX) artery and proximal and mid portions of the right coronary artery (RCA), shows significant proximal stenosis. Urgent Coronary Artery Bypass Grafting (CABG) was considered for the patient, median sternotomy revealed that the heart is occupying exactly the mirror image of its normal position [Figure 3]. The left saphenous vein and right internal mammary artery (RIMA) were harvested and the surgeon stood on the left side of the patient instead of the right side. Cannulation was performed, and a routine antegrade cardioplegia was administered.



**Figure 1:** Chest-X-ray shows dextrocardia with anatomical left lung in right hemithorax. Also stomach is on right side.



**Figure 2:** CT scan of thorax shows the dextrocardia and honey comb appearance of right lower lobe bronchiectasis.



**Figure 3:** Mirror-image position of the heart.

CABGx4 done for him, RIMA and saphenous vein grafts were grafted on the LAD, diagonal branch, obtuse marginal (OM) and RCA, respectively. The aortic cross-clamp time and Cardiopulmonary bypass (CPB) were 39 and 55 minutes, respectively. The patient was weaned from CPB in normal sinus rhythm and without inotropic support. The postoperative course being smooth and uneventful, the patient was discharged on the 6th postoperative day in good condition.

## Discussion

Situs inversus totalis with dextrocardia is a rare finding, there are also a few reports of this anomaly in with coronary artery disease and CABG in the existing literature. Kartagener's syndrome is characterized by the triad of bronchiectasis, sinusitis and situs inversus, and is also combined with abnormalities of the cilia of the respiratory epithelium. The rate of coronary artery disease in those with this anomaly is similar to that in the normal population [2].

Saad., *et al.* reviewed the literature for coronary surgery in patients with dextrocardia, dealing with the position of the surgeon [7]. We reviewed also the literatures dealing with the conduit choice in such a case [4,8]. Most of the authors preferred to graft the LAD with the right internal mammary artery, as the mirror-image appearance of the heart offers the convenience of using this arterial graft [3,4,7,8]. Seedio., *et al.* reported a series of two patients. In one case they used LIMA as a free graft to the LAD and in the other case he used the right internal mammary artery to the LAD [9].

We think that our case is unique due to three reasons:

1. In contrast to previous studies reporting the surgeon standing on the right side of the patient [3-5], we performed uneventful operations while standing on the left side of the patient,
2. The RIMA, rather than LIMA, was harvested for grafting on the left anterior descending artery,
3. To our knowledge this is the 2<sup>nd</sup> case reported for a Kartagener's syndrome with CABG.

## Conclusion

Situs inversus with mirror-image of the heart is a rare condition, which eventually every cardiac surgeon might have to deal with. The position of the surgeon depends mainly on the surgeon's choice.

Dextrocardia or Kartagener's syndrome itself is not a contraindication to coronary bypass surgery and the surgery can be done safely and successfully without any problems or technical difficulties. Although the anatomic abnormality of the location of heart and the great vessels is challenging but standing at the left side of the patient may constitute a visible option in these patients.

The use of the RIMA seems to be the easier way to graft the LAD in such cases.

**Consent**

Written consent was obtained from the patients for the publication of this study.

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