

OFF-PUMP CORONARY ARTERY BYPASS IN PATIENTS WITH DEXTROCARDIA WITH SITUS INVERSUS

Debabrata Biswas*, Anirvan Karmakar, Subhendu Sarkar, Ratan Kumar Das, Lalit Kapoor, Sukanti Mohapatra

Department of Cardiac Surgery, BMBHRC, India

*Corresponding Author Email: drdeba07@rediffmail.com

ABSTRACT

The incidence of dextrocardia with situs inversus is uncommon with a reported incidence of 1 in 10000 live births. Patients with dextrocardia undergoing Coronary artery bypass surgery are very rare. The rate of coronary heart disease in situs inversus, however, is similar to that of the general population. We report two cases of CABG in our institution involving 2 patients with dextrocardia and situs inversus. Both the patients had excellent recovery. We present the technical difficulties in performing the operation with possible improvisations, which makes it an interesting case report. More importantly, we believe there is few documented case report of CABG in such a patient cured with totally off pump technique using conventional off pump apparatus.

Keywords: *Dextrocardia, OPCAB, Situs Inversus*

INTRODUCTION

Incidence of congenital cardiac anomalies in dextrocardia with situs inversus is low as compared to congenital cardiac anomalies in isolated dextrocardia. Dextrocardia with situs inversus is an uncommon congenital abnormality in which case a left-handed abnormal rotation of the visceral organs occurs. The occurrence of coronary artery disease is the same as that in the general population. We report two cases of coronary artery bypass graft (CABG) in our institution involving 2 patients with dextrocardia and situs inversus and underwent off-pump coronary artery bypass (OPCAB).

Patient A

A 58-year-old gentleman was admitted in our Cardiology department with a 6-day history of worsening exertional angina. He had no significant past medical history. He had been a lifelong nonsmoker. Interestingly, on physical examination, a right-sided apex beat was found on palpation. This raised the possibility of Dextrocardia in our clinical assessment. Subsequent chest x-ray confirmed our initial suspicion (Fig 1). He underwent further investigations including an echocardiogram which showed akinetic inferior wall with mid and basal segment by means of an ejection fraction of 47% along with grade-I diastolic dysfunction with mild pulmonary artery hypertension.

Subsequently, a coronary angiography (CAG) was performed. This confirmed severe triple vessels disease with a background of good left ventricular function (Fig 2).

The patient was referred for CABG. During operative planning it was predictable that the approach to the surgery had to be modified in view of his anatomy. A plan was made to harvest the right internal thoracic artery as the conduit for the left anterior descending graft. Reversed saphenous vein was used for the other grafts. We initially started with the surgeon standing on the conventional right side of the operating table. Soon after opening the pericardium it became obvious that the procedure would be difficult to perform with the conventional surgeon position. Hence the doctors quickly modified the method and decided to perform the entire procedure with the main surgeon standing on the left of the patient.

The patient underwent OPCAB. The right internal thoracic artery was grafted to the left anterior descending artery, and the reversed saphenous vein graft was anastomosed to the diagonal, first obtuse marginal artery and the posterior descending branch of the morphologic right coronary artery (Fig 3, 4, 5).

His postoperative recovery was uneventful. He was discharged on the 6th postoperative day. Post-operative angiography showed that all grafts are patent.



Fig 1: Plain PA view of the patient with dextrocardia.



Fig 2 : CAG showing severe triple vessel disease.



Figure 3 : RIMA to the LAD marked with arrow.



Figure 4: SVG to the OMI



Figure 5: SVG to the PDA

The operative strategy was similar to the first procedure. The right internal thoracic artery was grafted to the LAD and the reversed saphenous vein graft was anastomosed to the diagonal, first obtuse marginal artery and the PDA of the morphologic right coronary artery.

Again he had an uneventful post operative recovery and was discharged on the 7th postoperative day.



Figure 6 : Chest x ray



Figure 7

DISCUSSION

Situs inversus viscerum is the state in which the normal arrangement of the viscera is reversed to form a mirror image of the usual position. This transposition is usually total but may in exceptional instances involve either the thoracic viscera or the abdominal viscera alone (Cleveland, 1926). Although the exact etiology remains unclear dextrocardia is thought to have autosomal recessive inheritance (Perloff, 1987). The incidence of atherosclerotic heart disease is known to be similar to that in the general population (Hynes, Gau, & Titus, 1973). The first reported coronary artery bypass surgery in a patient with dextrocardia was in 1980 (Irvin & Ballenger, 1982).

There are only a few case reports of myocardial revascularization in such patients (Erdil *et al.*, 2002). There are also very few reports of off-pump coronary revascularization (Tabry *et al.*, 2001).

We found that the right internal thoracic artery anastomosis to the LAD was the easiest option. The procedure was greatly facilitated by the surgeon

Patient B

A 62 years male patient was admitted with exertional angina. His past medical history included hypertension only. He had been a lifelong nonsmoker. His pre operative chest x-ray confirmed dextrocardia as suspected clinically (Fig 6).

Echocardiogram showed dextrocardia with ejection fraction of 62%, and with no regional wall motion abnormality.

Coronary angiography confirmed severe disease in the left anterior descending artery (LAD), Diagonal, posterior descending (PDA) and obtuse marginal (OM) of the morphologic right coronary artery (Fig 7).

standing on the left side of patient.

CONCLUSION

In conclusions, we believe that myocardial revascularization in dextrocardia can be successfully achieved. However, we suggest that the surgeon stands to the Left of the patient while doing the procedure. Also it needs to be noted that during the construction of the proximal anastomosis, the heel must be in the exact mirror position of CABG in levocardia.

REFERENCES

- Cleveland, M. (1926). Situs inversus viscerum, anatomic study. *Archives of Surgery*, 13(3), pp 343-368.
- Erdil, N., Cetin, L., Sener, E., Demirkiliç, U. & Sağ, C. (2002). Situs inversus and coronary artery disease. *Asian Cardiovascular and Thoracic Annals*, 10(1), pp 53-54.
- Hynes, K. M., Gau, G. T. & Titus, J. L. (1973). Coronary heart disease in situs inversus totalis. *American Journal of Cardiology*, 31(5), pp 666-669.
- Irvin, R. G. & Ballenger, J. F. (1982). Coronary artery bypasses surgery in a patient with situs inversus. *Chest*, 81(3), pp 380-381.
- Perloff, J. K., (1987). The clinical recognition of congenital heart disease, 3rd edition, W.B. Saunders. Philadelphia
- Tabry, I. F., Calabrese, J., Zammar, H., Abou-Kasem, K., Akeilan, H., Gharbieh, N., Zinati, H., Noureddine, W., el-Hout, A., Tayah, M., Khalidy, L. & Yaghi, M., (2001), Case report: off-pump total myocardial revascularization for dextrocardia and situs inversus. *Heart Surgery Forum*, 4(3), pp 251-253.