CASE REPORT

Multiple Coronary Artery Bypass Grafting in Dextrocardia: Case Report

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Summary

This is a case report of an unusual case of a patient with dextrocardia and "situs inversus totalis" who presented with unstable angina. Coronary angiography revealed severe main stem and severe triple vessel coronary artery disease. The patient later underwent successful emergency coronary artery bypass graft surgery. To the authors' knowledge this is the first reported case in Malaysia and also, the first ever report in the literature of *multiple* vessel coronary artery grafting, including the use of the right internal mammary artery.

Key Words: Dextrocardia, Coronary artery bypass

Introduction

Atherosclerotic coronary disease may develop even in patients who reach adult life with complex cardiovascular anomalies. Although the incidence of situs inversus and dextrocardia in the adult populationin Malaysia is not known, studies from North America have quoted an incidence of 1 in 10,000[1]. Only the patients with dextrocardia as part of "situs inversus totalis" commonly survive long enough to develop atherosclerotic coronary artery disease. The occurrence of coronary artery disease in this condition is similar to the general population[2].

In this report, we describe a patient with dextrocardia and "situs inversus totalis" with unstable angina on whom successful emergency *multiple* vessel coronary artery bypass grafting (CABG) was performed.

Case Report

A 68 year old female presented with a three-month history of central chest pain on minimal exertion highly suggestive of angina pectoris. She has a past medical history of a prolapsed lumbar intervertebral disc. Risk factors included obesity, hypertension and hyperlipidaemia. Physical examination showed an obese lady (body mass index 30) with a blood pressure of 150/80 and pulse rate 80 beats per minute. The apex beat was palpable in the 5th intercostal space in the right mid-clavicular line and the heart sounds were normal. The remainder of the physical examination was unremarkable. The chest radiograph showed the aortic arch, cardiac apex and fundus of the stomach to be on the right side (Fig. 1). The electrocardiography with the leads reversed showed good 'R' wave progression with no signs of ischaemia.

She developed unstable angina prior to presentation to hospital and she was commenced on intravenous heparin and glyceryl nitrate infusion. She therefore proceeded to urgent coronary artery angiography. Both the right and left coronary ostia, anatomically situated contralateral to their usual locations, were cannulated using the standard Judkins coronary catheters. Contralateral image intensifier views were taken of the coronary arteries, that is the standard view of the first image of the left coronary system is the right anterior oblique. In

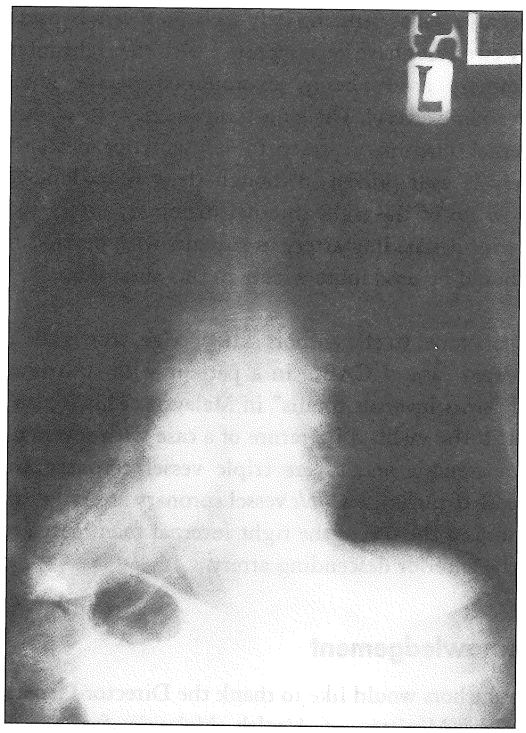

Fig. 1: Chest radiograph showing the aortic arch, cardiac apex and gastric bubble on the right side.

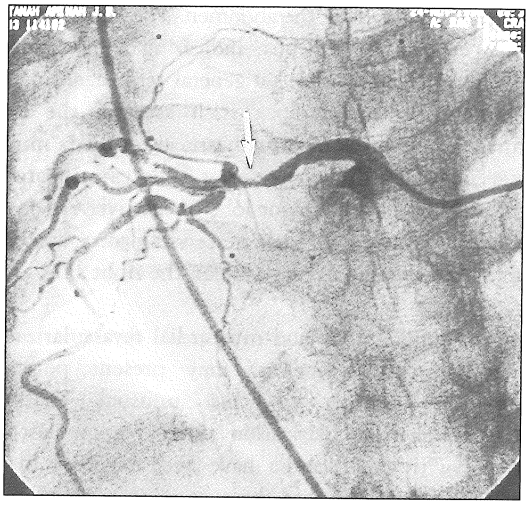

Fig. 2: Right anterior oblique view of the coronary angiogram showing the morphologic left main coronary artery with a distal stenosis (arrow). There are also stenoses in the proximal anterior descending and circumflex arteries.

this case, the left anterior oblique view was taken. It showed 80% stenosis of the distal main stem with 90% diffuse stenosis of the proximal anterior descending artery and 90% stenosis of the proximal circumflex artery (Fig. 2). There was 70% stenosis of the proximal morphological right coronary artery with 90% stenosis of the proximal posterior descending artery. The morphologic left ventricular function was good.

At emergency operation, the inferior vena cava, anatomic right atrium, and the major lobe of the liver are on the left side and the cardiac apex, descending aorta, anatomic left atrium, and the stomach are on the right side. There were two lobes in the right-sided lung. Coronary artery bypass grafting (4 grafts) was performed using cardiopulmonary bypass cooling the patient down to a core temperature of 33 degrees centigrade. Intermittent ischaemic fibrillatory arrest of the heart was used for myocardial protection during the construction of the grafts. Myocardial ischaemic time was 67 minutes and cardiopulmonary bypass time was 130 minutes. The right internal mammary artery was anastomosed to the anterior descending artery, reversed long saphenous vein grafts were used to graft the posterior descending, diagonal and first obtuse marginal branch of the circumflex artery. Post-operatively she developed atrial fibrillation with a fast ventricular response rate requiring intravenous digoxin to control her pulse rate. Otherwise her recovery was uneventful. She was discharged home on the 12th post-operative day in sinus rhythm. At follow-up 9 months following surgery, she was angina free and had good exercise tolerance.

Discussion

In situs inversus, the right and left sides of the abdomen and thorax are reversed in a mirror-image fashion. The spleen, stomach bubble, and lower leaf of the diaphragm

are on the right side of the abdomen. The left-sided lung has an epiarterial bronchus, indicating a morphologic right lung. Dextrocardia is a general term denoting the fact that the cardiac apex is located in the right hemithorax. In situs inversus heart, also called "mirror-image" dextrocardia, the inferior vena cava, anatomic right atrium, and the major lobe of the liver are on the left side and the cardiac apex, descending aorta, anatomic left atrium, and the stomach are on the right side.

Coronary angiography and myocardial revascularization (surgical or percutaneous) may present potential difficulties related to this unusual anatomy. Percuatenous revascularization such as angioplasty in patients with dextrocardia have been reported in the literature. In this patient, because of the critical main stem stenosis and severe proximal triple vessel coronary artery disease, surgical revascularization was the better treatment option. The operative time took longer than usual as the surgeon had to operate from the patient's left (as opposed to the right) to access the right internal mammary artery and the heart, which in this case lies towards the right of the midline. There has been only 4 previous reports of CABG in dextrocardia with "situs inversus totalis" utilizing only saphenous vein bypass and only two cases have been reported with the right internal mammary artery being anastomosed to the anterior descending artery[3]. The long-term patency rate of the left internal mammary artery to left anterior descending artery is well proven. Although there is no long-term follow up of the right internal mammary artery to the anterior descending artery in patients with dextrocardia, it should be used more widely in this situation.

To conclude, to the authors' knowledge, this is the first reported case of CABG in a patient with dextrocardia and "situs inversus totalis" in Malaysia. This is also the first in the medical literature of a case with severe main stem stenosis and severe triple vessel coronary artery disease requiring *multiple* vessel coronary artery grafting, including the use of the right internal mammary artery to the anterior descending artery.

Acknowledgement

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References

1. Rosenberg HN, Rosenberg IN. Simultaneous association of situs inversus, coronary heart disease and hiatus hernia. Ann Intern Med 1949; 30: 851-59.
2. Hymes KM, Gau GT, Titus JI. Coronary heart disease in situs inversus totalis. Am J Cardiol 1973; 31: 666-69.
3. Mesa JM, Aroca A, Frutos A, Centeno J, Silvestre J, Baset F. Situs inversus and myocardial revascularization. J Cardiovasc Surg 1995; 36: 571-72.