Case Report

Surgical repair of delayed chronic Type A dissection after previous Coronary Artery Bypass Grafting

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ABSTRACT

We report of a 57 years-old woman who had undergone coronary artery bypass three years previously. Computed tomography (CT) revealed that the ascending aorta was dilated to about 7cm in diameter, with type A dissection. Angiography revealed that left internal thoracic artery (LITA) graft to left anterior descending artery (LAD) and saphenous vein grafts to posterior descending artery (PDA) branch of the right coronary artery (RCA) and second obtuse marginal (OM) branch of the circumflex artery (CX) correspondingly were patent. Though the risk of surgical treatment via repeat median sternotomy is usually very high in these cases, we successfully performed the reoperation using profound hypothermic circulatory arrest. We dissected the mediastinum by using a sternum retractor for ITA and saphenous vein grafts dissection. We didn't use cardioplegia during profound hypothermic circulation.

KEY WORDS: Reoperation, CABG, Type A dissection.

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INTRODUCTION

Delayed chronic type A dissection of the aorta after previous cardiac surgery is difficult to treat. It has been reported with variable etiology and with high surgical mortality.[1–6] We report successfully undertaken surgical treatment of a patient with type A dissection who had previous CABG under hypothermic circulatory arrest without cardioplegia.

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CASE STUDY

A 57-years old woman was seen in our outpatient clinic with no complaints for a routine control because she had CABG operation. She had undergone triple CABG [left internal thoracic artery (LITA) to left anterior descending artery (LAD), and saphenous vein graft (SVG) to the posterior descending branch (PDA) of the right coronary artery (RCA) and second obtuse marginal (OM) branch of the circumflex artery (Cx)] operation three years previously at a different hospital. CT revealed that the ascending aorta was dilated aneurysmally to about 7cm in diameter, with type A dissection (Fig-1). Angiography at the ascending aorta revealed that the LITA to LAD graft had excellent patency and the SVGs to the corresponding arteries had excellent patency (Fig-2). But left ventricular function (LVF) was moderately depressed, with an ejection fraction of 44%. Because it was thought that the risk of rupture of the aneurysm was higher than that of surgical repair, we performed the surgical repair of the dissected aorta with success.

Operation: The patient was taken to operation room with radial artery; invasive pressure, with five lead electrode; electrocardiography (ECG) and with

Svanganz catheter; the pulmonary artery pressure was monitored. After the satisfactory induction of general anesthesia, the left femoral artery and femoral vein were exposed, taped, and prepared with purse-string stitches for cannulation. A secondary midline skin incision was made on the previous scar, followed by repeat sternotomy with oscillating saw with no trouble. We dissected the mediastinum and the right and left pleural cavities were opened widely. The mediastinum became en bloc with patent LITA and saphenous vein grafts and ascending aortic aneurysm (7cm). We dissected safely the ascending aorta. We planned bicaval venous cannulation so that retrograde cerebral perfusion was obtained via the superior vena cava (SVC), under full heparinization (300 unit/kg), cardiopulmonary bypass (CPB) was started initially with the arterial infusion cannula in the left femoral artery and a single, 2-stage venous cannula in the right atrium.

After the vent tube was inserted in the left ventricle via the right upper pulmonary vein, core cooling was initiated. When a rectal temperature of 18°C was reached the pupils fix dilated and electro encelogragphy (EEG) was flat line circulatory arrest was initiated and the ascending aorta was cut open. The patient's head was covered with an ice pack during core cooling. An intimal tear was identified in the anterior side of the proximal ascending aorta. The ascending aorta was transacted just at the brachiocephalic take-off, obliquely, on the lesser curvature of the arch, just beyond the intimal tear. After the distal stump was reinforced with a strip of ePTFE felt on the outside of the aorta, the bevelled end of a piece of 30-mm woven Dacron prosthesis was anastomosed using 3-0 polypropylene under the open anastomosis technique (Fig-3). On completion of the distal anastomosis, body perfusion was resumed via a side branch of the prosthesis. The duration of circulatory arrest was 46 min. The aortic wall layers in the proximal stump were reinforced with 3-0 polypropylene using a mattress-suture technique, with 2 expanded polytetrafluoroethylene (ePTFE) felt strips one on each side of the aorta.

Thereafter, a prosthesis of the same size was anastomosed using a 3-0 polypropylene running suture. Rewarming was started and the graft-to-graft anastomosis was made with a running 4-0 polypropylene suture. The proximal ends of the SVGs were anastomosed to the holes made on the ascending prosthesis with a 6-0 running polypropylene suture. De-airing of the left heart was carried out via the aortic root catheter, followed by de-clamping of the graft. The heart spontaneously resumed beating into ventricular fibrillation, underwent cardioversion into a normal sinus rhythm. About 43 minutes after de-clamping the aorta, the hemodynamics stabilized with good left ventricular contraction. CPB was withdrawn uneventfully. After sufficient hemostasis was

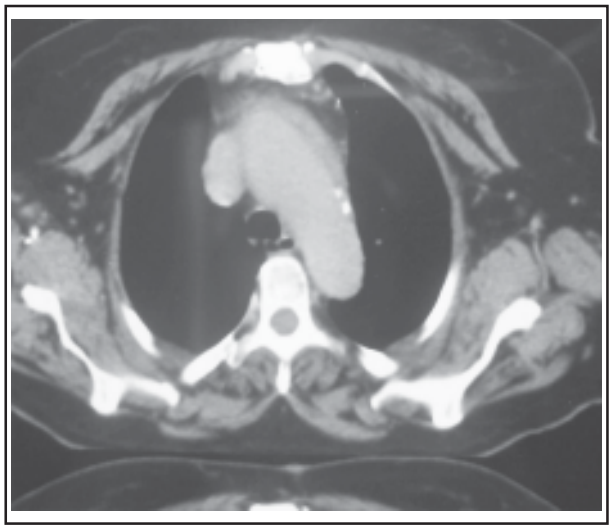

Fig-1: Type A dissection seen in Computed Tomography (CT) which is 7cm in diameter.

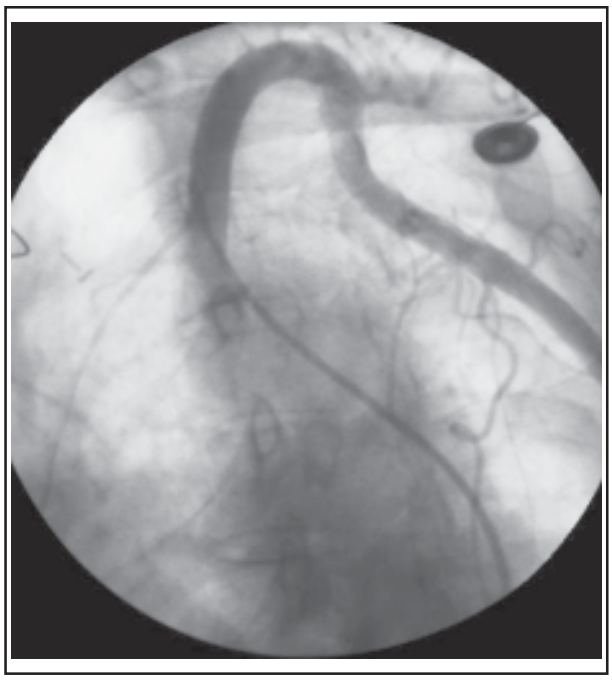

Fig-2: Angiography revealed that left internal thoracic artery (LITA) graft to left anterior descending artery (LAD) and saphenous vein grafts to posterior descending artery (PDA) branch of the right coronary artery (RCA) and second obtuse marginal (OM) branch of the circumflex artery (CX) correspondingly were patent.

achieved, the chest was closed. On the next postoperative day, the patient regained consciousness and the endotracheal tube was extubated. Postoperative Magnetic Rezonance Angiography (MRA) showed that aortic dissection had disappeared. (Fig-4)

DISCUSSION

Debakey and his team performed aortic replacement with beating heart and with normothermia in 176 patients in 1965. The total martality was 21%.[7] Grieep and his colleagues performed the first succesful surgical management in chronic aortic dissections with deep hypothermia and total circulatory arrest in 1975.[8] Liversay and his colleagues performed arcus replacement via open anostomosis technique with moderate hypothermia and with brief circulatory arrest in 15 patients in 1982. The mortality was between 7-17% with elective cases.[9]

The mortality is 34% in Bachet's series in emergency cases with deep hypothermic circulatory arrest.[10] Delayed ascending aortic dissection after cardiac surgery is difficult to treat, especially in cases with functional grafts. It has previously been reported as a complication originating from cross-clamp injury[3] or from intimal tears at the suture line of a CABG[1] or from the site of cannulation.[6] In the present case, the intimal tear was identified in the anterior of the ascending aorta, which was compatible with the site of the suture line of the SVG or the site of antegrade cardioplegia infusion but intraoperative findings were not conclusive to clarify the etiology of the dissection. At the other hand choronic postoperative dissecting aneurysm and pseudoaneurysm of the ascending aorta after cardiac surgery are relatively rare but potentially serious complication of various cardiac procedures.[11,12] Orszulac et al. commented that delayed aortic dissection after cardiac surgery was not related to technical operative errors or clamp injury, but to cystic medial necrosis or hypertension.[12]

The early hospital mortality in late type A dissection of the aorta after previous cardiac surgery is high, exceeding that of primary type A dissections by almost two fold.[4] On the other hand, the low incidence of perforation after previous cardiac surgery is in agreement with the reported prevalence of 2.5%.[6–9] Apparently, postoperative pericardial scarring and adhesions may, in part, explain this condition. Though the aortic dissection was chronic in our case, the diameter of the ascending aorta was 7 cm with dissection. We judged the risk of aneurysm rupture to be higher than that of surgical repair.

Even so, the surgical risk in this case was very high because of the combination of repeat median sternotomy with huge aneurysm, patent ITA and saphenous vein grafts from the previous CABG, mildly depressed LVF. Although it's known that Deep Hypothermia Circulatory Arrest (DHCA) is a safe method for cerebral protection the neurologic complications due to air and particulate embolozation are consideraly common.[13,14] The neurological complications reach to 13% in some series, furhtermore it's pointed out that pulmonary complications are 7% and hemotologic diathesis is 7%.[14] Though DHCA time was comparatively long with

Fig-3: The distal and proximal anostomosis of the graft.

Fig-4: Postoperative Magnetic Rezonance Angiography (MRA) to the aortic arch which showed that aortic dissection had had disappeared.

46 min, it was lucky for us not to have caused a central neurological complication. Covering the head with an ice pack may have contributed to prevention of central neurological complication.[15]

REFERENCES

1. Archer AG, Choyke PL, Zeman RK, Green CE, Zuckerman M. Aortic dissection following coronary artery bypass surgery: Diagnosis by CT. Cardiovasc Intervent Radiol 1986;9:142–145.
2. Gillinov AM, Lytle BW, Kaplon RJ, Casselman FP, Blackstone EH, Cosgrove DM. Dissection of the ascending aorta after previous cardiac surgery: Differences in presentation and management. J Thorac Cardiovasc Surg 1999;117:252–260.
3. Litchford B, Okies JE, Sugimura S, Starr A. Acute aortic dissection from cross-clamp injury. J Thorac Cardiovasc Surg 1976;72:709–713.
4. Stanger O, Oberwalder P, Dacar D, Knez I, Rigler B. Late dissection of the ascending aorta after previous cardiac surgery: Risk, presentation and outcome. Eur J Cardiothorac Surg 2002;21:453–458.
5. Kodolitsch YV, Loose R, Ostermeyer J, Aydin A, Koschyk DH, Haverich A, et al. Proximal aortic dissection late after aortic valve surgery: 119 cases of a distinct clinical entity. Thorac Cardiovasc Surg 2000;48:342–346.
6. Williams CD, Suwansirikul S, Engelman RM. Thoracic aortic dissection following cannulation for perfusion. Ann Thorac Surg 1974;18:300–304.
7. DeBakey E, Henly WS, Cooley DA. Surgical management of dissecting aneurysm of the aorta. J Thorac Cardiovasc Surg 1965;49:131.
8. Griepp RB, Stinson EB, Hollingsworth JF. Prosthetic replacement of the aortic arch. J Thorac Cardiovasc Surg 1975;70:105.
9. Haverich A, Miller DC, Scott WC. Acute and chronic aortic dissections-determinants of long-term outcome for operative survivors. J Thorac Cardiovasc Surg 1985;72(Suppl II):11-22.
10. Bachet J, Teodori G, Goudo B, Diaz F. Replacement of the transvers aortic arch during emergency operations for type A acute aortic dissection. J Thorac Cardiovasc Surg 1988;96:878.
11. Orszulak TA, Pluth JR, Schaff HV, Piehler JM, Smith HC, McGoon DC. Results of surgical treatment of ascending aortic dissections occurring late after cardiac operation. J Thorac Cardiovasc Surg 1982;83:538–545.
12. Hagl C, Ergin MA, Galla JD, Spielvogel D, Lansman S, Squitieri RP, et al. Delayed chronic type A dissection following CABG: Implications for evolving techniques of revascularization. J Card Surg 2000;15:362–367.
13. Ergin MA, Griepp RB. Progress in treatment of aneurysm of the aortic arch. World J Surg 1980;4:535-539.
14. Liversay JJ, Cooley DA, Duncan JM, Ott DA, Walker WE, Reul GJ. Open aortic anastomosis improved results in the treatment of aneurysm of the aortic arch. Circulation 1982;66(Suppl I):122-127.
15. Azariades M, Firmin R, Lincoln C, Lennox S. The effect of propranolol on the cerebral electrical response to deep hypothermia and total circulatory arrest in lambs. J Thorac Cardiovasc Surg 1990;99:1030–1036.