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Alternative technique for early postoperative aortic tear with prosthetic vascular graft: a case report

Ameliyat sonrası erken aort yırtılması için prostetik vasküler greft ile alternatif teknik: Bir olgu sunumu

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ABSTRACT

In this article, we present a patient who underwent coronary bypass, and had a postoperative ascending aorta injury. The aorta patch plasty and coronary graft which were previously placed were extended by using synthetic vascular graft, and anastomosed to the innominate artery under current conditions. The patient was discharged on postoperative 10th day. Dynamic computed tomography angiography on postoperative 90th day showed that both the vascular graft and the right coronary saphenous vein graft as well as the anastomosis were patent.

Keywords: Beating heart; Dacron patch; polytetrafluoroethylene vascular graft; postoperative aortic tear.

ÖZ

Bu yazıda, koroner baypas sonrası çıkan aort yaralanması olan bir hasta sunuldu. Önceden yerleştirilmiş aort yama plasti ve koroner greft, sentetik vasküler greft kullanılarak uzatıldı ve mevcut koşullar altında innominat artere anastomoz edildi. Hasta ameliyat sonrası 10. günde taburcu edildi. Ameliyat sonrası 90. gündeki dinamik bilgisayarlı tomografi anjiyografi hem vasküler greftin hem de sağ koroner safen ven grefti ile anastomozun açık olduğunu gösterdi.

Anahtar sözcükler: Atan kalp; Dakron yama; politetrafloroetilen vasküler greft; ameliyat sonrası aort yırtılması.

One of the problems which may occur during surgeries on the aorta (e.g., coronary artery bypass surgery) is an aortic injury. Hypertension (HT), age, connective tissue disorders of the aorta, atherosclerosis, and dilation of a thin-walled aorta are some of the etiologic factors that play a role in this type of injury along with postoperative structural changes that occur in the aortic and cardioplegic cannula sites or the proximal anastomosis sites after the placement of cross-clamps and side clamps.[1] Different types of interventions are possible when aortic injuries happen, including primary repair of the aorta, ascending aorta replacement, or patch plasty repair of the ascending aorta. When aortic injury occurs during or after coronary artery bypass surgery, a problem can arise regarding where to perform the proximal anastomosis after the repair of the ascending aorta. In these cases, it can be done either at a location other than the ascending aorta graft, on an existing saphenal vein, or on the internal thoracic artery (ITA).[2]

CASE REPORT

A 77-year-old, diabetic, hypertensive female patient presented to the emergency room complaining of a sudden onset of chest pain. She was diagnosed with myocardial infarction (MI) and admitted to the cardiology clinic where she underwent coronary angiography. Afterwards, the decision was made for

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the patient to undergo a double coronary bypass operation [left internal thoracic artery (LITA) left anterior descending artery (LADA) and ascending aorta-safenous vein graft-right coronary artery (RCA)]. The operation was performed using standard aortic and two-stage venous cannulation, antegrade and retrograde blood cardioplegia, and moderate hypothermia. The ascending aorta had a highly atherosclerotic and fragile structure, but it was not classified as a porcelain aorta.

Next, the patient was scheduled for revision surgery since she had abundant drainage after a hypertensive attack at approximately the postoperative eighth hour. Unfortunately, she went into cardiac arrest while being transported to the operating theater, but resuscitation efforts were successful. The patient was then taken into surgery, and intraoperative observation revealed that she had a tear in the right coronary saphenous proximal anastomosis site. The tear was not eligible for primary repair, and abundant hemorrhage was present.

A side clamp was then placed on ascending aorta, the right saphenous proximal anastomosis was ended, the tear site was expanded, and patch plasty was performed on the ascending aorta using a 1.5x1.5 cm Dacron graft (C.R. Bard Inc., Murray Hill, NJ, USA). Before removing the side clamp, BioGlue® surgical adhesive (Cryolife, Inc., Kennesaw, GA, USA) was squeezed onto the graft to bolster the impermeability of the Dacron patch site. After the side clamp was removed, no hemorrhage was observed. Since the Dacron patch had a small diameter, the orifice to be opened for the right coronary proximal anastomosis needed to accommodate the graft in its entirety; therefore, there was no a risk of the patch graft suture line coming undone. However, this meant that proximal anastomosis could not be performed on the Dacron patch. The ascending aorta was also highly atherosclerotic and fragile; hence, we performed the proximal anastomosis on the innominate artery. The length of the saphenal vein anastomosed to the RCA was not long enough to reach the innominate artery, and the saphenous vein grafts (SVGs) from both lower extremities, which could have been used, had been completely removed during the elective surgery. Needing an alternative, we dissected the right internal mammary artery from the chest wall and inspected it, but this vessel was extremely small and friable and was not suitable for a coronary bypass graft. In the end, because of the lack of hemodynamic instability and a saphenous graft, a 7 mm proximal part of a GORE INTERING® vascular graft (W.L. Gore and Associates, Inc., Flagstaff, AZ, USA) was anastomosed to the innominate artery in an end-to-side fashion, and a 4 mm distal part of the same type of graft was anastomosed to the right coronary SVG in an end-to-end manner.

The patient was then transferred to the intensive care unit (ICU) and was extubated on postoperative day two. She had a total drainage of 400 mL during the follow-up in the ICU, and the patient received a total of 3 units of erythrocyte suspension transfusion postoperatively. In addition, no other coronary ischemia findings or arrhythmias were observed. Therefore, the patient was discharged on postoperative day 10. Dynamic computed tomographic angiography (CTA) was performed on postoperative day 90, and it showed that both the vascular graft, the right coronary SVG, and the anastomosis were patent (Figure 1).

DISCUSSION

An injury to the thoracic aorta can occur without a preexisting aneurysm or previous dissection. An aortic tear, which may be induced by sudden HT, is most commonly associated with fixed arteriosclerotic plaques, cystic medionecrosis, or mural thinning of the aortic wall due to long-term steroid therapy.[3] Possible methods of repair arguably include primary repair, ascending aorta replacement, and patch-assisted aortoplasty. In our case, we chose to perform aortoplasty, and Toker et al.[4] also preferred the same technique for aortic repair in their case and it was succesful.

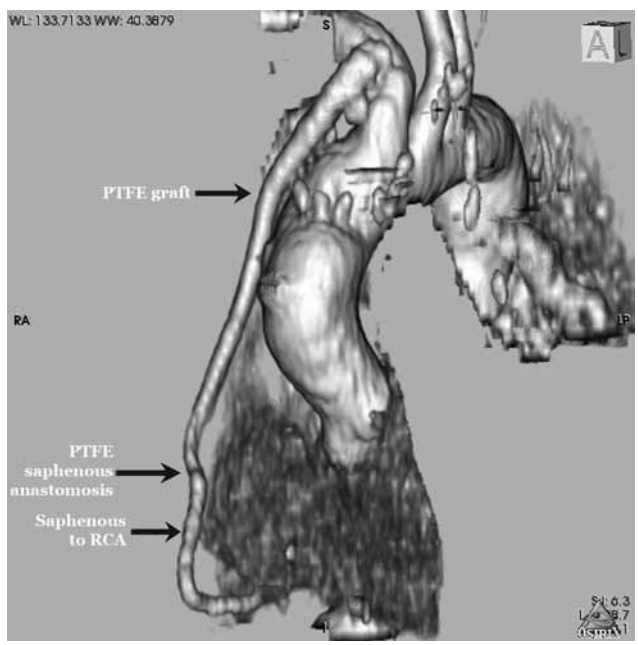

Figure 1. It is shown that polytetrafluoroethylene graft, right coronary artery saphenous vein anastomosis and polytetrafluoroethylene-saphenous vein anastomosis. PTFE: Polytetrafluoroethylene; RCA: Right coronary artery.

Prosthetic grafts are rarely used for coronary artery bypass because of the anticipated high risk of thrombosis and general availability of autogenous veins and arteries.[5] In our case, proximal anastomosis of the right coronary SVG had to be performed following the Dacron patch plasty because during the patient's elective surgery, we only found one SVG that was eligible for bypass in both lower extremities, and this was used for the RCA. The LITA was then removed in the form of a flap and used for the LADA anastomosis.

The medical literature contains many reports of intraoperative iatrogenic aortic dissections that were repaired successfully,[6] but little attention has been given to postoperative acute aortic dissections that occur within hours, days, or weeks after the surgery. With regard to the early postoperative dissections, the intimal tear usually originates at the aortic clamp site or at the site of the proximal anastomosis on the ascending aorta. In our case, the aortic tear stemmed from the site where the right coronary proximal anastomosis had been performed, and this was atherosclerotic to the highest degree.

Conclusion

We observed that an aortic dissection, which may develop at any time following coronary bypass surgeries and be fatal, can arise out of a proximal anastomosis of the saphenous vein. Accordingly, utmost care must be exercised while opening the ostia through which the grafts are anastomosed to the aorta, and an aortic punch should be used in such a way as to perform a single-piece, full-fold incision. In addition, the sutures through the aorta should be placed so as to include all of the aortic layers. In some patients, aortic tears occur in spite of the best efforts of the medical staff. When this severe, mortal complication develops, we believe that repairing the ascending aorta via a Dacron patch and then using an extra-anatomical bypass technique with a Dacron graft added to the SVG can be performed safely and effectively while leaving the aorta intact, as was successfully done in our case.

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