Case Report

AORTA

AORTA, December 2016, Volume 4, Issue 6:244-247
DOI: http://dx.doi.org/10.12945/j.aorta.2016.16.031

Received: May 24, 2016
Accepted: October 23, 2016
Published online: December 2016

Simplified Approach for Repair of Early Pseudoaneurysm of the Left Coronary Button Following Composite Graft Due to Acute Type A Aortic Dissection

Thierry Carrel, MD*, Samuel Hurni, MD, Christoph Huber, MD, Lars Englberger, MD

Clinic for Cardiovascular Surgery, University Hospital Bern and University of Bern, Bern, Switzerland

Abstract

We present a simplified surgical technique that was performed on a 37-year-old man who presented with a pseudoaneurysm of the left coronary ostium two months after repair of acute Type A aortic dissection with a composite graft. Intraoperatively, the surgical sites showed extreme adhesions. The leakage at the level of the coronary suture line was exposed from inside the aortic graft. Repair was performed using 7.0 polypropylene sutures, and the postoperative course was uneventful. The patient was discharged on postoperative day six without further complications.

Key Words

Aortic dissection • Composite graft • Coronary button • Pseudoaneurysm

Introduction

Pseudoaneurysm is a rare but challenging complication that occurs at the level of aortic anastomoses or coronary reimplantation suture lines following composite graft replacement [1]. The etiology of pseudoaneurysm includes weak tissue secondary to aortic dissection or connective tissue disease and technical failure during anastomosis construction [2, 3]. Pseudoaneurysm repair requires surgical intervention in the vast majority of cases, although exceptional cases can be treated via an interventional technique. The aim of this brief report is to present a simplified approach for the treatment of a pseudoaneurysm of the left coronary orifice presenting in the early postoperative period following composite graft replacement of the aortic root for Type A aortic dissection.

Case Presentation

The 37-year-old patient had undergone composite graft replacement for acute Type A aortic dissection 2 months earlier at another university hospital in Switzerland. At initial presentation, the patient suffered from pericardial tamponade, had to be intubated during transportation, and underwent emergency surgery due to unstable hemodynamics.

Initial repair was performed without complication and consisted of the implantation of a composite graft with a mechanical valve (St. Jude Medical, St. Paul, MN, USA). The distal anastomosis was performed with an open aortic arch technique during a brief period of moderate hypothermic circulatory arrest using selective antegrade cerebral perfusion, involving perfusion catheters in both carotid arteries, for brain protection. Re-institution of cardiopulmonary

Fax +1 203 785 3552
E-Mail: aorta@scienceinternational.org
http://aorta.scienceinternational.org

Published by Science International Corp.
ISSN 2325-4637

Accessible online at:
http://aorta.scienceinternational.org

* Corresponding Author:
Thierry Carrel, MD
Clinic for Cardiovascular Surgery
University Hospital
CH-3010 Bern, Switzerland
Tel.: +41 31 632 23 75; Fax: +41 31 632 44 43; E-Mail: thierry.carrel@insel.ch

bypass was achieved via cannulation of the sidearm of the aortic graft (Vascutek© Anteflow, Renfreshire, UK). Coronary reimplantation was performed with a modified button technique using 6.0 polypropylene sutures and a pericardial strip as reinforcement. Intraoperative transesophageal echocardiography (TEE) performed at the conclusion of the procedure was normal.

The immediate postoperative evolution was uneventful, and the patient was discharged on postoperative day 8. An initial computed tomography (CT) scan was performed four weeks after discharge and revealed extravasation of contrast medium, indicating an 8 mm pseudoaneurysm behind the aorta and close to the left coronary artery origin. The initial decision was to treat conservatively by lowering the systolic blood pressure to values between 80 and 100 mm Hg; however, a second CT scan 4 weeks later revealed that the pseudoaneurysm had increased in size to 17 mm (Figure 1A), although the patient remained asymptomatic. At this point, correction of the pseudoaneurysm was planned as soon as possible.

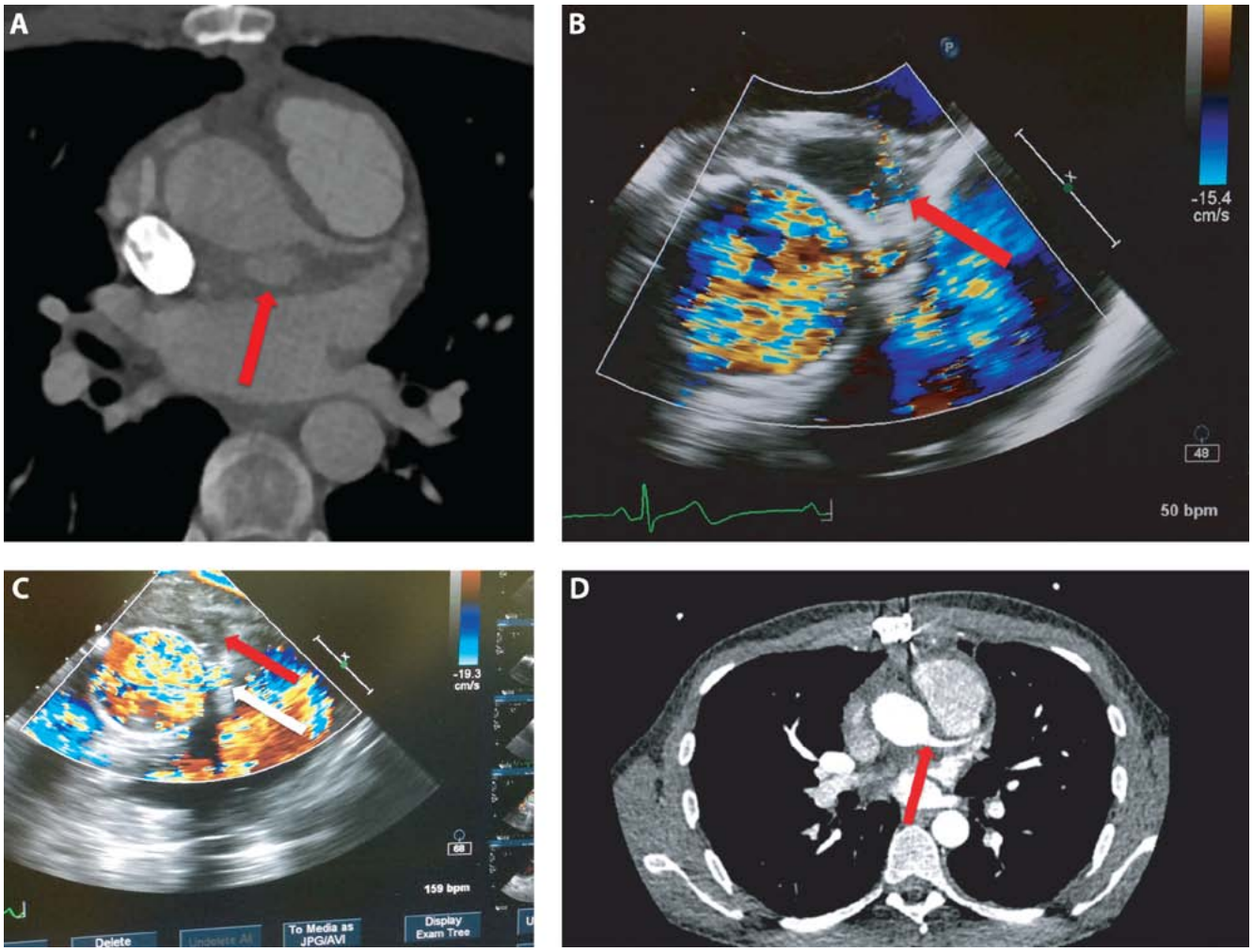

Figure 1. *Panel A*. Computed tomography (CT) scan performed 2 months after initial surgery showing a pseudoaneurysm (arrow) close to the left coronary button anastomosis and posterior to the aortic root. *Panel B*. Preoperative echocardiography showing the perfused pseudoaneurysm (arrow) of the left coronary button anastomosis. *Panel C*. Intraoperative transesophageal echocardiography after repair of the pseudoaneurysm (red arrow = smaller pseudoaneurysm without perfusion; white arrow = left main coronary artery). *Panel D*. Postoperative CT scan 1 month after repair of the pseudoaneurysm showing normal anatomy at the level of the left main coronary artery (arrow).

Surgical Technique

Prior to reopening the sternotomy, the external iliac artery and vein were exposed. Preparation of the mediastinal and intrapericardial sites was very difficult due to the extremely strong adhesions between the vascular prosthesis and the adjacent structures (mainly the pulmonary artery but also the right atrium and the superior vena cava). For this reason, we decided to cannulate the femoral artery and vein using the Seldinger technique. The patient was cooled to a core temperature of 28°C. Shortly before hypothermic arrest, pentothal was administered, and then the cardiopulmonary bypass was interrupted without clamping the prosthesis, as mobilization of the prosthesis would have considerably prolonged the time of the bypass. The previous anastomosis between the arch prosthesis and the composite graft was opened (Figure 2A), and the ascending aortic graft was prepared from inside to facilitate dissection from the surrounding structures (e.g., pulmonary artery). Then, the graft was clamped, and cardiopulmonary bypass was reinstituted. The patient was then rewarmed after only 5 min of hypothermic arrest. During this period, inspection of the left coronary orifice from inside the aortic prosthesis was performed. A small leak was identified at the lower part of the coronary button suture line. This leak was repaired with two separate U-stitches from inside of the coronary button anastomosis, and additionally, the previous suture line was tightened with an additional stitch (Figure 2B-D). Cross-clamp time was only 22 minutes.

Intraoperative TEE was performed before and after repair (Figure 1B and C). The patient's immediate postoperative evolution was uneventful, and he was discharged on postoperative day six. A CT scan performed at four weeks did not show any perfusion into the pseudoaneurysm cavity, which had decreased in size (Figure 1D).

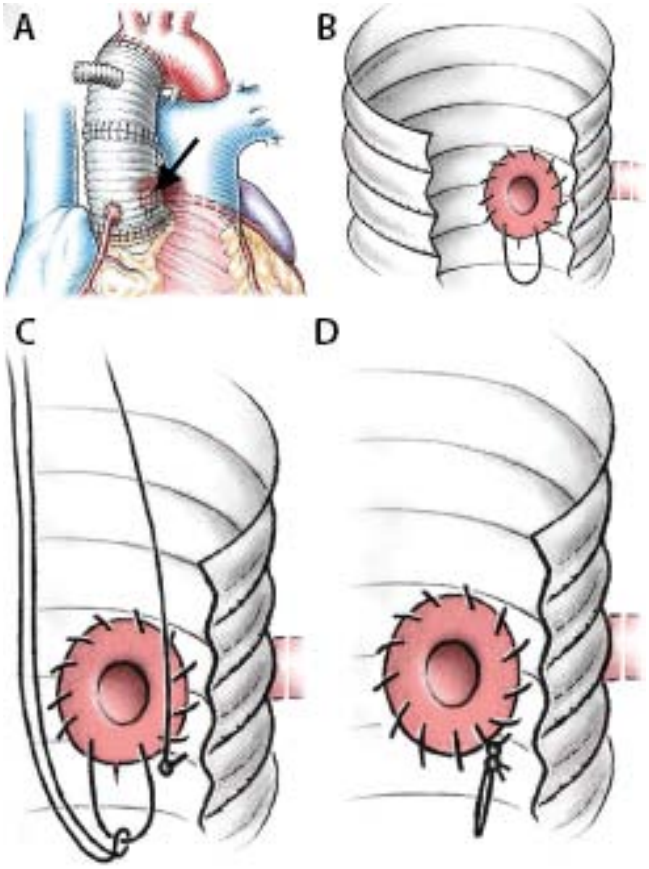

Figure 2. Schematic illustration of the situation before re-exploration. Composite graft prosthesis and separate Vaskutek Anteflow for the distal ascending aorta (open arch technique) are shown. Pseudoaneurysm (arrow) is shown at the level of the left coronary button *(Panel A)*.The repair technique involved opening of the previous anastomosis between the composite graft and the ascending-arch prosthesis, and the pseudoaneurysm was fixed from the inside. A small loop of the previous polypropylene suture was discovered to be loose *(Panel B)*. First, a U-stitch was made close to the loop and tied. One end of the suture was cut and passed through the loop *(Panel C)*. Finally, the loop was eliminated by tying both sutures together *(Panel D)*.

Discussion

Here, we describe a simplified technical approach to pseudoaneurysm of the left coronary orifice during the early recovery following composite graft replacement for Type A acute aortic dissection. This complication is a rare but challenging event that almost always requires surgical repair even though the dense adhesions behind the aorta likely prevent rupture. Another potential complication of the pseudoaneurysm is compression of the left main coronary artery due to expansion of the aneurysm.

The etiology of the pseudoaneurysm aneurysm in our patient was most probably weakening of the continuous polypropylene suture. Other potential causes like infection or tissue necrosis secondary to too gen-

erous use of glue seemed unlikely since the coronary button looked completely normal.

Diagnosis of a pseudoaneurysm is made by echocardiography and/or CT scan, which should always be performed in the first three months following repair of acute Type A aortic dissection. TEE may help to localize the exact position of the leakage and to confirm intraoperatively that the problem has been solved.

In the present case, moderate hypothermic circulatory arrest helped to save time by greatly facilitating control of the aortic graft. After incision of the graft in its anterior region, the transection was performed under visual control, and circular preparation of the graft was possible without injury to the pulmonary artery or the superior vena cava. Once the cranial part of the prosthesis was clamped, the cardiopulmonary bypass was restarted, and aneurysm repair was performed from inside during rewarming.

Complete reconstruction of the anastomosis of the left coronary artery ostium to the composite graft is rarely necessary as small leakages can usually be repaired by just a few single stitches from inside the aortic graft. In the presence of larger defects in the suture continuity, particularly in case of late presentation, direct repair may not be feasible. In this case, internal inspection may be useful for circumferential dissection, and repair may require either xenopericardium to reinforce the tissue or complete removal and reconstruction of the anastomosis, either directly with interposition of a short venous graft or with a classical Cabrol modification if the coronary artery button cannot be sufficiently mobilized.

The technique we used in this case is safe because it does not require exposure of the coronary button from outside of the graft behind the aorta. Furthermore, this technique can be applied both early and late following composite graft repair of a dehiscence of the coronary artery button anastomosis.

Conflict of Interest

The authors have no conflict of interest relevant to this publication.

Comment on this Article or Ask a Question

References

1. Carrel T, Tkebuchava T, Turina M. Reoperations after previous surgery on the thoracic aorta: etiology, techniques and results. Ann Thorac Surg. 1993;56:259-268. DOI: 10.1016/0003-4975(93)91157-I
2. Luciani N, De Geest R, Lauria G, Farina P, Luciani M, Glieca F, Massetti M. Late reoperations after acute aortic dissection repair: Single-center experience. Asian Cardiovasc Thorac Ann. 2015;23:787-794. DOI: 10.1177/0218492315584523
3. Mattesini A, Porto I, D'Alfonso MG, Cecilia A, Gensini GF, Valente S. A rapidly growing coronary pseudoaneurysm. Cardiovasc Revasc Med. 2015;16:320-321. DOI: 10.1016/j.carrev.2015.05.007

Cite this article as: Carrel T, Hurni S, Huber C, Englberger L. Simplified Approach for Repair of Early Pseudoaneurysm of the Left Coronary Button Following Composite Graft Due to Acute Type A Aortic Dissection. AORTA (Stamford). 2016;4(6):244-247. DOI: http://dx.doi.org/10.12945/j.aorta.2016.16.031