

Minimally Invasive Revision for Bleeding Following Totally Endoscopic Coronary Surgery

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ABSTRACT

We report 2 cases of minimal invasive revision for postoperative bleeding following totally endoscopic coronary surgery (TECAB). In the first case the revision was performed totally endoscopically without additional incisions. In the second patient revision was performed via enlargement of the camera port to a minithoracotomy. Both revisions were successfully conducted without sternotomy. We demonstrated that the technique of minimal invasive revision can further reduce the rate of conversion to sternotomy in TECAB operations.

BACKGROUND

Since its introduction 10 years ago, robotically enhanced totally endoscopic coronary surgery (TECAB) has been further developed and has become a safe and reproducible surgical procedure [Loulmet 1999; Argenziano 2006; Bonatti 2008]. Several obstacles such as conduction of remote-access perfusion and balloon endoocclusion of the aorta, appropriate anastomotic suturing, endoscopic stabilization of the heart, and intraoperative quality control have been solved successfully [Schachner 2005; Bonatti 2006; Schachner 2007]. However, the best way to proceed in case of operative revision that is necessary because of bleeding is still a matter of discussion. Generally sternotomy is an option and is the fastest way to treat hemodynamically unstable patients. On the other hand, minimally invasive approaches preserve the aim of the initial operation by avoiding sternotomy. Herein we describe 1 case of totally endoscopic revision and 1 case of revision via minithoracotomy of postoperative hemothorax following TECAB procedures.

CASE REPORTS

The first case patient is a 55-year-old male patient underwent arrested heart TECAB with left internal mammary

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artery (LIMA) to left anterior descending coronary artery (LAD) bypass. Four hours postoperatively, because of a left-sided hemothorax, the patient underwent a totally endoscopic revision. The robotic instruments (1 camera port and 2 working ports of the Da Vinci™ telemanipulator) were inserted into the left hemithorax under single lung ventilation via the same ports used for the prior operation. A flexible suction device was inserted through the parasternal assisting port to withdraw liquid and disintegrated solid parts of the hematoma. The camera port was identified as source of bleeding and was controlled from outside after removal of the endoscopic instruments. The patient received 3 units of packed red blood cells.

The patient was transferred to the intermediate care unit on postoperative day 1. Intensive physiotherapy was performed because of a partial atelectasis of the left inferior lobe. Because of to postoperative fever (maximum body temperature 38.2°C) the patient had a prolonged hospital stay. No infection site could be detected, however, and the computed tomographic scan showed good patency of the bypass graft. The patient was discharged on postoperative day 10 from our cardiac surgical ward.

The second patient was a 68-year-old man who underwent arrested-heart TECAB with LIMA-to-LAD bypass. The patient received aspirin and clopidogrel until the day



Postoperative result after revision (necessary because of bleeding) via minithoracotomy of a patient who underwent previous arrested-heart TECAB.

of operation. The patient underwent revision 16 hours postoperatively owing to left-sided hemothorax. Because the Da Vinci telemanipulator was not available at the time of the event (interdisciplinary usage), the patient's revision was performed by an extension of the preexisting camera port (in the fifth intercostal space) to a 6-cm long minithoracotomy (Figure). The source of bleeding was a side branch of the LIMA bypass, which was successfully clipped. The patient received a total of 6 units of packed red blood cells. The patient had an intensive-care unit stay of 7 days because of postoperative renal failure, which required transient hemofiltration. The further stay at our department was uneventful, and the patient was transferred on postoperative day 15 with normal renal function.

DISCUSSION

Postoperative hemorrhage is an important issue in cardiac surgery and remains a potential complication in endoscopic coronary surgery. Although revision for bleeding requires "simple" reopening of the sternotomy in standard coronary artery bypass graft operations, the situation is more delicate in TECAB patients undergoing endoscopic surgery. In this report we present 2 minimally invasive ways to handle the problem of postoperative hemothorax after TECAB surgery. In the first case we had the Da Vinci telemanipulator available in the evening hours and successfully performed a totally endoscopic revision through the preexisting port holes. There are limitations to this way of revision, however. In the evening or night when patients are usually revised for postoperative bleeding there is the need for a surgical team that is familiar with the handling of the robotic system. Furthermore, the setup is quite time-consuming and takes approximately 1 hour. This time cannot be spent if the patient suffers a pericardial tamponade. In addition, single-lung ventilation is required for the procedure. On the other hand this method provides the best result without additional incisions. In our first case the source of bleeding was the camera port. Although we inspected the port holes intraoperatively, bleeding was missed, possibly owing to the compression of leaking vessels during

inspection. In the second case the source of bleeding was a LIMA side branch. Although the LIMA was checked twice, by endoscopic vision and by intraoperative bypass angiography, side-branch bleeding developed after a delay of some hours. We perform endoscopic LIMA harvesting with electrocautery at 20 W, with clipping of only major side branches, and with this procedure remains a risk of delayed bleeding. It is noteworthy that the patient took aspirin and clopidogrel until the day of surgery, which increased his risk of hemorrhage. The option to enlarge the camera port to a minithoracotomy is attractive and makes the surgeon independent from the setup of the robotic system. Another important point of discussion is the risk of postoperative sternal wound infection, which is a troublesome complication after full sternotomy and can be avoided by minimally invasive approaches.

We conclude that revisions required because of bleeding after endoscopic coronary surgery can be performed either totally endoscopically or via minithoracotomy.

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