Anesth Crit Care 2019; 1 (1): 034-036 *DOI: 10.26502/acc.006*

Case Report

The Benefit of a Percutaneous Coronary Sinus Catheter for Warm Blood Cardioplegia administration in Cardiac Reoperations

Thierry V. Scohy[1*], Sander Bramer[2], Bastiaan M. Gerritse[1], Martijn W van Geldorp[2]

[1]Department of Anaesthesiology, Amphia Hospital, Breda, The Netherlands

[2]Department of Cardiothoracic surgery, Amphia Hospital Breda, The Netherlands

***Corresponding Author:** Dr. Thierry V. Scohy, Department of Anaesthesiology, Amphia Hospital, Breda, The Netherlands, Tel: +31(0)765955570; E-mail: tscohy@amphia.nl

Received: 10 June 2019; **Accepted:** 19 June 2019; **Published:** 21 June 2019

1. Introduction

Cardiac reoperations represent a challenge in cardiac surgery. Adverse events occur regularly during these reoperations and happen, particularly during dissection of adhesions [1]. In common practice catastrophic hemorrhage, still poses significant risks [2, 3]. If fewer adhesions are divided, the risk of bleeding complications will decrease. If the reoperation is for valve surgery, no further dissection of adhesions is carried out on the left side [4].

At the Amphia Hospital Breda, The Netherlands, warm blood cardioplegia is intermittently delivered, every 20 minutes, for all cardiac operations. For aortic valve replacement, this can be done selectively through the coronary ostia, which is time consuming, or retrogradely, which requires further adhesiolysis of the sinus coronaria area. With the placement of a percutaneous coronary sinus catheter (PCSC) (PR9 Catheter, Edwards Scientific, Salt Lake City, Utah, USA) adhesions over the coronary venous system do not need to be freed. In this way, fewer adhesions are divided and bleeding is minimized with lower possibility of catastrophic hemorrhage [2] or postoperative tamponade [4]. This could be a welcome adjunct to other precaution measures [3] in order to reduce injury- either direct or indirect myocardial damage- in reoperative cardiac surgery.

This is the first report addressing the advantage of a PCSC for cardiac reoperations.

2. Case Report

A 52-year-old women with a history of Aortic Valve (AV) replacement with a mechanical prosthesis due to AV stenosis (2013) and Implantable Cardiac Defibrillator (ICD) after out of hospital cardiac arrest (2017), presented

with a prosthetic valve endocarditis (PVE) with enterococcus faecalis. She was initially treated with ICD lead removal and IV antibiotics. After 16 days progression to aortic root abscess was demonstrated by TTE/TEE. Coronary arteriography showed normal coronary arteries. Because of uncontrolled infection despite the adequate antibiotic therapy, surgical therapy was indicated; a Bentall procedure was performed through a median re-sternotomy.

3. Surgical Technique

After steel wire removal safe entry into the mediastinum could be achieved using an oscillating saw. Dense adhesions were present around the aorta and right atrium. The latter were only freed as far as necessary to provide access for venous cannulation, mainly using electrocautery. Arterial cannulation was performed using an Eopa® cannula (Medtronic Inc, Minneapolis, USA) introduced by Seldinger technique. For venous cannulation a two-stage MC2® 34/46Fr cannula (Medtronic Inc, Minneapolis, USA) was used. Wound ventilation using carbondioxide was installed. After clamping of the aorta, warm blood cardioplegia could be delivered through the aortic root resulting in adequate cardioplegic arrest (Table 1). The infected mechanical prosthesis could easily (and partially manually) be removed and the almost circumferential annular abscess cavities were cleaned and soaked in Rifampicin. Sequential gifts of cardioplegia were delivered retrogradely through the PCSC ensuring backflow of dark blood from the coronary ostia but without pausing the operation. A mechanical composite conduit (Carboseal Valsalva SN S1259646-B) 21/24mm was sutured deep in the left ventricular outflow tract using matrass sutures and the coronary ostia were reimplanted.

Patient confidentiality was guaranteed according to the Dutch law on personal data protection.

Time	Operative Steps	Condition
10:15	ECC start	-
10:17	Cooling 32	-
10:43	Ao-X on	-
10:43	Cardioplegia: Antegrade Root	2 Min. Flow: 400 ml/min.
10:50	Cardioplegia: Retrograde PR9	2 Min. Flow: 100 ml/min.
10:53	Cardioplegia: Antegrade Selective Right	1 Min. Flow: 100 ml/min.
11:16	Cardioplegia: Retrograde PR9	3 Min. Flow: 100 ml/min.
11:45	Cardioplegia: Retrograde PR9	3 Min. Flow: 100 ml/min.
12:16	Cardioplegia: Retrograde PR9	3 Min. Flow: 100 ml/min.
12:39	Cardioplegia: Antegrade Selective Right	1 Min. Flow: 100 ml/min.
12:41	Cardioplegia: Antegrade Selective Left	1 Min. Flow: 60 ml/min.
12:42	Cardioplegia: Retrograde PR9	2 Min. Flow: 100 ml/min
12:51	warming 34	-
13:01	Ao-X off	-
13:50	ECC stop	-

Table 1: Operative time track.

4. Discussion

At the Amphia Hospital Breda, The Netherlands, warm blood cardioplegia is intermittently delivered to protect myocardial function during cardiac surgery. The initial dose of cardioplegia was administered antegrade through the aortic root. Cardioplegia was repeated 8 times. The patient received 5 doses of cardioplegia retrogradely through a PCSC which was placed percutaneously through the right internal jugular vein guided by TEE after induction. Cardioplegia delivery was considered successful when dark blood flowed out of both coronary ostia. A PCSC also facilitates delivery of cardioplegia, as the surgical procedure does not have to be stopped for selective cardioplegia administration in both coronary ostia. Out of precaution we also delivered 3 times cardioplegia antegradely.

After a procedure of 7 hours with 3 hours 35 min of cardiopulmonary bypass time and 2 hour 18 min of aortic cross clamping time, the post-operative Cardiac troponin T (cTnT) was low (15:35 cTnT=0.14 mcg/l; 21:15 cTnT=0.10 mcg/l; Post op day 1: 05:00 cTnT=0.08 mcg/l), indicating adequate myocardial protection. The total postoperative drain production was only 180 ml.

5. Conclusion

With the placement of a PCSC, adhesions need not to be freed over the coronary venous system. In this way, fewer adhesions have to be divided and bleeding can be minimized.

References

1. Roselli EE, Pettersson GB, Blackstone EH, et al. Adverse events during reoperative cardiac surgery: frequency, characterization, and rescue. J Thorac Cardiovasc Surg 135 (2008): 316-323.
2. Morales D, Williams E, John R. Is resternotomy in cardiac surgery still a problem? Interactive CardioVascular and Thoracic Surgery 11 (2010) 277-286.
3. Park CB, Suri RM, Burkhart HM, et al. Identifying patients at particular risk of injury during repeat sternotomy: analysis of 2555 cardiac reoperations. J Thorac Cardiovasc Surg 140 (2010): 1028-135.
4. O'Brien MF, Harrocks S, Clarke A, et al. How to do safe sternal reentry and the risk factors of redo cardiac surgery: a 21-year review with zero major cardiac injury. J Card Surg 17 (2002): 4-13.

Citation: Thierry V. Scohy, Sander Bramer, Bastiaan M. Gerritse, Martijn W van Geldorp. The Benefit of a Percutaneous Coronary Sinus Catheter for Warm Blood Cardioplegia administration in Cardiac Reoperations. Anesthesia and Critical Care 1 (2019): 34-36.