



## CORONARY ENDARTERECTOMY FOLLOWING FAILED PTCA IN RIGHT CORONARY ARTERY: A CASE REPORT

Redoy Ranjan<sup>1\*</sup>, Dipannita Adhikary<sup>2</sup>, Sabita Mandal<sup>3</sup> and Asit Baran Adhikary<sup>4</sup>

<sup>1</sup>Department of cardiac surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

<sup>2</sup>MPH Student, North South University, Dhaka.

<sup>3</sup>Department of Community Medicine, Shaheed Suhrawardy Medical College, Dhaka.

<sup>4</sup>Department of Cardiac Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

### ARTICLE INFO

#### Article History:

Received 15<sup>th</sup> May, 2017

Received in revised form 3<sup>rd</sup> June, 2017

Accepted 16<sup>th</sup> July, 2017

Published online 28<sup>th</sup> August, 2017

#### Key words:

Coronary endarterectomy, Coronary angioplasty, Coronary artery disease.

### ABSTRACT

A 56-year old male's presented with occlusion in distal part of right coronary artery which was initially treated with balloon angioplasty at 6 months back. Restenosis of stent in right coronary artery was evaluated with coronary angiogram and surgical revascularization was done by Coronary endarterectomy with Coronary artery bypass graft surgery. A closed technique coronary endarterectomy performed to remove the stents, and atheromatous plaque. We reviewed the technical achievability of the surgical removal of occluded coronary stents by Coronary endarterectomy and postoperative outcome following failed PTCA in this study.

Copyright © 2017 Redoy Ranjan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### INTRODUCTION

In the late 1957, Coronary endarterectomy was at first presented as a surgical option for myocardial revascularization by Bailey *et al.*<sup>1</sup> Coronary Endarterectomy (CE) is the expulsion of the atheromatous plaque, dismembering and isolating the outer media and adventitia layers and CE is frequently important to perform total myocardial revascularization during CABG or to encourage anastomosis of severely calcified and diffuse coronary arteries disease<sup>1</sup>. In spite of the presentation of coronary endarterectomy (CE) 60 year's prior as a strategy for treatment of diffuse coronary artery disease, its application remains controversial as it conveys a higher perioperative hazard and poor long term survival<sup>1,2</sup>. But complete myocardial revascularization for multi vessel CAD patients has been appeared to reduce the frequency of perioperative morbidity and mortality and the duration of hospital stay<sup>3,4,6</sup>.

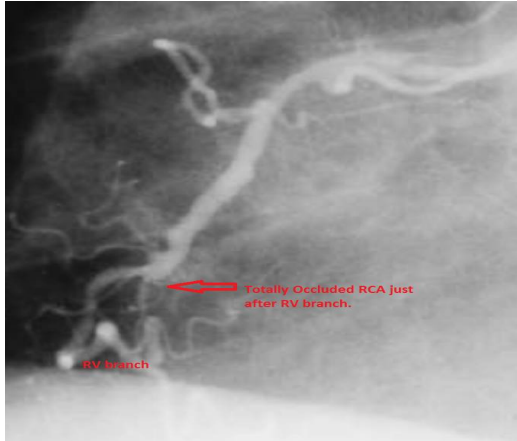
This case report demonstrates the safety and feasibility of coronary endarterectomy in the presence of an occluded stent in the coronary arteries.

### CASE PRESENTATION

A 56 years old ex-smoker, and diabetic male presented with dyslipidemia, hypertension and previous history of coronary angioplasty in right coronary artery. Patient also have had NYHA class III angina with a positive CAG (coronary angiogram) which revealed 60% stenosis in the mid part of left anterior descending coronary artery (LAD) and right coronary artery (RCA) was dominant with diffuse disease, a near total occlusion (100%) in the proximal and mid part of the RCA, just proximal to the stent and also poor retrograde blood flow filling from LAD circulation (**Figure-1**). During CAG a guide wire could not be inserted via RCA and also repeat PTCA was not feasible to performed. Aggressive Medical management was started but patient remained symptomatic throughout the course of treatment. Due to failed medical management and progressing stable angina, the patient went for elective coronary artery bypass graft (CABG) surgery.

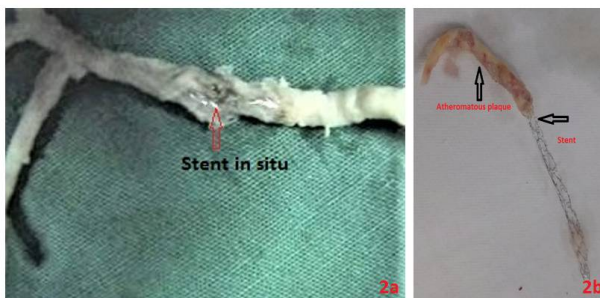
Standard intraoperative monitoring strategies were utilized and a CPB circuit was kept on standby for this cases. After standard median sternotomy, Heparin was used to maintain an ACT (Activated clotting time) more than 400 seconds during harvesting of conduits (left internal mammary artery, and the long saphenous vein). Operations was performed off pump

CABG with CE (Coronary endarterectomy), utilizing mechanical stabilizers like suction type and the compression type stabilizer to immobilize the target coronary artery during grafting. A conclusive decision to endarterectomize a vessel is made per-operatively and CE from RCA was done in this patient due to diffuse complete lesion and restenosis of the stent with poor distal run-off.

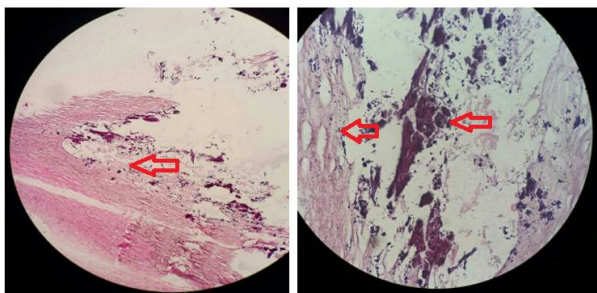


**Figure 1** Coronary angiogram showed 100% stenosis at the proximal part of RCA just after RV branch with retrograde filling through left coronary circulation.

Following coronary endarterectomy with removal of stent from RCA with approximately 15mm incision over the stent, and reconstruction done with a reverse saphenous venous graft to RCA. Left internal thoracic artery was used to graft LAD artery. The endarterectomy specimen was 11 cm long incorporated with the stent (Figure- 2) and little distortion of the stent was considered due to traction during the procedure. Histological examination of the atheroma specimen observed old thrombusoccluding the lumen with fibro cartilage and macrophagealso foci of calcification was present (Figure- 3).



**Figure 2** Post-operative specimen of atheroma and Stent. Distorted atheromatous plaque with stent in situ (2a); Stent with atheroma (2b).



**Figure 3** Histopathological study of atheromatous plaque revealed foci of calcification, hyaline cartilage and also fibro cartilage (arrow mark).

The postoperative period was uneventful and patient was discharge date 10<sup>th</sup> postoperative day with good ambulatory

condition. However, patient was free of angina at follow up after 6 months.

## DISCUSSION

In case of diffuse CAD, conventional CABG does not provide a satisfactory blood supply through the distal part of the vessel, resulting inadequate myocardial revascularisation<sup>1</sup>. Coronary endarterectomies were performed manually by slow sustain and continuous traction of atheromatous plaque with the aid of delicate Ring Forceps, utilizing closed methods trailed by reproduction with anastomosis with pre-planned graft. The arteriotomy incision was roughly 8-10mm long, however that was stretched out for another 5mm in few cases, if complete removal of the plaque was not feasible<sup>1, 2</sup>. In our study, arteriotomy incision was approximately 15mm long. In our case atheroma was 11 cm long; however, till date the reported longest atheroma was removed from RCA which was 14 cm in size in Bangladesh described by Ranjan *et al.*<sup>2</sup> There are two techniques to perform coronary endarterectomy- Closed technique and Open technique. We utilized the closed "Traction technique- slow, sustain and continuous traction" to perform endarterectomy; which is also described by Ranjan *et al.* in their study<sup>2</sup>. But the potential dangers are inadequate expulsion of the plaque and the "snowplow effect," to be specific, and tearing-off of the plaque in the side branches<sup>5,6,9,10</sup>. But with the "open procedure" the vision is better, and that may prompt more entire expulsion of the atheroma from the coronary vessel and its side branches. However, open technique is time consuming and required patch repair. So that, we preferred "traction technique" with careful examination of the atheromatous plaque after expulsion, which also supported by other articles also<sup>2,7,8,10</sup>. To ensure complete expulsion, the atheromatous plaque carefully inspected for a smooth distal taper end. In addition, back flow of blood from the distal vessel following extraction of the atheroma is a consoling indication of adequate removal atheromatous plaque<sup>11,12</sup>.

Postoperative anticoagulation therapy is very important to prevent graft occlusion as well as native endarterectomized artery by thrombus<sup>9,11</sup>. Following CE, routine Heparin infusion was prescribed in the early post-operative period followed by oral Warfarin for next 6 months, and double anti-platelet agent for life long<sup>10,12,13</sup>. In our study, once postoperative blood draining is settle down (usually 3-4 hours following surgery), we started Heparin usually for 48 hours, followed by bridging to Warfarin (5mg) orally from 1st post-operative day. From 3rd Post-operative day, we started Warfarin (2.5-5mg) for next 3-6 months and dose adjusted according to INR findings (Targeted INR was 1.5-2.5). We also prescribed Clopidogrel and Aspirin (75mg) for life long following CE with OPCABG, which also described in other articles.<sup>2,12,13</sup>

This present case report observed that CE (Coronary endarterectomy) with off-pump coronary artery bypass graft is attainable and accomplishes total myocardial revascularization in presence of stent in coronary artery; when there are no other alternative options for sufficient revascularization.

## CONCLUSION

Despite the higher risk group patients, surgical skill and the patient's selection criteria are main stream for better outcome following CE with CABG surgery in a patient with stent occlusion, and should not be considered a contraindication to surgical revascularization.

## References

1. Bailey CP, May A, Lemmon WM. 1957. Survival after coronary endarterectomy in man. *J Am Med Assoc.* 164:641-646.
2. Ranjan R, Adhikary D, Saha H, Saha SK, Hasan K, Adhikary AB. 2017. Coronary atheroma [14cm] extracted from the right coronary artery during off-pump coronary artery bypass grafting. *Bangabandhu Sheikh Mujib Med Univ J.* 10: 97- 100.
3. Livesay JJ, Cooley DA, Hallman GL, Reul GJ, Ott DA, Duncan JM, *et al.* 1986. Early and late results of coronary endarterectomy: analysis of 3,369 patients. *J Thorac Cardiovasc Surg.* 92:649-660.
4. Al-Ruzzeh S, Nakamura K, Athanasiou T, Modine T, George S, Yacoub M, *et al.* 2003. Does off-pump coronary artery bypass (OPCAB) surgery improve the outcome in high-risk patients? A comparative study of 1398 high-risk patients. *Eur J Cardiothorac Surg.* 23:50-55.
5. Beretta L, Lemma M, Vanelli P. 1992. Coronary 'open' endarterectomy and reconstruction: short-and long-term results of the revascularization with saphenous vein versus IMA-graft. *Eur J Cardiothorac Surg.* 6:382-387.
6. Riha M, Danzmayr M, Nagele G, Mueller L, Hoefler D, Ott H, *et al.* 2002. Off pump coronary artery bypass grafting in Euro SCORE high and low risk patients. *Eur J Cardiothorac Surg.* 21:193-198.
7. Suzuki T, Okabe M, Handa M, Yasuda F, Miyake Y. 2004. Usefulness of preoperative intra-aortic balloon pump therapy during off-pump coronary artery bypass grafting in high risk patients. *Ann Thorac Surg.* 77:2056-2059.
8. Berson AJ, Smith JM, Woods SE, Hasselfeld KA, Hiratzka LF. 2004. Off-pump versus on-pump coronary artery bypass surgery: does the pump influence outcome? *J Am Coll Surg.* 199: 102-108.
9. Djalilian AR, Shumway SJ. 1995. Adjunctive coronary endarterectomy: improved safety in modern cardiac surgery. *Ann Thorac Surg.* 60:1749-1754.
10. Jones EL, Craver JM, Guyton RA, Bone DK, Hatcher Jr. CR, Riechwald N. 1983. Importance of complete revascularization in performance of the coronary bypass operation. *Am J Cardiol.* 51:7-12.
11. Mills NE. 1998. Coronary endarterectomy: surgical techniques for patients with extensive distal atherosclerotic coronary disease. *Adv Cardiac Surg.* 10:197-227.
12. Vohra HA, Kanwar R, Khan T, Dimitri WR. 2006. Early and Late Outcome After Off-Pump Coronary Artery Bypass Graft Surgery with Coronary Endarterectomy: A Single-Center 10-Year Experience. *Ann Thorac Surg.* 81:1691-1696.
13. Ranjan R, Adhikary AB. 2017. Coronary endarterectomy in diffuse coronary artery disease. Dhaka: LAP publishing;2017

\*\*\*\*\*