



Coronary Anastomosis In Stent—Useful to Do When No Other Alternative Is Given?

Robert Balan¹ Christian Mogilansky¹ Markus Czesla¹ Parwis Massoudy¹

¹Department of Cardiac Surgery, Klinikum Passau, Passau, Germany

Thorac Cardiovasc Surg Rep 2023;12:e4–e6.

Address for correspondence Parwis Massoudy, Professor, Department of Cardiac Surgery, Klinikum Passau, Innstrasse 76, Passau 94032, Germany (e-mail: parwis.massoudy@klinikum-passau.de).

Abstract

Keywords

- ▶ coronary artery bypass grafting
- ▶ anastomosis in-stent
- ▶ percutaneous coronary intervention (PCI)

Background Many patients being referred for coronary artery bypass grafting have a history of percutaneous coronary intervention (PCI).

Case Description In a patient after multiple PCI of the left anterior descending artery (LAD), repeated in-stent stenosis was diagnosed. The LAD being covered with stents to the periphery, no meaningful anastomosis with stent-free vessel was possible. After thorough discussion with the patient, the referring cardiologist, and our local heart team, an in-stent anastomosis was planned and created, that was found to be angiographically patent 21 months after surgery with the patient free from angina.

Conclusion Without any alternative treatment method given, our approach of in-stent anastomosis confers a good mid-term angiographic result.

Introduction

Coronary artery bypass grafting (CABG) has been a success story for decades.¹ Our patients became older and sicker but cardiac surgeons were able to keep mortality rates in the low single digits.² An increasing number of the patients we operate on have a history of percutaneous coronary intervention (PCI) when they are transferred for CABG.³

We herein present a patient in whom the left anterior descending artery (LAD) was stented to the peripheral parts of the vessel leaving no option for an anastomosis beyond the end of the stents because of small diameter in the remaining native LAD.

After thorough consideration and multidisciplinary discussion, the creation of an in-stent anastomosis was chosen to bypass repeated in-stent stenosis.

Case Description

Our patient was a 72-year-old lady with a history of multiple PCI, the LAD being covered with stents from its proximal

segment to the periphery (▶**Fig. 1**). Repeat coronary angiography was indicated because of recurrent angina with only light exertion. It showed high grade in-stent stenosis slightly distal to the offspring of a high diagonal branch with no other relevant stenosis in the remaining coronary arteries. Further interventional attempts on the LAD were rejected by the referring cardiologist and by the patient. The patient was thereafter discussed with the referring cardiologist and in our in-house heart team.

On the one hand, no meaningful interventional alternative was given. On the other hand, the remains of the LAD were too small for an anastomosis in stent-free territory (▶**Fig. 2**). Therefore, finally, the creation of an in-stent anastomosis was suggested to the patient. She was expressively informed of the novelty of the approach and gave her consent for surgery.

Surgery was performed under dual platelet inhibition with 100 mg of aspirin and with 90 mg of ticagrelor. A strategy including sternotomy, cardiopulmonary bypass, and cardiac arrest was chosen. Distal from the origin of the diagonal branch, the LAD stent was opened with a sharp

received
August 27, 2022
accepted
November 8, 2022

DOI <https://doi.org/10.1055/s-0043-1760750>
ISSN 2194-7635.

© 2023. The Author(s).

This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany

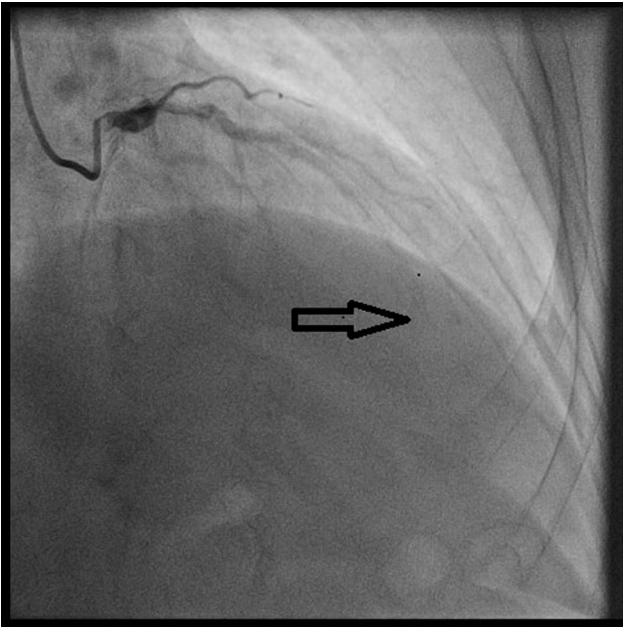


Fig. 1 Left anterior descending artery of the patient with distal tip of stent load, as indicated by black arrow.

coronary knife. The incision site was enlarged proximally and distally using regular coronary scissors, which cut the stent grid easily. Consequently, two or three stent bracelets were loose and were pulled gently and without resistance out of the stent. Thereafter, the incision looked ready for suturing, a large coronary plaque was found at the bottom of the incision site (► **Fig. 3**). A coronary probe was carefully applied, and lumen diameter was 1.5 mm. The anastomosis between the left mammary artery (LMA) and the LAD was performed in standard fashion using 7/0 Prolene running suture. Run-off was measured with intraoperative transit time flow mea-

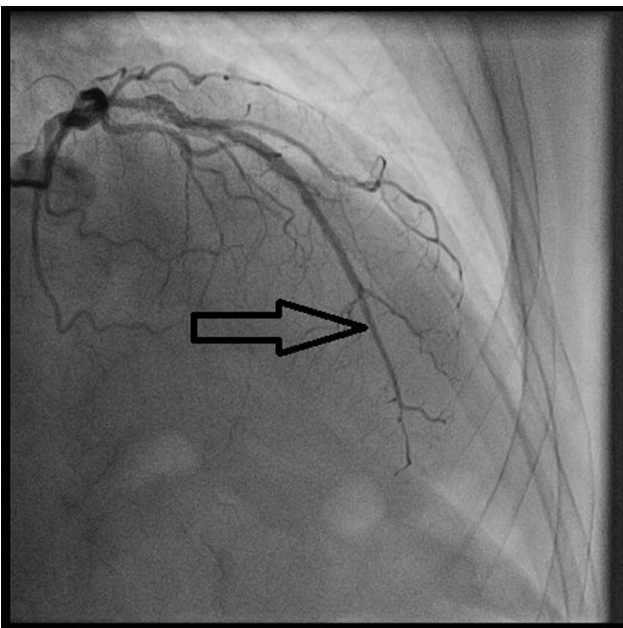


Fig. 2 Left anterior descending artery with contrast medium, showing a small native vessel beyond the end of the stent, which is indicated by black arrow.

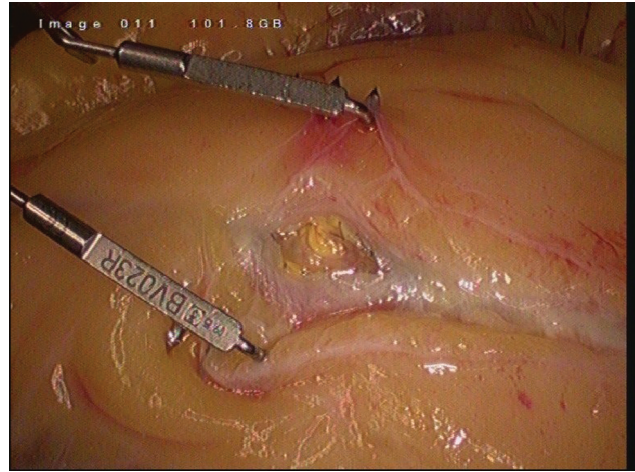


Fig. 3 Intraoperative view of left anterior descending artery after stent incision, with coronary plaque at the bottom of the vessel.

surement (Medistim VeriQ, Deisenhofen, Germany), showing regular waveforms. The pulsatility index was 3.6, and flow volume was 28 mL/min. Maximum postoperative creatine kinase - muscle brain (CK-MB) level was 40.0 IU/L, the patient had an uneventful recovery, and dual platelet inhibition was resumed after removal of the chest tubes.

The patient agreed to undergo control coronary angiography at 21 months after surgery, which showed a patent anastomosis and good run-off into her LAD (► **Fig. 4**). Moreover, she continues to be free from angina at 27 months after surgery.

Discussion

In this study, we report on a patient with an indication for CABG after repeated PCIs of the LAD, the LAD finally being



Fig. 4 Patent anastomosis between left mammary artery and left anterior descending artery with good run-off into the periphery of the left anterior descending artery after a follow-up of 21 months after coronary artery bypass grafting.

covered with stents from its offspring to the periphery, leaving no option to perform an anastomosis in stent-free territory, because of small vessel diameter distal to the stented segments. The observed in-stent stenosis was circumscribed.

After thorough discussion with the referring cardiologist, our in-house cardiologist, and the patient, a strategy of opening stent grid and creating an anastomosis between the bypass graft and a stented segment of the vessel was planned and applied. Dual platelet inhibition was resumed after surgery to allow for better ingrowth of the bypass graft anastomosed directly into a stent.

One case of in-stent coronary artery anastomosis has been described before, with a patent LMA at hospital discharge.⁴ Our report is the first to describe a mid-term result after this unusual maneuver. The patient agreed to undergo coronary angiography at 21 months after surgery. A patent LMA to LAD anastomosis and a good run-off into her LAD were found. At 27 months after surgery, the patient continues to be free from angina.

In conclusion, multiple PCI before CABG may compromise the cardiac surgeon's strategy to create an anastomosis in stent-free territory. We do not encourage to perform in-stent

distal anastomoses in coronary artery bypass grafting as long as any other alternatives are given. But, it is consoling to share the information that an anastomosis to a stented coronary artery is not only technically feasible but also seems to confer a good mid-term result.

Conflict of Interest

None.

References

- 1 Mack MJ, Squiers JJ, Lytle BW, DiMaio JM, Mohr FW. Myocardial revascularization surgery: JACC historical breakthroughs in perspective. *J Am Coll Cardiol* 2021;78(04):365–383
- 2 Beckmann A, Meyer R, Lewandowski J, Markewitz A, Gummert J. German Heart Surgery Report 2020: The Annual Updated Registry of the German Society for Thoracic and Cardiovascular Surgery. *Thorac Cardiovasc Surg* 2021;69(04):294–307
- 3 Massoudy P, Thielmann M, Lehmann N, et al. Impact of prior percutaneous coronary intervention on the outcome of coronary artery bypass surgery: a multicenter analysis. *J Thorac Cardiovasc Surg* 2009;137(04):840–845
- 4 Mataró MJ, Sánchez-Espín G, Porras C, Melero JM, Olalla E, Such M. Coronary bypass grafting to a “full-metal jacket” left anterior descending artery. *Ann Thorac Surg* 2013;95(02):717