Guiding Catheter-Induced Dissection with the Closure of the Last Patent Bypass Graft – A Case Report

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Summary

We present guiding catheter-induced dissection of left inter-
fernal mammary artery (LIMA) bypass graft in a young high-
risk patient with severe coronary artery disease. This iatro-
genic complication was followed by periprocedural infarction
without cardiogenic shock or hemodynamic unstability. We
resolved the occluding dissection with long multiple stenting
successfully. We expected a poor prognosis of our patient be-
cause of the depressed LV function. Nevertheless, the patient
improved during the time on conservative treatment, without
the necessity for heart transplantation.

Introduction

Compared to percutaneous coronary interventions (PCI) on
native vessels, the intervention of arterial bypass graft is a rare
procedure [1]. Therefore, large trials are not available in this
area. When performed by an experienced team, PCI of arterial
graft is safe procedure with acceptable long-term results [2].
Complications may occur especially in very tortuous grafts.
Iatrogenic dissection of the left internal mammary artery
(LIMA) is a rare, but sometimes very dangerous complication.

History

A 44-year-old man with a history of myocardial infarction
(MI) and triple coronary bypass grafting performed 5 years
earlier was admitted to our department. He was transferred
from peripheral hospital for subacute Q MI of the inferior
wall. His risk factors were hypertension and hyperlipidemia,
he was a former smoker.

On angio we found the closure of both saphenous venous
grafts (SVG) for right coronary artery (RCA) and left circum-
flex (LCx) (Fig. 1), moreover with 90% stenosis of tortuous
left internal mammary artery (LIMA) in anastomosis to left
anterior descending (LAD) (Fig. 2). On the native vessels we
found the occlusion of middle part of LCx and LAD with ad-
ditional significant stenoses of left main coronary stem
(LMS), small right coronary artery (RCA), and proximal
LAD (Fig. 3–4). Left ventricle ejection fraction (LVEF) mea-
sured by ventriculography was 40% with inferior wall akine-
sis. We tried to recanalise the SVG for LCx as well the native
LCx without success, RCA was not suitable for PCI. We dis-
cussed the possibility of repeating the surgical revascular-
cation, which was refused by the patient. He was discharged
in stable condition, remaining on dual antiplatelet therapy.
The second step was a staged procedure on the LIMA three
weeks later.

Procedure

Our stategy was an elective drug-eluting stent implanta-
tion into the LIMA-LAD lesion. We used a 6F IM Vista guiding
catheter (Cordis), BMW guide wire (Abbott Vascular). A stan-
dard weight-adjusted dose of heparin was given intravenously
(80 IU/kg). Shortly after the insertion of guiding catheter the
patient experienced chest pain, there were ST elevations in
precordial leads on ECG. There was an occluding dissection
on angio in the proximal part of LIMA, induced by guiding
the catheter (Fig. 5). The occlusion was persisting after
nitrates given into the guiding catheter. Although there was an
occlusion of the last patent graft, the patient was not in a car-
diogenic shock. That indirectly showed evidence of the pres-
ence of previously invisible collaterals. Invasive blood pres-
ure was 140/90 mmHg, we gave anodynes (fentanyl) and
nitrates in continual infusion. Activated clotting time (ACT)
value was 302 seconds, measured by Hemochron whole blood
couagulation system (ITC, Edison, NJ).

We were not able to wire the true lumen with BMW wire, so
we changed to the PT2 Light Support wire (Boston Scientific)
(Fig. 6). After 15 minutes we successfully wired LAD periph-
ery. We put a long bare metal stent Multilink Zeta 3,5/38 mm
(Abbott Vascular) in the proximal part of LIMA with the goal
to cover the end of the dissection (Fig. 7). Unfortunately,
there was not any impact on distal flow. It was clear that the dissection involves the whole length of LIMA from origin to the LAD anastomosis.

Therefore, we changed our strategy and covered whole LIMA from primary lesion to origin with seven bare metal stents in total length of 220 mm. We implanted five Multilink Zeta stents (Abbott Vascular) and two Flexmaster F1 stents (Jomed). We had to use the “buddy wire” technique because of severe LIMA tortuosity. The patient was hemodynamically stable, the total time of LIMA occlusion was 42 minutes. We finished with optimal result and TIMI 3 flow after postdilatations with non-compliant balloons (Fig. 8).

The patient was discharged seven days after PCI on dual antiplatelet therapy, a large periprocedural MI was confirmed with Troponin I value 182 ng/ml. He was free of symptoms.

**Outcome**

Four months later, the patient was admitted to a peripheral hospital for acute congestive heart failure (CHF), complicated with sepsis and transient pancytopenia. We found diffuse 60% in-stent restenosis in middle part of LIMA on control angio (Fig. 9), there was an optimal result in LIMA-LAD anastomosis. LVEF was 25–30%, we found no viability in LIMA-LAD
or RCA territory on dobutamine echo. Therefore, we treated only significant stenosis of the LMS and proximal LAD with a bare metal stent with the goal to prevent ischemia of first the diagonal branch (D1) territory. We established maximal medical treatment of congestive heart failure— beta-blockers, ACE-inhibitors, furosemide, spironolactone and digoxin, moreover aspirin with statins.

The patient presented to our follow-up control three months later. The LVEF checked by the echocardiography was 33%. The patient was in the class NYHA II without angina, he felt much better compared to the previous visit and refused planned angiographic control. Because of this improvement, there was no reason to put him on the heart transplantation waiting list. We regularly monitored his status in our CHF office. On the last telephone control 16 months after index PCI he was still free of angina, having dyspnoea class NYHA II.

### Discussion

We present a guiding catheter-induced dissection of LIMA in a young high-risk patient with periprocedural infarction but without hemodynamic collapse. Although we have stand-by intraaortic balloon pump (IABP, Datascope) in our cathlab, it was not necessary to insert it because of the good hemodynamic status. We treated the acute complication with long...
stenting, but we expected a poor prognosis because of the signs of congestive heart failure and depressed LV function. We observed the improvement of the patient’s status during the time on conservative treatment.

There are certain risk factors of dissection of native coronary vessels, which can predict the complication rate during PCI – calcifications in the aortic wall or in the coronary ostia, tortuosity, diffuse disease [3]. Although the procedure on the arterial grafts could be different compared to native vessels, the tortuosity remains a strong predictor of complications. Sometimes we can see a problematic intubation of LIMA origin, which can cause the dissection. We found only few cases published in the electronic sources [4, 5]. In the case of long dissection, a “full metal jacket” is very often the only possibility to resolve this complication [6]. To avoid this unpleasant surprise, a very careful manipulation with guiding catheter (rather rotation than pushing) is recommended.

References:

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