Case report: Unexpected Coronary Perforation During "Simple" Direct Stenting

Apró D, Fogarassy G, Posgay B

Journal für Kardiologie - Austrian Journal of Cardiology 2013; 20 (7-8), 218-221
Datenschutz:
Ihre Daten unterliegen dem Datenschutzgesetz und werden nicht an Dritte weitergegeben. Die Daten werden vom Verlag ausschließlich für den Versand der PDF-Files des Journals für Kardiologie und eventueller weiterer Informationen das Journal betreffend genutzt.

Lieferung:
Die Lieferung umfasst die jeweils aktuelle Ausgabe des Journals für Kardiologie. Sie werden per E-Mail informiert, durch Klick auf den gesendeten Link erhalten Sie die komplette Ausgabe als PDF (Umfang ca. 5–10 MB). Außerhalb dieses Angebots ist keine Lieferung möglich.

Abbestellen:
Das Gratis-Online-Abonnement kann jederzeit per Mausklick wieder abbestellt werden. In jeder Benachrichtigung finden Sie die Information, wie das Abo abbestellt werden kann.

Das e-Journal
Journal für Kardiologie

✔ steht als PDF-Datei (ca. 5–10 MB)
✔ stets internetunabhängig zur Verfügung
✔ kann bei geringem Platzaufwand gespeichert werden
✔ ist jederzeit abrufbar
✔ bietet einen direkten, ortsunabhängigen Zugriff
✔ ist funktionsfähig auf Tablets, iPads und den meisten marktüblichen e-Book-Readern
✔ ist leicht im Volltext durchsuchbar
✔ umfasst neben Texten und Bildern ggf. auch eingebettete Videosequenzen.

www.kup.at/kardiologie
Case Report

A 59-year-old Caucasian male who had undergone non-diagnostic exercise test (non significant ST depression in leads V3-6) 3 weeks earlier, was admitted to our hospital. He had been having moderately severe effort angina for several months. In his past history a 6 year hypertension and long-standing bronchitis were reported. His blood pressure was 120/70 mmHg, pulse 60/min, laboratory tests were within normal limits with serum LDL cholesterol of 3.6 mmol/l. Physical examination revealed a patient with normal weight, normal heart sounds, without any remarkable physical find-
through the femoral venous sheath. The aortic pressure (Pa) was recorded through the guiding catheter, while the distal coronary pressure (Pd\textsubscript{LAD}) was measured by use of pressure wire. FFR\textsubscript{myo} was determined as the ratio of the mean distal (transstenotic) LAD pressure divided by the mean aortic pressure (Pa) during hyperemia: 

$$FFR_{\text{myo}} = \frac{P_{d\text{LAD}}}{Pa}$$

was calculated 15 min after a non-diagnostic angiographic result had been obtained. In this case the determined FFR\textsubscript{myo} was 0.70 (Fig. 2), therefore on the basis of observations in earlier studies, the stenosis was considered significant and angioplasty to the LAD with direct stenting was decided.

The wire was changed and the LAD stenosis was crossed with a 0.014 IQ marker wire (Boston Scientific, Natick, MA). A 3.5 × 32 mm Liberte stent (Boston Scientific, Natick, MA) was deployed at 12 atm (Fig. 3), which resulted in severe chest pain and pressure drop. Angiography confirmed the presence of Ellis grade 3 coronary perforation at the proximal part of the stent with free flow of contrast into the pericardial space (Fig. 4). The stent’s balloon was reinflated immediately to 5 atm and the perforation was sealed temporarily, which restored hemodynamic stability. Considerable amount of pericardial fluid became apparent (between arrows Fig. 5). We have seen no chance of sealing the large perforation with a perfusion balloon, so heparin was reversed with 20 mg of intravenous protamine sulphate and the use of a coronary stent graft was decided. A 3.5 × 19 mm JOSTENT Graftmaster (Abbott Vascular, Santa Clara, California) was deployed at 12 atm over the perforation site (Fig. 6). Test injections revealed no further extravasation, the flow into the pericardial space abolished (Fig. 7). The patient remained hemodynamically stable.
Cally stable thereafter. Echocardiogram revealed 11–16 mm pericardial fluid. After urgent consultation with cardiotho-
cracic surgeons, transport to a heart surgery (nearest 110 km) 
was decided. On the 4th day exudative pericarditis developed 
and pericardiocentesis became necessary. The patient re-
mained stable during the remaining hospital stay. There were 
no significant ECG changes and maximum CPK level was 
186 U/l. He was discharged on aspirin 300 mg, and clopido-
grel 2 × 75 mg. At 6-month follow-up, he had no effort angina 
and the treadmill test was negative.

■ Discussion

Coronary artery perforation is an infrequent, but dreaded 
complication, which occurs in 0.2–0.5 % during PCI [1–3]. 
It can be associated with adverse clinical outcome, such as 
pericardial tamponade, myocardial infarction, need for emer-
gency coronary artery bypass surgery (CABG) or death. 
There are several factors that predispose to coronary perfora-
tion, such as excessive vessel tortuosity, calcification, small 
vessel diameter, CTO, high pressure balloon dilatation, or use 
of an oversize balloon. Stiffer hydrophilic wires can also 
cause Ellis type 1 or type 2 perforation, but generally wire-
related perforations have benign course [9]. The classical 
treatment of the perforation is the prolonged balloon inflation 
 at the site of the extravasation and reversal of the anticoagula-
tion with protamin [3]. The administration of protamin was 
reported to be safe and not to predispose to stent thrombosis, 
but the reversal of heparin after a complex PCI remained con-
troversial [10]. Deployment of a conventional stent at the site 
of perforation may be effective, but rarely it can make perfora-
tions worse by expanding the vessel [9, 10]. In type 3 perfora-
tion the classical nonsurgical management often fails. The surgical management includes urgent repair or ligation, and 
grafting of the related artery as well as pericardial drainage. 
However, this intervention has an overall mortality rate up to 
20 % [10].

At the end of the 1990ies covered stent grafts as a new method 
for perforations appeared. In the beginning autologous veins 
were surgically harvested, prepared and mounted on a conven-
tional stent to cover it [11], but this approach is logisti-
cally impossible in an emergency situation. In contrast, the 
implantation of the polytetrafluoroethylene (PTFE)-covered 
stent grafts is much easier and faster, and does not require spe-
cial skills. A PTFE-covered stent consists of two conventional 
stents and a thin polytetrafluoroethylene membrane in be-
tween. Therefore these stents are more rigid than other normal 
stents, and without adequate guiding catheter support they 
may be difficult to deliver [4]. A randomized study is not fea-
sible to analyse the effectiveness of the covered stent in severe 
coronary perforations. Briguori et al. [4] reported lower rates 
of tamponade and need for emergency surgical intervention in 
patients in whom conventional prolonged balloon inflation 
therapy failed and who were treated with PTFE stent. How-
ever, this study compared the findings with a historical cohort 
before the availability of covered stents. At present 91–93 % 
of cases can be sealed successfully with the implantation of 
PTFE-covered stents [1, 4].

PTFE-covered stents in various clinical settings showed a 
subacute stent thrombosis rate of 5.7 %, which is higher than 
that of normal stents. The angiographic restenosis rate is also 
relatively high (32 %), mainly localized at the stent edge [12]. 
As indicated by angioscopic and optical coherence tomogra-
phy (OCT) observations [13], the endothelialisation of these 
stents is delayed and restenotic lesions may also contain 
thrombus, similarly to drug eluting stents. There is no consen-
sus on the duration of antiplatelet and anticoagulant therapies 
after PTFE-covered stent implantation [13]. Long-term data 
are not yet available to assess post-discharge thrombosis, 
restenosis and vessel reocclusion rate. The present case proves 
that coronary rupture can take place in simple direct stenting 
cases as well. Since coronary perforation is a potentially fatal 
complication, familiarity with steps to manage this complica-

Figure 6: A 3.5 × 19 mm JOSTENT GraftMaster (Abbott Vascular, Santa Clara, Cali-
fornia) was deployed at 12 atm over the perforation site.

Figure 7: Test injections revealed no further extravasation, the flow into the pericar-
dial space abolished.
Case Report

Conduction: speed to obstruct the affected part, protamin and the use of stent graft in Ellis grade 3 perforations is essential. Transport to heart surgery may be recommended even in stable condition.

References:

Correspondence to: Apró Dezső, MD
I. Kardiológia
State Hospital for Cardiology Balatonfüred
Állami Szívkórház, 8230 Balatonfüred, Gyógy tér 2
Hungary
e-mail: apro.d@elso.bfkor.hu

For films see www.kup.at/A8566 or enter A8566 into a search box at www.kup.at
Haftungsausschluss


Bitte beachten Sie auch diese Seiten:

Impressum  Disclaimers & Copyright  Datenschutzerklärung

Mitteilungen aus der Redaktion

Besuchen Sie unsere Rubrik

✓ Medizintechnik-Produkte

Neues CRT-D Implantat
Intica 7 HFT OP von Biotronik

Aspirator 3
Labotect GmbH

Artis pheno
Siemens Healthcare Diagnostics GmbH

Philips Azurion:
Innovative Bildgebungslösung

InControl 1050
Labotect GmbH

e-Journal-Abo

Beziehen Sie die elektronischen Ausgaben dieser Zeitschrift hier.
Die Lieferung umfasst 4–5 Ausgaben pro Jahr zzgl. allfälliger Sonderhefte.
Unsere e-Journale stehen als PDF-Datei zur Verfügung und sind auf den meisten der marktüblichen e-Book-Readern, Tablets sowie auf iPad funktionsfähig.

✓ Bestellung e-Journal-Abo