



CASE REPORT

Missing grafts and the potential for inappropriate revascularization



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Abstract The best outcome for coronary intervention in coronary artery bypass graft patients requires knowledge of prior coronary anatomy. This information is not always available as many cases present acutely, especially in ST-elevation myocardial infarction. We present three cases in which bypass grafts were documented as occluded but follow-up angiograms for other reasons revealed that the grafts were still patent. This presents the potential for inappropriate revascularizations.

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PALAVRAS-CHAVE

Enfarte do miocárdio;
Falta de enxertos;
Cirurgia de
revascularização do
miocárdio

Falta de enxertos e o potencial de uma revascularização inapropriada

Resumo O melhor resultado da intervenção coronária nos doentes submetidos a cirurgia de revascularização do miocárdio requer conhecimento da anatomia coronária anterior. Tal informação nem sempre está disponível, uma vez que muitos casos apresentam-se agudos, em particular nos enfartes do miocárdio com elevação do segmento ST. Apresentamos três casos em que foram referidos enxertos ocluídos, mas os angiogramas de seguimento, por outros motivos, revelaram que os enxertos ainda estavam patentes. Tal comprova o potencial de revascularizações inapropriadas.

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Introduction

Management of coronary artery disease (CAD) after coronary artery bypass grafting (CABG) is multifaceted. Due to the adverse risk factor profile of these patients, there is frequently significant progression of atherosclerosis in the native vessels and grafts requiring future invasive procedures.¹ Coronary intervention in this population is more complex, making knowledge of prior coronary anatomy essential for achieving excellent outcomes. This information is not always available, as many cases present emergently as ST-elevation myocardial infarction (STEMI), therefore emergent intervention is performed without complete data. This has led to some inappropriate revascularizations with the attendant risk of major complications.

We highlight this highly under-reported problem and suggest management techniques to help mitigate the risk.

Case reports

Case A

A 74-year-old male had a history of hypertension and CAD with previous CABG, including left internal mammary (LIMA) to left anterior descending (LAD), saphenous vein graft (SVG) to posterolateral (PL) branch, SVG to first diagonal and SVG to posterior descending artery (PDA). He developed chest pain and presented with an inferior wall STEMI. Per a previous angiogram performed at another hospital, his SVG to PDA graft was considered chronically occluded. Emergent cardiac catheterization revealed significant native multivessel disease. The LIMA-LAD, SVG-PL and SVG-diagonal grafts were all widely patent. The SVG to PDA graft was totally occluded proximally with fresh thrombi (Figure 1A). As this graft had an ostial stent protruding about 5 mm into the aorta, cannulation was difficult, and required a multipurpose guide catheter. Intravascular ultrasound was used to properly characterize this lesion, then aspiration thrombectomy of a fresh thrombus was successfully performed (Figure 1B) followed by placement of a drug-eluting stent. In retrospect, this graft had been considered totally occluded on a previous angiogram, probably due to the difficulty of cannulation. Proper engagement of the graft this time spared the patient significant myocardial damage that might have resulted from not intervening on this culprit artery.

Case B

A 70-year-old female with a history of CAD and previous CABG (LIMA-LAD, SVG-OM), peripheral vascular disease, diabetes, hypertension, and hyperlipidemia was admitted eight months after CABG with an acute non-ST-elevation myocardial infarction (NSTEMI), with troponin I of 8 ng/ml (normal: 0.0-0.04). Cardiac catheterization revealed significant native LAD and left circumflex (LCx) disease. The LIMA-LAD graft was patent, and since an extensive search including aortography revealed no other patent grafts (Figure 2A), it was assumed that the SVG-OM was occluded. Consequently, percutaneous transluminal balloon

angioplasty and stenting of the native LCx/OM was performed.

Seven months later, she was readmitted with angina and a positive nuclear stress test suggestive of inferolateral ischemia. Repeat cardiac catheterization this time using an AL1 catheter showed a widely patent SVG-OM graft with good distal runoff (Figure 2B). Medical therapy was optimized. It was concluded that the SVG-OM was missed during the previous cardiac catheterization, possibly leading to unnecessary intervention on the native LCx. This could have potentially led to competitive flow and subsequent closure of a patent graft.

Case C

A 52-year-old male had a history of CAD and previous CABG (LIMA-LAD, SVG-PDA, SVG-OM). On admission for NSTEMI, cardiac catheterization revealed a patent LIMA-LAD, an occluded SVG-OM, and 90% stenosis of the SVG-PDA, for which he received a stent.

Two years later, he presented with another NSTEMI (troponin I 8.5 ng/ml [normal: 0.0-0.04]). This time the SVG-PDA was considered totally occluded and optimized medical management was offered. On another admission for NSTEMI and worsening LV dysfunction, his ejection fraction dropped from 45% to 20%, and another cardiac catheterization showed that the SVG-PDA was not totally occluded as assumed previously, but was rather 99% stenosed ostially (Figure 2C). Selective engagement was achieved using a multipurpose catheter with gentle manipulation followed by angioplasty and successful stent placement, with restoration of TIMI 3 flow (Figure 2D). In this case, we can speculate that a timely intervention on this lesion could have avoided the drop in left ventricular function.

Discussion

These three cases highlight the importance of accurate graft localization during coronary angiography of patients with prior CABG. The phenomenon of missing grafts and inappropriate revascularization during emergent angiography is under-reported and a meticulous literature search failed to reveal any reports commenting on its incidence or prevalence. It is a common situation that many interventional cardiologists face when treating patients with prior CABG and can lead to suboptimal management and outcome.

It is extremely important to have the prior operative and angiography report in order to prepare a plan and road map prior to intervention, but unfortunately this is not always available, especially in emergent situations. Also, even if the cardiac catheterization report is available with the patient or in their chart, this would not be as helpful as reviewing images and films that can give clues regarding anatomy beyond what is only reported.

Various methods have been used to identify bypass grafts. In the past, surgeons marked the ostia of vein grafts with radio-opaque rings, substantially aiding the angiographer to localize the vein graft ostia during angiography. However, nowadays this is not a common practice. The use of different catheters other than the usual JR4, such as Amplatz multipurpose, AL1, AL2, or AR catheters or others according to the

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