

Difficult CABG in the Era of Stenting

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Abstract

For the past three decades, coronary artery bypass grafting has been the standard treatment for patients with severe multivessel ischemic heart disease. In the past few years, however, it has been increasingly challenged by percutaneous coronary intervention. The increasing tendency to report interventional treatments being based on "patient or physician preference" is both inadequate and inappropriate, discussion of all interventions by a multidisciplinary team should be a minimum standard of care. In this report we present a patient with coronary artery disease who underwent coronary catheterization and stenting many times, and finally the decision was to do a coronary artery bypass grafting in which the saphenous vein anastomosis to the distal right coronary artery was done over an old stent.

Keywords: Coronary artery bypass grafting, coronary stenting, angioplasty, in-stent restenosis.

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Introduction

The choice of angioplasty or bypass surgery is based on physician and patient preference, as well as patient-specific characteristics, such as diabetes or heart failure, which may favor one strategy over another. A number of randomized trials have compared coronary artery bypass grafting (CABG) with percutaneous coronary intervention (PCI) in the management of multivessel coronary artery disease.¹⁻⁶ Indeed, in many parts of the developed world PCI is done twice to five times as often as coronary artery bypass grafting.⁷ Is CABG, which is one of the most successful and widely applied surgical procedures, about to follow surgery for peptic ulcer disease into obsolescence? The question has serious implications for service provision and training as well as for informed patient consent.^{7,8}

Angioplasty should be considered when one, two or even three arteries have become narrowed, provided that the arteries are suitable for angioplasty. On the other hand, when there is significant narrowing of the left main coronary artery or of all three major coronary arteries, CABG should be considered. CABG is preferable in the presence of diabetes and/or heart failure when two or three coronary arteries are narrowed. Of those patients with coronary artery disease, about 10% will undergo CABG.

The main limitation of coronary stenting is restenosis, when the treated artery becomes narrowed again. The chance of restenosis is 25% with stent implantation. The new generation of drug-eluting stents, coated with a special medication that prevents scar tissue growth in the

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artery where the stent is placed, seems to be a breakthrough in the prevention of in-stent restenosis.

In our case study, the story is totally different. our patient who underwent recurrent PCI with its worrisome recurrent in-stent restenosis, and whose coronaries were overloaded with more and more stents as treatment for his new stenotic lesions of the non-stented coronary parts, as well as, for the in-stent restenosis. The last choice was to go through CABG where, surprisingly, even the most distal option for feasible anastomosis with the distal Right Coronary Artery (RCA) was obligatory to be done "over a stent", which was the decision we took. We reviewed the literature, but did not find any similar case.

Case Report

Our patient is a 63-year old male, who is non-smoker, and a known case of Diabetes Mellitus (DM), hypertension, coronary artery disease and dyslipidemia. The patient's history dated back 10 years ago when he started to complain from exertional chest pain with shortness of breath. He had a positive Treadmill test with unremarkable echocardiographic results.

He underwent coronary artery angiography many times which showed a multi-vessel disease with stents that were applied, on different occasions, on Left Anterior Descending (LAD), Circumflex (CX) and RCA. This time, the patient presented to our clinic with recurrence of his symptoms. Coronary artery angiography was done and demonstrated proximal, in-stent, and distal 70% stenosis of LAD, proximal and in-stent 70% stenosis of Circumflex and patent RCA stent with distal 70% stenosis (Figure 1). CABG was planned and performed as the following: Left internal mammary artery (LIMA) → LAD, Saphenous Vein Graft (SVG) → CX, SVG → (RCA). During this operation, when we opened the distal RCA to perform the distal anastomosis, we found a distally placed stent just near the start point of Posterior descending artery. The decision was taken intraoperatively to go on making the anastomosis over this distally placed stent using 6-0 proline suture material, taking in consideration that stenosis is just proximal to this point and there was no place to perform further distal anastomosis (Figure 2). Post operative course passed smoothly, and the patient was discharged home 6 days post operation. Regular follow up in clinic revealed good performance with no significant new complaints. Cardiac catheterization was performed 9 months post-operatively and showed patent SVG conduit to the RCA, patent stent over which the anastomosis was held, and intact distal run off (Figure 3).

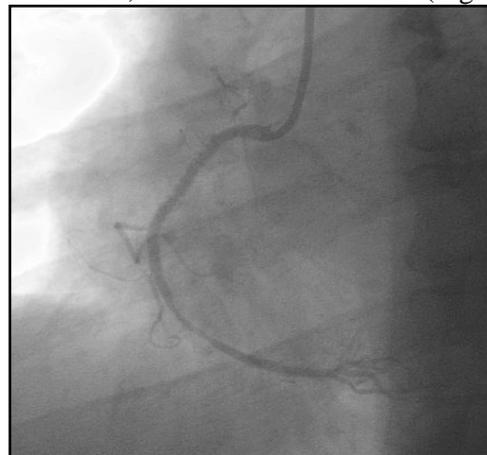
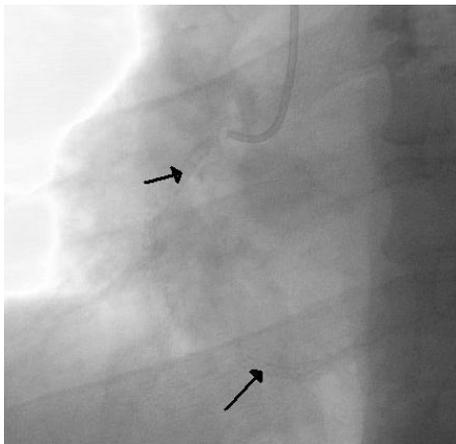


Figure (1): RCA angiography done pre-operatively shows the already applied proximal and distal stents (arrows) (Left), and the in between 70% stenosis (Right).

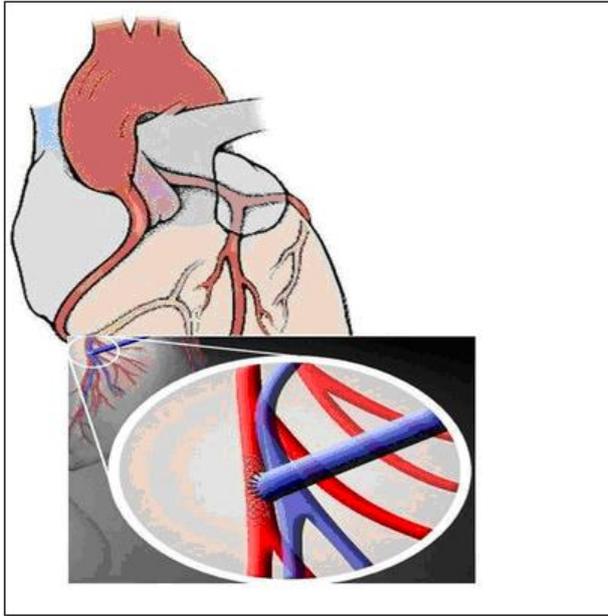


Figure (2): A schematic view of the "over-stent" distal anastomosis between SVG and RCA.

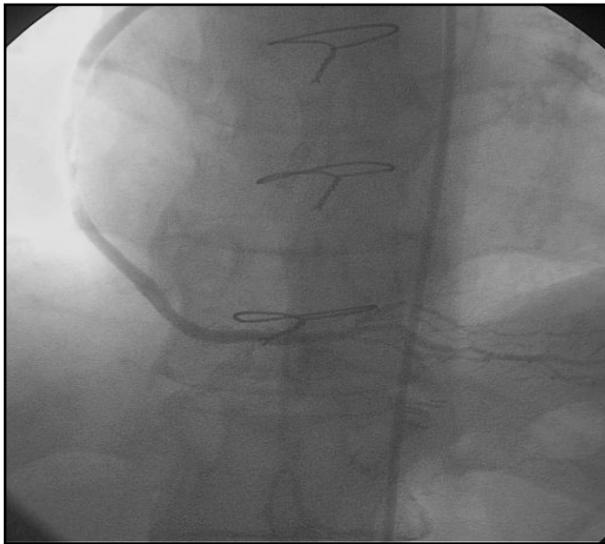


Figure (3): Post operative coronary artery angiography shows a patent SVG conduit with intact distal run off.

Discussion

Percutaneous balloon angioplasty has been used to treat patients with coronary artery disease since the procedure was first reported by Gruntzig in 1979. Although the growing use of coronary stents has improved the results of percutaneous coronary revascularization, the problem of in-stent restenosis continues to limit its long term success.

Long term follow-up of the Stent or Surgery SoS study show that relatively low-risk patients who underwent Coronary Artery Bypass Grafting (CABG)surgery have a survival advantage over those who receive a bare- metal stents.⁹

Five year survival rate in the BARI trial for 1829 randomized patients was 89.3% for CABG and 86.3% for PTCA ($p=.17$).¹ However, diabetic patients treated with either oral agents or insulin showed a 15% survival advantage of CABG over PTCA at five years in contrast to non-diabetics

who showed no survival difference between the two modalities.

Similar trends are apparent in the smaller CABRI trial² and suggest that CABG should be considered the first line of treatment in this patient group. These results raise a question of whether PTCA might also be less effective than CABG in single-vessel patients who are diabetic. Further investigation is needed to define the mechanisms underlying the better observed outcome in diabetic patients treated with CABG in comparison to angioplasty.⁶

The need for repeating revascularization procedures is 34% in PCI versus 3.3% in CABG in the first year of follow-up^{10, 11} these findings can be attributed to less complete revascularization and in-stent stenosis.

The good long-term results achieved with the surgical therapy cannot be reproduced by an interventional strategy using Drug-Eluting Stents (DES) especially for patients with Left main disease, multiple vessel disease, diabetics and patients with decreased ejection fraction. and there is an international consensus that the price tag for the 2 commercially available drug-eluting stents is excessive.¹²

Nevertheless, the results from ERACI II trial in Patients with multivessel disease and significant disease of the proximal LAD assigned in the ERACI II trial to PCI or CABG had similar survival and freedom from myocardial infarction at long term follow up. Repeat revascularization procedures were higher in the PCI group.⁶

Patient who is clearly unfit or unwilling to pursue a surgical option; discussion of all interventions by a multidisciplinary team should be a minimum standard of care as proposed by Taggart.⁷ It also remains to be seen whether the evidence base when it is eventually acquired will vindicate the present increasing dominance of PCI over CABG.

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عمليات طعوم المجازات الإكليلية (CABG) الصعبة في عصر الدعامات

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الملخص

في العقود الثلاثة الماضية، كانت عملية طعوم المجازات الإكليلية (CABG) هي العلاج التقليدي للمرضى الذين يعانون من أمراض القلب الإقفارية (IHD) في عدة أوعية دموية. وفي السنوات القليلة الماضية، على الرغم من ذلك، تم تحديدها من قبل طريقة التدخل الإكليلي عبر الجلد (PCI). وفي الواقع، إن الميل المتنامي إلى القيام بالتدخل الإكليلي عبر الجلد (PCI) اعتماداً بالدرجة الأولى على ما يفضله الطبيب و ما يرغبه المريض هو عمل غير كاف، كما أنه غير مناسب أيضاً، حيث ان كل التدخلات الجراحية يجب مناقشتها من قبل فريق طبي متعدد التخصصات، وذلك كحد أدنى لتقديم الرعاية الصحية. وفي عرض الحالة التالية مريض يعاني من داء السكر، ارتفاع الضغط الشرياني، أمراض الشرايين الإكليلية، وخلل شحم الدم. يعود تاريخه المرضي لعشرة أعوام ماضية حيث بدأ يعاني من ألم في الصدر عند الجهد مع ضيق في النفس. وخضع المريض لتصوير الأوعية الإكليلية عدة مرات وأظهرت الصور وجود آفات تضيقية في عدة أوعية دموية مع وجود دعامات مغروسة في وقت سابق في عدة أماكن. راجع المريض العيادة شاكياً من تكرار نفس الأعراض السابقة. تم تصوير الأوعية الإكليلية مجدداً و أظهرت الصور وجود تضيق بنسبة 70% في كل من الجزء الداني و البعيد وفي الدعامات من الشريان الإكليلي الأيسر النازل (LAD)، وكذلك وجود تضيق بنسبة 70% في الجزء الداني وفي الدعامات من الشريان المنعكس (Cx)، وكذلك وجود شريان إكليلي أمين سالك مع تضيق بنسبة 70% في الجزء البعيد منه. كان خيارنا الأخير هو القيام بعملية طعوم المجازات الإكليلية (CABG) ومن المدهش أنه حتى أبعد نقطة تم اختيارها للقيام بالمفاغرة مع الشريان الإكليلي الأيمن (RCA) كانت واقعة فوق إحدى الدعامات.

الكلمات الدالة: عملية طعوم المجازات الإكليلية (CABG)، التدخل الإكليلي عبر الجلد (PCI)، تضيق الدعامات (Instent stenosis).