

## **Case Reports**

# **My Buddy, My Friend: Focused Force Angioplasty Using the Buddy Wire Technique in an Inadequately Expanded Stent**

**David Meerkin\***

**Progressive minituarization of angioplasty hardware has resulted in a reduction of access site complications. This has limited to some degree the equipment used with small delivery systems. The buddy wire technique is a potential solution for resistant lesions with an underexpanded stent that can be used without having to upsize the introducer and guiding catheter.** © 2005 Wiley-Liss, Inc.

**Key words:** angioplasty; radial; stent

### **INTRODUCTION**

The progressive minituarization of interventional cardiology hardware has brought with it a reduction of the introductory arterial sheath size used and access site complications. In an attempt to reduce these complications further, some operators have adopted the radial artery approach for most coronary angiographic and interventional procedures [1,2]. Most recently, the introduction of 5 Fr guiding catheters with angioplasty balloons and stents that are 5 Fr-compatible provided us and others with the stimulus to combine the use of the small arterial entry site with the radial approach in an attempt to minimize further access site complications [3]. To date, however, certain common interventions remain incompatible with 5 Fr guide catheters. In particular, IVUS, atherectomy, and thrombectomy devices and the cutting balloon require the use of larger guide catheters.

In general, the use of devices requiring > 5 Fr guide catheters can be determined before the intervention so that the procedure is performed through a larger guide catheter. In selected cases, this is not possible and we suggest a potential solution using focused force angioplasty for an underdeployed stent through a 5 Fr guide catheter.

### **CASE REPORT**

A 64-year-old diabetic man presented with an episode of anginal chest pain associated with pulmo-

nary edema. He had evidence of inferolateral ST changes and uncontrolled hypertension. Following stabilization, he was referred for coronary angiography that revealed mild atheroma of the LAD, an occluded small marginal system, and a large dominant RCA with a significant unstable lesion of the distal RCA (Fig. 1). Arterial access was attained with a 5 Fr arterial sheath in the right radial artery. A 5 Fr JR4 guide catheter (ZUMA Medtronic) was used to intubate the RCA. A Balance Middle Weight 0.014'' coronary wire (ACS) was placed across the lesion. Primary stenting was then performed with a Medtronic AVE S7 3.5 mm/18 mm coronary stent. In spite of progressive balloon inflation to 18 atm, a distinct waist remained on the delivery balloon (Fig. 2) and at angiography a wedge was clearly noted at a site in the distal half of the stent (Fig. 3). To treat this, a short balloon was then taken (Maxxum, Scimed,

Department of Cardiology, Hadassah Hebrew University Medical Center, Ein Kerem, Jerusalem, Israel

\*Correspondence to: David Meerkin, Department of Cardiology, Hadassah Hebrew University Medical Center, Ein Kerem, Jerusalem, Israel. E-mail: ddr@rocketmail.com

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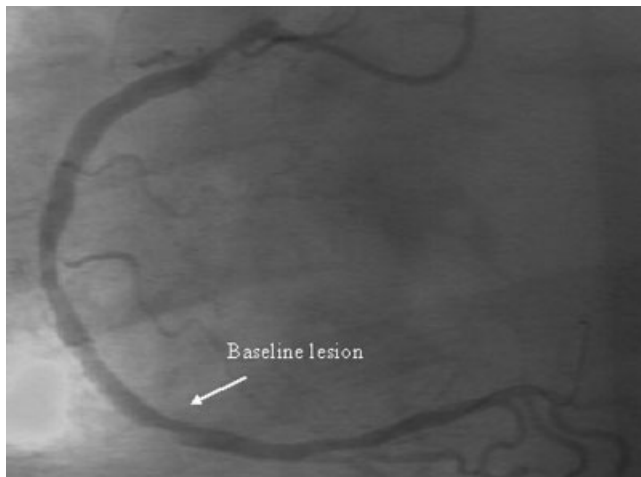


Fig. 1. Baseline lesion prior to intervention.

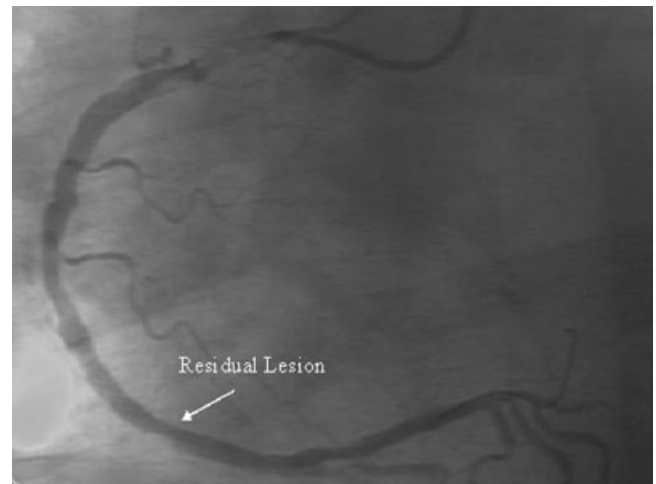


Fig. 3. Angiogram with postinflation residual lesion.

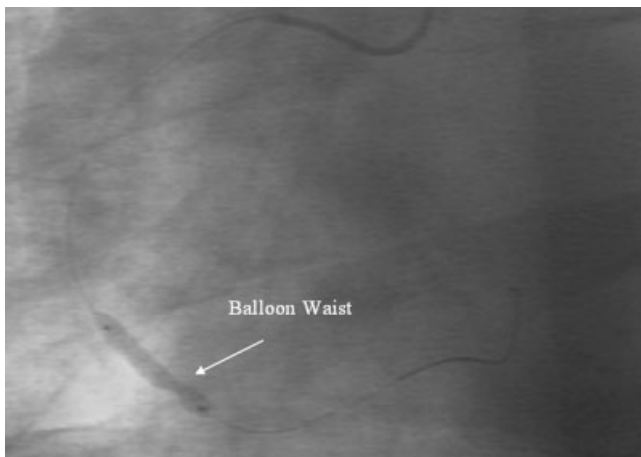


Fig. 2. Initial stent deployment demonstrating waist on the balloon inflated to 18 atm.

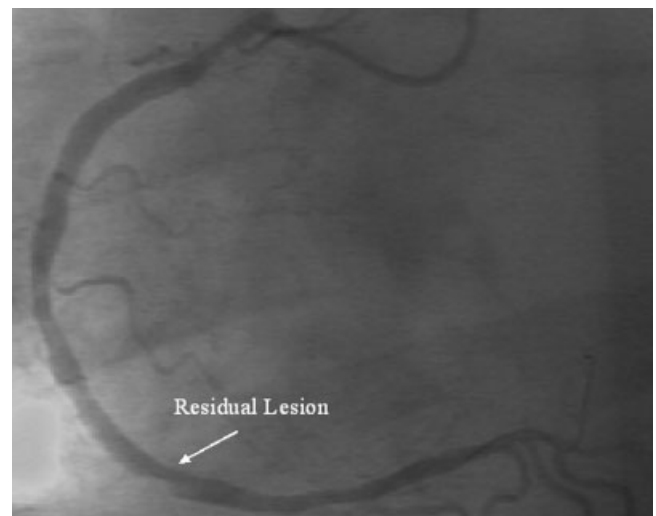


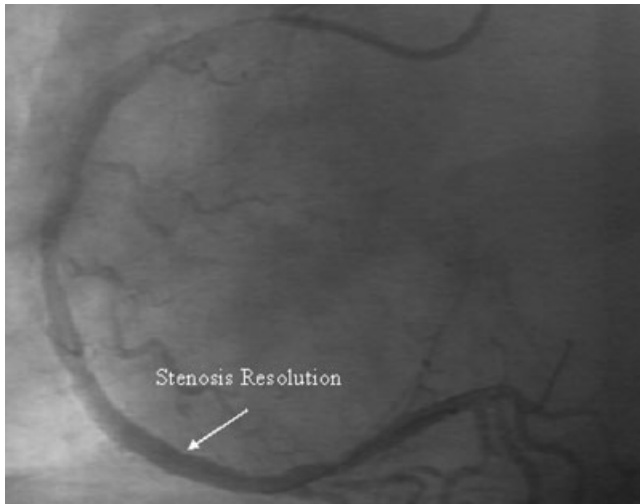
Fig. 4. Angiogram following in-stent inflation of balloon to 20 atm.

3.5 mm/13 mm) and inflated across the residual lesion in the stent to 20 atm. This did not improve the underdeployed stent (Fig. 4). In order to focus the force of the inflated balloon at the site of the residual stenosis, a second wire was then placed through the stent in a buddy wire fashion to splint the balloon. The short balloon was reintroduced and reinflated to 20 atm, parallel to the wire, with resolution of the residual stenosis providing an excellent final angiographic result (Fig. 5). Removal of the 5 Fr arterial sheath from the radial artery was performed at the end of the procedure.

## DISCUSSION

Resistant coronary lesions are the principal limitation to the time-saving procedure of primary stenting. The risk of deploying a stent to such a lesion may result in the reduced ability to apply resistance-

reducing devices such as rotational atherectomy and cutting balloon angioplasty. The use of small lumen catheters further limits the range of devices that can be used to attempt to dilate the resistant residual lesion after stent deployment. The successful application of the buddy wire technique to this scenario suggests that a concentration of force along the line of the wire is transferred from the balloon. This force is clearly significantly greater than that applied by the balloon alone, relieving the resistant lesion as demonstrated in this case [4,5]. The force will be concentrated or focused at the wire position in both longitudinal and circumferential planes, limiting balloon winging longitudinally and localizing the force in a very small zone. Furthermore, with the increasing phenomena of primary stenting (no predilatation) and smaller guide catheters precluding the use of



**Fig. 5.** Angiogram following in-stent inflation of the balloon on the buddy wire to 20 atm with resolution of the residual stenosis.

certain devices such as the cutting balloon or the FX miniRAIL, this technique offers a simple and inexpensive therapeutic option to the extremely undesirable alternatives of leaving an underdeployed stent or upsizing the entire system to allow for the use of alternative devices.

We present a case of focused force angioplasty using the buddy wire technique for an underdeployed stent following primary stenting. This was achieved with a 5 Fr system using a radial approach. With the progressive minituarization of most of the devices in interventional cardiology and the increasing use of stenting in the absence of predilatation, this technique offers a simple and inexpensive solution to a potentially troubling complication.

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