Volume 28 • Number 3 • March 1993

Catheterization and Cardiovascular Diagnosis

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Editor • Frank J. Hildner, MD • Editorial Office, Ocala, Florida

Catheterization and Cardiovascular Diagnosis (ISSN 0098-6569) is published monthly by Wiley-Liss, Inc., a division of John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012. **Send subscription inquiries to:** John Wiley & Sons, Inc., Subscription Department, 9th floor, 605 Third Avenue, New York, NY 10158.

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Indexed by: BIOSIS Data Base · Biomedical Engineering Citation Index · Cardiology Digest · Current Contents/Clinical Medicine · Science Citation Index · Scisearch · Current Opinion in Cardiology · Current Opinion in Radiology · Excerpta Medica · Index Medicus.

Printed in the United States of America.

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Volume 28 • Number 3 March 1993

WILEY-LISS

A JOHN WILEY & SONS, INC., PUBLICATION

New York • Chichester • Brisbane • Toronto • Singapore

Catheterization and Cardiovascular Diagnosis 28:263–266 (1993)

Coronary Stenting Through 6 French Guiding Catheters

Philip Urban, MD, Bernhard Meier, MD, Emmanuel Haine, MD, Vitali Verine, MD, and Vivek Mehan, MD

Most stent implantation procedures currently require the use of large-diameter guiding catheters. We describe our preliminary successful experience with 6 French guiding catheters to deliver balloon-expandable Palmaz-Schatz stents to the coronary arteries.

Key words: stent implantation, 6 French guiding catheter, coronary arteries

INTRODUCTION

Coronary stent implantation constitutes a rapidly developing adjunct to balloon angioplasty. It is an effective form of treatment for a majority of cases when abrupt closure occurs [1,2] and is currently being evaluated in several randomized trials for its potential benefit in preventing late restenosis. The major drawback of all currently available devices, however, is the risk of thrombotic stent occlusion and the ensuing need for aggressive antiplatelet and anticoagulant treatment. Vascular access site is a frequent localization for bleeding complications since the sheath must be retrieved without prolonged interruption of the anticoagulation regimen [3,4]. This problem can be partially overcome by the use of vascular sealing devices [5] and improved external compression, but it remains desirable to minimize local arterial trauma.

Guiding catheters have been decreasing in outer diameter over the years: from the early 9 French (9F) to current high-flow 7F systems [6]. Recently, our group [7,8] and others [9] have reported the use of 6F and even 4F diagnostic catheters [10] for coronary angioplasty with excellent results for selected cases. During the past months, several manufacturers have produced 6F high-flow guiding catheters that allow the use of Monorail type balloons. We report our early experience with coronary stent implantation using a Monorail balloon through such catheters in 3 patients.

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Received August 20, 1992; revision accepted November 16, 1992.

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MATERIALS AND METHODS

Our current stent implantation protocol consists of manually crimping a naked articulated Palmaz-Schatz stent (or half a stent, [11]) onto the previously used Monorail balloon catheter, placing this across the target segment, and inflating the balloon to deliver the stent. When 2 stents are required, the distal one is implanted first. Heparin is given in all cases, either a 20,000-IU bolus, or titrated to reach an ACT of 300 sec. We no longer routinely give dextran or urokinase to all patients, the femoral sheath is pulled immediately after completing the procedure, and local hemostasis is achieved with a combination of a collagen sealing device (Vasoseal, Datascope) and an external compression system (Femostop, Radi Medical Systems). Following this, oral anticoagulation is given for 3 to 6 months (INR $>$ 2.3) together with aspirin (100 mg/day) and dipyridamole (225 mg/day).

RESULTS

Patient 1

A 59-year-old man with recent onset of Canadian Cardiovascular Society (CCS) class 3 angina pectoris and a positive stress test. Angiography showed normal left ventricular function with an ejection fraction of 72% and a single 95% stenosis of the midportion of the left anterior descending coronary artery with good collaterals originating from the right coronary artery. Heparin (20,000 IU) was given and balloon angioplasty was carried out during the same session using a 6F femoral sheath, a 6F number 4 Judkins guiding catheter with a 0.060-inch inner lumen (Schneider) and a 3.0-mm Speedy-plus Monorail balloon catheter (Schneider) with a 0.014-inch wire. After 4 inflations to a maximum of 6 bars, there was a significant, long dissection with reduced flow at the site of previous balloon inflations. There was no chest pain or resting ECG changes due to the well developed collaterals. Two Palmaz-Schatz stents (Johnson and Johnson) were successively hand-crimped onto the Speedy balloon and delivered to the dissected site by balloon inflation to 6 bar with a good angiographic result. The femoral sheath was removed immediately after the procedure, a Vasoseal collagen sealing device was placed and external compression was achieved with a Femostop device. The patient's subsequent hospital course was uneventful, and he was discharged home 6 days later with a regimen of phenprocoumone, aspirin 100 mg/day and dipyridamole 225 mg/day.

Patient 2

A 55-year-old man with CCS class 3 angina pectoris following a nontransmural anterior myocardial infarct. Angiography showed a tight stenosis of the middle third of the left anterior descending artery. During the same session, and after informed consent was obtained, the patient was included in an ongoing randomized multicenter study of elective stent implantation for prevention of restenosis. Heparin 20,000 IU was given and balloon angioplasty was first carried out with a Schneider Speedy 3.5-mm Monorail balloon catheter and a 0.014-inch floppy wire through a 6F number 4 Judkins guiding catheter with a 0.060-inch inner lumen (Schneider) and a 6F femoral sheath. After this was completed, a Palmaz-Schatz stent was hand-crimped onto the previously used balloon and implanted into the target lesion. Angiographic appearance was excellent (Fig. 1). The femoral sheath was withdrawn immediately upon completing the procedure, and a combination of Vasoseal and Femostop devices was again used to insure local hemostasis. The patient developed a minor groin hematoma, but was ambulated normally after 48 hours and did not require transfusions. He was discharged free of angina on day 6 with acenocoumarol, aspirin, dipyridamole and nifedipine.

Patient 3

A 68-year-old carpenter with stable CCS class 2 angina pectoris and a positive stress test. Cardiac catheterization in another hospital had shown the left ventricular function to be normal, and revealed single vessel disease with a 70% proximal stenosis in the left anterior descending artery. After heparin 20,000 IU was administered, balloon angioplasty was carried out using a 6F sheath, a 6F number 4 left Judkins guiding catheter with a 0.062-inch inner lumen (Cordis) and a Speedy 3.0-mm monorail balloon catheter over a 0.014-inch wire. A large dissection developed after 2 inflations to a maximum of 6 bar and bail-out stenting was decided. A single Palmaz-Schatz stent was hand-crimped onto the previously used balloon and delivered to the dissected site with an excellent angiographic result (Fig. 2). The sheath was pulled immediately and hemostasis was achieved with a combination of Vasoseal and Femostop devices. The hospital course was uneventful, the patient remained asymptomatic and was discharged after 4 days on acenocoumarol, aspirin and dipyridamole.

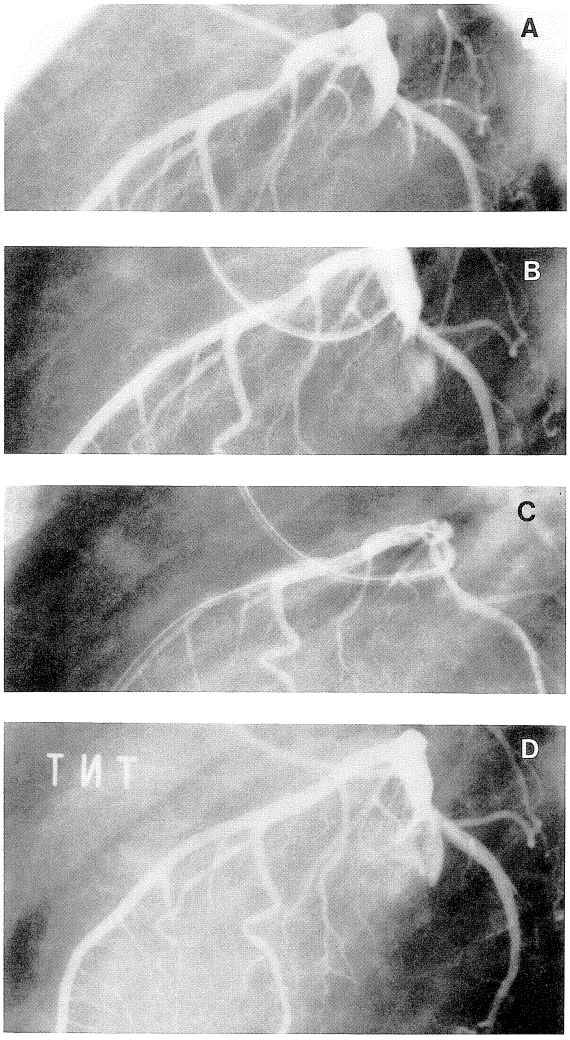

Fig. 1. A: Left lateral view of the left coronary artery showing a moderately severe stenosis of the mid left anterior descending coronary artery. B: Intermediate result, after dilatation with a 3.5-mm balloon. The guide wire remains across the lesion. C: The 15-mm Palmaz-Schatz stent is crimped onto the same balloon and placed across the lesion. The central balloon marker is well visible, and dye injection allows for precise positioning prior to deployment. D: After implantation, there is no visible residual stenosis.

DISCUSSION

Minimizing the size of the femoral puncture site is a desirable improvement for all angioplasty procedures, since it should bring about a decrease of local bleeding complications [7–10]. This is all the more true when uninterrupted anticoagulation is necessary after the procedure, as is the case after metallic coronary stent implantation [3,4]. Using 6F diagnostic catheters for selected patients undergoing coronary balloon angioplasty has shown itself to be a safe, rapid, and simple approach when the anatomy of the stenosis was favorable, but the

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