not organized, and therefore, there is no need for a “high powered” system.

The results in the treatment of embolized material showed that this system can be applied before balloon angioplasty, but it can also be a very useful tool during an interventional procedure when fresh thrombus has embolized. In the latter situation, the balloon catheter can easily be exchanged for the Rescue PT catheter because of the monorail system to perform distal thrombosuction.

Angiographic analysis showed that distal flow was restored in 41 of the 51 vessels with thrombectomy alone, but the operator decided to perform an additional procedure because of residual lesions in 42 of the vessels (83%). This percentage is comparable with the trials using other thrombectomy devices, probably because most operators do not accept a good distal runoff alone but also want to achieve an optimal angiographic result. Although stents were only placed in 18 lesions and no patient received a glycoprotein IIb/IIIa receptor antagonist, even when patients were not pretreated with a thrombolytic agent, only 4 patients underwent target vessel revascularization during 6-month follow-up (2 percutaneous interventions after 1 hour and after 1 day, respectively, 2 bypass operations after hospital discharge).

Despite the limited number of patients, this study showed that thrombosis using the Rescue PT catheter is safe and effective in patients with a fresh thrombus of <10 hours old in native coronary arteries as well as in older venous bypass grafts. An additional important finding was that material embolized during passage of the guidewire or after balloon angioplasty could be successfully removed from distal vessels.

The Rescue PT device is an intuitive, fast, safe, and effective alternative for the removal of fresh thrombus from coronary arteries and bypass grafts during interventional procedures to prevent reclosure and distal embolization. It is also particularly useful for the management of embolized material.


Predictors of Restenosis Following Unprotected Left Main Coronary Stenting

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Unprotected left main (LM) coronary artery disease has a wide spectrum of clinical presentations and risks. Once identified, selection of percutaneous or surgical management remains controversial. Unprotected LM coronary lesions may be managed safely with intracoronary stent therapy, although strategies for different anatomic subsets may vary. However, late restenosis remains the main limitation. The identification of patients at higher risk of late restenosis at this specific site might improve selection for treatment. This report is a retrospective study focused on the factors influencing restenosis after unprotected LM coronary stenting.

From a total of 155 patients with unprotected LM coronary disease who received stents, we selected those who had primary success and favorable in-
hospital outcome (n = 142), and also had serial angiographic observations (n = 77) (before treatment, immediately after stent placement, and at follow-up.).

This group of 77 patients formed the study cohort. All patients who had successful stent implantation at the LM site, and 57 patients (74%) had successful implantation at other remote sites, all with a favorable inhospital outcome. Table 1 shows baseline data in comparison with the overall series. Right and left cardiac catheterization were performed in all patients. After angiographic assessment of left ventricular function and the coronary arteries, the ideal projection that showed the LM anatomy most clearly was selected for analysis. In 28 patients the procedure was monitored by intracoronary ultrasound studies. After angiographic and ultrasonic measurements, a strategy was designed for each patient, according to the anatomy of the LM lesion, the site and characteristics of the LM plaque, the presence of remote lesions needing repair, and hemodynamic condition. Standby cardiopulmonary support was available for all patients and was instituted when hemodynamic instability occurred before or during the procedure. Once stent treatment was completed, all patients under cardiopulmonary support were easily weaned from the pump; 7 patients required inotropic drugs. In patients with involvement of the bifurcation, 2 guidewires were passed into the left anterior descending and left circumflex arteries, respectively. In patients without bifurcation involvement, a single wire was placed in the left anterior descending artery. As in other bifurcation lesions, stent treatment was initially designed according to a stepwise strategy, from the simplest stent oriented to the LM site and 51 had continuing success. Factors influencing restenosis at the LM site and 51 had continuing success.

In patients with combined right coronary artery disease, representing the highest myocardium at risk, the right coronary artery was first revascularized, before attempting the LM site. The stent diameter and length were selected in accordance with on-line quantitative coronary angiography and/or intracoronary ultrasonography measurements. Stents were deployed at the LM site at a mean pressure of 13 ± 2 atm. All patients were discharged asymptomatic, 2 ± 2 days after treatment, and received antithrombotic therapy (low-molecular weight heparin, ticlopidine or clopidogrel, and aspirin) for 1 month. All 77 patients underwent follow-up cardiac catheterization after 9 ± 9 months; 26 of them had restenosis (>50% stenosis) at the LM site and 51 had continuing success. Patients with restenosis of the LM sites or at other sites underwent percutaneous intervention (14 cases) or surgery (12 cases).

Factors influencing restenosis at the LM site were studied. Quantitative data are expressed as mean ± SD. Comparison between restenosis and late success was performed by Student’s t test for continuous and chi-square test for categorical variables. Those factors showing significant p values were included in a multivariate stepwise logistic regression model (SPSS software, SPSS Inc., Chicago, Illinois).

Figure 1 shows 2 examples of different angiographic evolution after treatment. Tables 2 and 3 show the univariate study. A small LM diameter, the bifurcational involvement of the lesion, and the need for a longer stented length were adverse factors in the uni-

### Table 1

Overall Series Versus Study Group

<table>
<thead>
<tr>
<th></th>
<th>Study Group (n = 77)</th>
<th>Overall Series (n = 155)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>58 ± 10*</td>
<td>63 ± 11*</td>
</tr>
<tr>
<td>Men (%)</td>
<td>58 [75%]</td>
<td>117 [75%]</td>
</tr>
<tr>
<td>Stable angina pectoris</td>
<td>16 [21%]</td>
<td>27 [17%]</td>
</tr>
<tr>
<td>Unstable angina pectoris</td>
<td>58 [75%]</td>
<td>122 [69%]</td>
</tr>
<tr>
<td>AMI in cardiogenic shock</td>
<td>3 [4%]</td>
<td>6 [4%]</td>
</tr>
<tr>
<td>Angiographic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM lesion location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ostial</td>
<td>18 [23%]</td>
<td>48 [31%]</td>
</tr>
<tr>
<td>Body</td>
<td>14 [18%]</td>
<td>24 [15%]</td>
</tr>
<tr>
<td>Bifurcation</td>
<td>45 [58%]</td>
<td>83 [54%]</td>
</tr>
<tr>
<td>No. stents/patient</td>
<td>2.2 ± 1.1</td>
<td>2.2 ± 1.3</td>
</tr>
<tr>
<td>Stented length (mm)</td>
<td>18 ± 12</td>
<td>17 ± 13</td>
</tr>
<tr>
<td>Stent diameter (mm)</td>
<td>3.6 ± 0.4</td>
<td>3.7 ± 0.4</td>
</tr>
<tr>
<td>Stenting at remote sites</td>
<td>57 [74%]</td>
<td>111 [72%]</td>
</tr>
<tr>
<td>Need for cardiopulmonary support</td>
<td>28 [36%]</td>
<td>41 [26%]</td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary success</td>
<td>—</td>
<td>142 [92%]</td>
</tr>
<tr>
<td>In-hospital mortality</td>
<td>—</td>
<td>5 [3%]</td>
</tr>
<tr>
<td>AMI</td>
<td>—</td>
<td>8 [5%]</td>
</tr>
<tr>
<td>Angiographic reevaluation</td>
<td>—</td>
<td>77 [50%]</td>
</tr>
<tr>
<td>Restenosis rate</td>
<td>26 [34%]</td>
<td>—</td>
</tr>
<tr>
<td>Target lesion revascularization</td>
<td>26 [34%]*</td>
<td>26 [17%]*</td>
</tr>
</tbody>
</table>

*p < 0.05

AMI = acute myocardial infarction.
treated with stents with a high rate of initial success, the procedure. In fact, all bifurcation lesions can be bifurcation, which could increase the complexity of the stem could play an important role. In our series, the anatomic location of the lesion at the LM limitation. This study is characterized by a wide spec-

Restenosis

Late Success

(n = 26)

(n = 51)

Age (yrs) 58 ± 13 59 ± 9
Men [%] 18 (69%) 40 (78%)
Previous myocardial infarction 6 (23%) 12 (24%)
Stable angina pectoris 3 (12%) 13 (25%)
Unstable angina pectoris 22 (85%) 36 (71%)
AMI in cardiogenic shock 1 (4%) 2 (4%)
Diabetes 6 (23%) 12 (24%)
Hyperlipemia* 12 (46%) 21 (48%)
Systemic hypertension 16 (62%) 24 (47%)
Smoking 11 (42%) 25 (52%)

*Total cholesterol ≥220 mg/dl. 
Abbreviation as in Table 1.

IVUS = intravascular ultrasound study; MLD = minimal lumen diameter.

Restenosis

Late Success

(n = 26)

(n = 51)

Ejection fraction (%) 66 ± 13 61 ± 11 NS
LM length (mm) 13 ± 5 18 ± 9 0.01
Reference LM diameter [mm] 3.56 ± 0.4 3.94 ± 0.4 0.01
Lesion length (mm) 16 ± 15 8 ± 4 0.05
MLD pre (mm) 1.07 ± 0.7 1.08 ± 0.6 NS
MLD post (mm) 3.31 ± 0.3 3.54 ± 0.6 NS
Percent stenosis 71 ± 17 73 ± 12 NS
Lesion location 0.05
Ostial 5 13
Body 1 13
Bifurcation 20 25
Stent diameter (mm) 3.49 ± 0.4 3.65 ± 0.4 NS
Stenting at remote sites 14 (67%) 24 (63%) NS
Deployment pressure 13 ± 2 13 ± 2 NS
(µm)
Type of plaque NS
Echogenic 4 4
Echolucent 4 5
Mixed 4 7
Coronary calcium 8 11 NS
IVUS stent diameter 3.63 ± 0.6 3.79 ± 0.5 NS

In conclusion, the whole clinical and anatomic spectrum of LM coronary disease can be treated safely with stents; however, short lesions and long stems are independent predictors for better long-term results.