Drug-Coated Balloon Versus Standard Balloon for Superficial Femoral Artery In-Stent Restenosis

The Randomized Femoral Artery In-Stent Restenosis (FAIR) Trial

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Background—Drug-coated balloon angioplasty (DCBA) was shown to be superior to standard balloon angioplasty (POBA) in terms of restenosis prevention for de novo superficial femoral artery disease. For in-stent restenosis, the benefit of DCBA over POBA remains uncertain.

Methods and Results—One hundred nineteen patients with superficial femoral artery in-stent restenosis and chronic limb ischemia were recruited over 34 months at 5 German clinical sites and prospectively randomized to either DCBA (n=62) or POBA (n=57). Mean lesion length was 82.2±68.4 mm. Thirty-four (28.6%) lesions were totally occluded; 30 (25.2%) were moderately or heavily calcified. Clinical and duplex ultrasound follow-up was conducted at 6 and 12 months. The primary end point of recurrent in-stent restenosis assessed by ultrasound at 6 months was 15.4% (8 of 52) in the DCBA and 44.7% (21 of 47) in the POBA group (P=0.002). Freedom from target lesion revascularization was 96.4% versus 81.0% (P=0.0117) at 6 months and 90.8% versus 52.6% (P<0.0001) at 12 months, respectively. At 12 months, clinical improvement by ≥1 Rutherford category without the need for target lesion revascularization was observed in 35 of 45 DCBA patients (77.8%) and 23 of 44 POBA patients (52.3%; P=0.015). No major amputation was needed. Two patients in the DCBA and 3 patients in the POBA group died. No death was procedure related.

Conclusions—DCBA for superficial femoral artery in-stent restenosis is associated with less recurrent restenosis and a better clinical outcome than POBA without an apparent difference in safety.

Clinical Trial Registration—URL: http://www.clinicaltrials.gov. Unique identifier: NCT01305070.

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Key Words: angioplasty ■ angioplasty, balloon ■ coronary restenosis ■ peripheral arterial disease ■ randomized controlled trial

In the majority of patients with peripheral arterial disease, the femoropopliteal segment is involved. As a result of guideline recommendations encouraging mainly an endovascular first-line approach and the development of new-generation nitinol stents, stenting of femoropopliteal lesions has become mainstream in recent years. However, midterm and long-term primary patency rates are suboptimal, with 1-year primary patency of 65% to 81% for slotted-tube nitinol stents, 83% to 86% for interwoven-wire nitinol stents, and 77.8% for drug-eluting stents. Five-year primary patency after endovascular therapy is reported to be 50% for TransAtlantic Inter-Society Consensus A to C lesions and 34% for D lesions. As a result, the treatment of in-stent restenosis (ISR) has become increasingly important.

Randomized trials have shown that drug-coated balloon angioplasty (DCBA) for femoropopliteal de novo disease is associated with less restenosis and target lesion revascularization (TLR) than standard (“plain old”) balloon angioplasty (POBA). However, for superficial femoral artery (SFA) ISR, currently available data are poor. In a small, prospective registry of DCBA for SFA ISR, recurrent restenosis rates were 7.9% (4 of 39) and 29.7% (11 of 37) at 12 and 24 months, respectively. For diabetic patients, Liistro et al reported significantly lower recurrent ISR rates at 12 months after DCBA compared with a historical POBA group (19.5% [8 of 41] versus 71.8% [28 of 39]; P<0.001).

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A direct comparison of DCBA and POBA for the treatment of SFA ISR has not been performed to date. Therefore, we initiated the randomized, controlled Femoral Artery In-Stent Restenosis (FAIR) trial to assess the midterm efficacy and safety of DCBA compared with POBA for SFA ISR.

Methods

Study Design

The FAIR trial had a prospective, multicenter, block-randomized, nonblinded design and was conducted at 5 experienced vascular centers in Germany. Patients with SFA ISR were allocated 1:1 to either DCBA or POBA treatment.

Patients

Patients were eligible for enrollment if they had an SFA ISR of up to 20 cm in length. Diameter stenosis had to be at least 70% by duplex ultrasound (DUS). At baseline, the popliteal artery and 1 of the infrapopliteal (below the knee) vessels had to be patent (≥50% stenosis) for sustained distal runoff. Clinically, the patients had to suffer from chronic limb ischemia of Rutherford category 15 2 to 4. Major exclusion criteria were an untreated ipsilateral iliac artery stenosis, ongoing dialysis treatment, and treatment with oral anticoagulants other than antiplatelet agents. The FAIR trial was approved by the Freiburg Ethics Commission International. All patients provided written informed consent.

Interventions

Patients were premedicated with acetylsalicylic acid (100 mg/d) and clopidogrel (75 mg/d) for at least 10 days. Patients not on this regimen were given an intravenous bolus of 500 mg aspirin before the intervention and a loading dose of 600 mg clopidogrel orally before or immediately after the intervention. After the procedure, patients received aspirin 100 mg/d indefinitely plus clopidogrel 75 mg/d for at least 6 months.

Access to the SFA ISR was achieved at the investigator’s discretion by way of either a retrograde approach from the contralateral femoral artery with a dedicated 6F crossover sheath or an ipsilateral approach with a standard 6F sheath. After sheath placement, a body weight–adjusted intravenous bolus of 5000 to 10000 U heparin was administered to achieve an activated clotting time of >250 seconds.

Digital subtraction angiography was subsequently performed to assess the following variables: the type of lesion (restenosis or reocclusion) and its location, pattern, length (determined by means of a radiopaque ruler placed under the patient’s upper thigh), and degree of calcification (by visual estimate). Furthermore, the patency status of the ipsilateral iliac arteries, popliteal artery, and infrapopliteal arteries was documented. Protocol-mandated angioplasty of a significant ipsilateral iliac artery stenosis was performed if needed before treatment of the SFA ISR.

After successful passage of the target lesion with a hydrophilic 0.018-in or 0.035-in guidewire, patients were randomly assigned either to POBA or to DCBA.

POBA

In patients randomized to POBA, an over-the-wire PTA balloon (Admiral Xtreme, Medtronic, Minneapolis, MN) was advanced into the lesion. Its nominal diameter had to be about the same as the reference vessel diameter, and its length had to match the lesion length, with a maximum balloon overhang of 10 mm at both edges. The balloon was gradually inflated until the lesion diameter appeared to be visually identical to the reference vessel diameter. Angioplasty was continued for at least 60 seconds.

DCBA

In patients randomized to DCBA, predilation of the target lesion with a standard balloon was mandatory to ensure that the DCB coating remains intact during lesion passage. The nominal diameter of the predilation balloon had to be at least 1 mm smaller than the reference vessel diameter. The drug-coated balloon (IN.PACT Admiral paclitaxel-eluting balloon, Medtronic, Minneapolis, MN) is mounted on an over-the-wire catheter and coated with a mixture consisting of urea and paclitaxel (FreePac coating; paclitaxel dose, 3.5 µg/mm²). It was available in nominal diameters of 4, 5, 6, and 7 mm and nominal lengths of 40, 60, 80, and 120 mm at study inception. The duration of dilatation had to be at least 60 seconds. The nominal balloon diameter had to match the reference vessel diameter. The DCBA-treated segment should at least have covered the lesion to avoid geographic miss but not exceeded it by >10 mm.

Both Treatment Groups

In lesions with >50% diameter residual stenosis, balloon inflation was repeated once for at least 3 minutes with the balloon already used. In case of a flow-limiting dissection or residual stenosis, bailout nitinol implantation was allowed.

Outcome Assessment

Clinical Evaluation

The patient’s clinical status was evaluated before the intervention and during outpatient hospital visits at 6 and 12 months. The evaluations included assessment of the Rutherford category, the ankle-brachial pressure index at rest, and a treadmill test at 2 mph on a 12% incline to determine the patient’s relative and absolute claudication distance.

Ultrasound Evaluation

Color DUS examination of the target SFA was performed within 1 week before the intervention and at the 6- and 12-month follow-up. Each examination comprised measurements of the maximum peak systolic velocity 2 cm proximal to the culprit lesion (prestenotic), within the lesion (intrasstenotic), and up to 4 cm distal to the lesion (poststenotic). To examine the correct lesion segments at DUS follow-up, the distance from the groin to the tibia plateau was noted in the patient chart with the help of a ruler placed under the patient’s leg at the time of intervention. The ratio of the maximum intrastenotic and maximum prestenotic peak systolic velocity (peak systolic velocity ratio) determined the degree of percent diameter stenosis by means of a validated reference table (peak systolic velocity ratio ≥2.4 corresponds to diameter stenosis ≥50%).

End Points

The primary study end point was the cumulative incidence of binary recurrent ISR at 6 months. Restenosis was assessed by DUS (peak systolic velocity ratio ≥2.4) at the study sites and confirmed by an independent and blinded core laboratory (coreLAB, Bad Krozingen, Germany).

Secondary procedural end points were primary angiographic success (successful access and deployment of the device with ≤50% diameter residual stenosis without bailout procedures), cumulative incidence of binary recurrent restenosis at 12 months, and Kaplan-Meier estimate of freedom from TLR based on recurrent restenosis ≥50%/reocclusion and clinical signs through the 6- and 12-month follow-up (not including procedural bailout). Secondary hemodynamic end points were ankle-brachial index at 6 and 12 months and immediate and sustained hemodynamic success (ankle-brachial index improvement of ≥0.15 from baseline to discharge and to 6 and 12 months without the need for TLR). Secondary clinical end points were sustained clinical improvement by ≥1 Rutherford category, ≥50%/reocclusion and clinical signs through the 6- and 12-month follow-up.

Statistics

Using an expected 6-month binary recurrent restenosis rate of 60% after POBA and postulating a reduction of the recurrent restenosis rate by half to 30% after DCBA, we calculated a sample size of 59 patients per group to give 80% power to detect a significant difference...
with a 2-sided α error of 5%. An anticipated dropout rate of 20% was taken into account.

After a parallel-group, block randomization with a block size of 10 and an allocation ratio of 1:1, patients were assigned to either DCBA or POBA. Allocation sequence was concealed from the investigators by sequentially numbered, opaque, sealed envelopes.

Continuous variables are presented by mean±SD; categorical variables, by percent and counts. Differences between continuous variables were assessed with the Student t test or Kolmogorov-Smirnov test. Differences between categorical variables were assessed with the Fisher exact test, χ² test, and Kruskal-Wallis test. Kaplan-Meier analysis was performed to estimate freedom from TLR. The Mantel-Cox log-rank test was run to test whether the survival functions differ. A value of P<0.05 indicated statistical significance. Statistical analyses were performed with SPSS 16.0.

Results

Between January 2010 and November 2012, 119 patients were enrolled at 5 German centers and randomized to undergo either DCBA or POBA for SFA ISR (Figure 1).

Patient cohorts were well matched with respect to risk factors and lesion characteristics. The majority of patients presented with hypertension or hyperlipidemia, and more than a third had diabetes mellitus. The difference in diabetes prevalence between both groups was not significant (P=0.085). Most patients (92.4%) had moderate (Rutherford 2) or severe (Rutherford 3) claudication (Table 1). Treated ISR lesion lengths in the DCBA and POBA group were 82.3±70.9 and 81.1±66.2 mm, respectively (median lesion length, 60 mm; interquartile range, 20–133 mm). Almost one third of the lesions were totally occluded, and one fourth were moderately or heavily calcified (Table 2).

Primary End-Point Outcome

The primary end point of binary recurrent restenosis assessed by DUS and adjudicated by core laboratory was 15.4% (8 of 52) in the DCBA group and 44.7% (21 of 47) in the POBA group (P=0.002; Figure 2). The DUS dropout rate at 6 months for DCBA and POBA was 16.1% and 17.5%, respectively (Figure 1), which was within the anticipated rate of 20% for sample size calculation.

Secondary Procedural, Clinical, and Hemodynamic Outcomes

Primary angiographic success was achieved in 95.1% of patients (58 of 61) in the DCBA group and in 78.9% of patients (45 of 57) in the POBA group (P=0.102). However, as a result of repeated and prolonged inflations or provisional/bailout stenting (Table 2), there was no difference in the residual stenosis rate between both groups (median, 0% [interquartile range, 0%–30%] versus 0% [interquartile range, 0%–20%]; P=0.630).

At 12 months, incidences of recurrent restenosis assessed by DUS were 29.5% (13 of 44 patients) in the DCBA and 62.5% (25 of 40 patients) in the POBA group (P=0.004). Accordingly, freedom from TLR was significantly higher in the DCBA than the POBA group (96.4% versus 81.0% at 6 months, P=0.017; 90.8% versus 52.6% at 12 months, P<0.0001; Figure 3).

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### Table 1. Baseline Patient Characteristics

<table>
<thead>
<tr>
<th></th>
<th>DCBA (n=62)</th>
<th>POBA (n=57)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>69±8</td>
<td>67±9</td>
<td>0.296</td>
</tr>
<tr>
<td>Male, % (n)</td>
<td>53.2 (33)</td>
<td>70.2 (49)</td>
<td>0.058</td>
</tr>
<tr>
<td>Obesity (BMI ≥30 kg/m²), % (n)</td>
<td>19.4 (12)</td>
<td>21.1 (12)</td>
<td>0.316</td>
</tr>
<tr>
<td>Diabetes mellitus, % (n)</td>
<td>45.2 (28)</td>
<td>29.8 (17)</td>
<td>0.085</td>
</tr>
<tr>
<td>Insulin dependent, % (n)</td>
<td>42.9 (12/28)</td>
<td>35.3 (12/17)</td>
<td>0.616</td>
</tr>
<tr>
<td>Hypertension, % (n)</td>
<td>83.9 (52)</td>
<td>93.0 (53)</td>
<td>0.123</td>
</tr>
<tr>
<td>Hyperlipidemia, % (n)</td>
<td>77.4 (48)</td>
<td>78.9 (45)</td>
<td>0.840</td>
</tr>
<tr>
<td>Renal insufficiency, % (n)</td>
<td>12.9 (8)</td>
<td>17.5 (10)</td>
<td>0.480</td>
</tr>
<tr>
<td>Dialysis, % (n)</td>
<td>0.0 (0/8)</td>
<td>10.0 (1/10)</td>
<td>1.000</td>
</tr>
<tr>
<td>Smoking, % (n)</td>
<td>0.635</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>29.0 (18)</td>
<td>35.1 (20)</td>
<td></td>
</tr>
<tr>
<td>Previous</td>
<td>41.9 (26)</td>
<td>45.6 (26)</td>
<td></td>
</tr>
<tr>
<td>Coronary artery disease, % (n)</td>
<td>41.9 (26)</td>
<td>38.6 (22)</td>
<td>0.681</td>
</tr>
<tr>
<td>Carotid vascular disease, % (n)</td>
<td>22.6 (14)</td>
<td>17.5 (10)</td>
<td>0.791</td>
</tr>
<tr>
<td>Infrapopliteal vascular disease, % (n)</td>
<td>25.8 (16)</td>
<td>21.1 (12)</td>
<td>0.495</td>
</tr>
<tr>
<td>Ankle-brachial index</td>
<td>0.63±0.27</td>
<td>0.64±0.25</td>
<td>0.872</td>
</tr>
<tr>
<td>Relative claudication distance, m</td>
<td>79.2±52.0</td>
<td>102.9±70.9</td>
<td>0.527</td>
</tr>
<tr>
<td>Absolute claudication distance, m</td>
<td>131.4±87.1</td>
<td>145.9±93.7</td>
<td>0.849</td>
</tr>
</tbody>
</table>

Data are mean±SD when appropriate. BMI indicates body mass index; DCBA, drug-coated balloon angioplasty; and POBA, standard balloon angioplasty.
From baseline to discharge, ankle-brachial index increased from 0.63±0.27 to 0.94±0.30 in the DCBA group and from 0.64±0.25 to 0.81±0.22 in the POBA group. Rutherford category 0 or 1 was achieved in 64.7% of DCBA patients (33 of 51) and 53.2% of POBA patients (25 of 47) at 6 months (P=0.413) and in 66.7% of DCBA patients (30 of 45) and 70.5% of POBA patients (31 of 44) at 12 months (P=0.820). At 12 months, clinical improvement by ≥1 Rutherford category without the need of TLR was observed in 35 of 45 DCBA patients (77.8%) and 23 of 44 POBA patients (52.3%; P=0.015; Table 3 and Figure 4).

Safety Outcomes
Two patients from the DCBA group (3.2%) and 3 patients from the POBA group (5.3%, P=0.67) died within 12 months. No deaths were procedure related. Procedure-related complications were 1 late stent thrombosis in a patient in the DCBA group and 1 subacute stent thrombosis after TLR with DCB in a patient in the POBA group. In another patient in the POBA group, the tibioperoneal trunk occluded at 294 days. In 2 patients in the DCBA group, a transient cerebral ischemic attack not related to the procedure occurred. Two distal embolizations in DCBA group patients were resolved without the need for intervention. Neither myocardial infarction nor major bleeding occurred, and no major amputation was necessary (Table 3).

Discussion
This study represents the first randomized comparison of DCBA versus POBA for SFA ISR. The treatment groups did not differ significantly with respect to patient or lesion characteristics.

There were 4 main findings in this trial: DCBA reduced the 6-month recurrent restenosis rate by two thirds compared with POBA, thus demonstrating superiority; TLR was needed significantly less frequent with DCBA than with POBA; there was a positive and sustained clinical impact for patients treated with DCBA in terms of Rutherford category improvement; and DCBA treatment of ISR was safe.

After stent implantation in the SFA, ISR is known to be associated with a high risk of recurrence in the midterm. This applies in particular to femoropopliteal lesions, possibly because of a continued restenosis process and neointimal hyperplasia.
The majority of previously assessed data on SFA ISR treatment have not been convincing. Results have been derived from single-arm observations (DCBA 12,13), historical comparisons (DCBA versus POBA 14), subgroup analyses (drug-eluting stent 18), studies on specific lesions (chronic total occluded ISR 19), and initial experiments (cutting balloon versus POBA 17). In some cases, high rates of bailout stenting (10% 13 and 15.9% 14) or additional laser mediated debulking (10% 13) weaken the significance of the findings.

Two prospective, randomized, controlled studies showed promising results for long SFA ISR lesions. The trial of covered stents20 (mean lesion length, 173 mm) showed a significantly higher 12-month primary patency than POBA. However, the duration and dose of dual antiplatelet therapy with covered stents need further evaluation. Even the long-term benefit of a “stent sandwich” remains to be proven. The trial of excimer laser atherec-tomy with adjunctive POBA21 (mean lesion length, 196 mm) showed superiority to standalone POBA alone with respect to 6-month freedom from TLR and 30-day major adverse events. The comparably higher rate of 6-month freedom from TLR after DCBA in FAIR may be attributable to shorter lesions. Therefore, the efficacy and safety of the less invasive treatment of DCBA for long ISR lesions are worth assessment.

The question of whether DCBA works in ISR as opposed to de novo SFA lesions can now be answered: On the basis of the clinical results of the present study, paclitaxel-coated balloons are as effective in restenotic lesions as in native vessels.

Table 3. Hemodynamic, Clinical, and Safety Outcomes

<table>
<thead>
<tr>
<th></th>
<th>At 6 mo</th>
<th>P Value</th>
<th>At 12 mo</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemodynamic outcome*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemodynamic improvement, % (n/N)†</td>
<td>67.5 (27/40)</td>
<td>0.408</td>
<td>61.1 (22/36)</td>
<td>0.343</td>
</tr>
<tr>
<td>Ankle-brachial index</td>
<td>0.90±0.25</td>
<td>0.379</td>
<td>0.86±0.30</td>
<td>0.502</td>
</tr>
<tr>
<td>Clinical outcome*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical improvement, % (n/N)‡</td>
<td>70.6 (36/51)</td>
<td>0.209</td>
<td>77.8 (35/45)</td>
<td>0.015</td>
</tr>
<tr>
<td>Relative claudication distance, m</td>
<td>115±63</td>
<td>0.118</td>
<td>126±89</td>
<td>0.431</td>
</tr>
<tr>
<td>Absolute claudication distance, m</td>
<td>200±128</td>
<td>0.610</td>
<td>218±187</td>
<td>0.968</td>
</tr>
<tr>
<td>Safety outcome (cumulative incidence), % (n)</td>
<td>All cause death§</td>
<td>0</td>
<td>2.1 (1/47)</td>
<td>0.124</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>...</td>
</tr>
<tr>
<td>Major bleeding</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>...</td>
</tr>
<tr>
<td>Major amputation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>...</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>1.8 (1/55)</td>
<td>0.910</td>
<td>2.1 (1/47)</td>
<td>0.519</td>
</tr>
<tr>
<td>Surgical intervention#</td>
<td>0</td>
<td>0</td>
<td>2.1 (1/47)</td>
<td>0.331</td>
</tr>
</tbody>
</table>

DCBA indicates drug-coated balloon angioplasty; and POBA, standard balloon angioplasty.
*Without the need for target lesion revascularization.
†Ankle-brachial index improvement of ≥0.15.
‡Clinical improvement of ≥1 Rutherford category.
§No procedure-related death.
DCBA group: 1 patient with target lesion occlusion at 199 days; POBA group: 1 patient with subacute stent-thrombosis after target lesion revascularization with DCBA at 84 days and 1 patient with occlusion of the tibioperoneal trunk at 294 days.
#Femoropopliteal bypass at the target limb.

The majority of previously assessed data on SFA ISR treatment have not been convincing. Results have been derived from single-arm observations (DCBA 12,13), historical comparisons (DCBA versus POBA 14), subgroup analyses (drug-eluting stent 18), studies on specific lesions (chronic total occluded ISR 19), and initial experiments (cutting balloon versus POBA 17). In some cases, high rates of bailout stenting (10% 13 and 15.9% 14) or additional laser mediated debulking (10% 13) weaken the significance of the findings.

Two prospective, randomized, controlled studies showed promising results for long SFA ISR lesions. The trial of covered stents20 (mean lesion length, 173 mm) showed a significantly higher 12-month primary patency than POBA. However, the duration and dose of dual antiplatelet therapy with covered stents need further evaluation. Even the long-term benefit of a “stent sandwich” remains to be proven. The trial of excimer laser atherec-tomy with adjunctive POBA21 (mean lesion length, 196 mm) showed superiority to standalone POBA alone with respect to 6-month freedom from TLR and 30-day major adverse events. The comparably higher rate of 6-month freedom from TLR after DCBA in FAIR may be attributable to shorter lesions. Therefore, the efficacy and safety of the less invasive treatment of DCBA for long ISR lesions are worth assessment.

The question of whether DCBA works in ISR as opposed to de novo SFA lesions can now be answered: On the basis of the clinical results of the present study, paclitaxel-coated balloons are as effective in restenotic lesions as in native vessels.

Limitations
This study was designed to assess the safety and efficacy of DCBA compared with POBA for SFA ISR treatment. At this stage, we did not focus on the assessment of predictive risk factors (eg, subgroup analysis) for restenosis recurrence. The DUS dropout rate for DCBA and POBA at 12 months was 29.0% and 29.8%, respectively (Figure 1). Therefore, the significance of the secondary outcome of 12-month restenosis rate is of minor weight.

Implications for Future Research
The recent results should be verified for longer follow-up periods. In addition, with a larger number of patients, a multi-variable analysis could provide information on predictive risk factors such as lesion length and complexity (classification introduced by Tosaca et al22), vessel morphology, comorbidities, and sex. Moreover, the mode of stenting (intraluminal versus subintimal) or the type of stent may be associated with the success of ISR treatment. Furthermore, it would be valuable to directly compare the efficacy of DCBA and DES implantation. In the next step, the treatment of recurrent ISR could be investigated.

Conclusions
This multicenter, randomized, controlled study demonstrates for the first time that the treatment of SFA medium-length ISR with DCBA is associated with lower recurrent restenosis rates and TLRs at 6 and 12 months than POBA. Clinical improvement of ≥1 Rutherford category at 12 months without the need for TLR was more frequent after DCBA compared with POBA. Safety profiles were equivalent between both


**CLINICAL PERSPECTIVE**

As a result of an increasing tendency to stent superficial femoral artery (SFA) lesions, which is associated with not entirely satisfying primary patency rates, the treatment of SFA in-stent restenosis (ISR) has become increasingly important. Drug-coated balloon angioplasty (DCBA) compared with standard balloon angioplasty has shown superior efficacy for de novo lesions. Therefore, DCBA seemed to be the obvious approach for the minimally invasive treatment of SFA ISR. However, available data were poor and did not allow therapeutic decisions. The multicenter, randomized, controlled Femoral Artery In-Stent Restenosis (FAIR) trial demonstrates for the first time that the treatment of SFA ISR with DCBA is associated with lower recurrent restenosis rates and target lesion revascularizations than standard balloon angioplasty at 6 and 12 months. Moreover, clinical improvement of ≥1 Rutherford category at 12 months without the need for target lesion revascularization was observed more often after DCBA. Safety profiles were equivalent between both treatment groups. Therefore, the question of whether DCBA works in an SFA ISR as opposed to de novo SFA lesions can now be answered: Based on the clinical results of the FAIR trial, paclitaxel-coated balloons are as effective in restenotic lesions as in native vessels. A clear treatment recommendation can be made for DCBA in SFA ISR up to 150 mm in length.
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