Percutaneous transluminal angioplasty for crural obliterations

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Up to 1985, in crural obliterations, we used only single Teflon catheters or balloon dilatation according to Grünzig (5, 7, 10, 16, 17) for treatment of occlusions and stenoses of the popliteal and proximal tibial arteries. As a result of the introduction of percutaneous transluminal coronary angioplasty (PTCA), balloon catheters of diameters smaller than 5 mm and coaxial coronary balloon-catheters have increasingly also been used. The indication in most cases was to improve the run-off flow in patients who previously had an angioplasty of the femoral or popliteal artery. In patients with critical limb ischemia and multiple obliterations in lower-leg arteries, also angioplasty in one or two crucal arteries has been successful to an increasing extent [11, 13, 15].

Prior to the publication of the “Critical Limb Ischemia Document” [4], the indication applied to patients with rest pain, necrosis or gangrene. The indication today applies, whenever the ankle blood-pressure is below 60 mm Hg, provided that it is measurable and that vascular sclerosis does not prevent a precise determination. The indications suited for angioplasty of crural arteries are summarized in Table 1.

Table 1. Angioplasty: crural arteries

1. As run-off angioplasty
2. As PTA alone in critical limb ischemia
3. As treatment of acute ischemia
4. As treatment at surgery
5. As treatment of bypass - stenoses
6. As treatment of bypass - occlusions

Technique

Premedication with acetylsalicylic acid (aspirin) is a prerequisite in leg angioplasty, which is preferably performed from the femoral artery in the groin. In uncommon cases also the transpopliteal antegrade puncture can be used [14]. For angioplasties of the crural arteries via both the inguinal and the popliteal route, we use catheters of 5-French-size as a maximum. When popliteal access is used, we directly insert the treating catheter, whereas in angioplasties starting from the groin, the use of sheaths has proved to have several benefits. These benefits are: small trauma to the artery to be punctured, and reduced risk of rethrombosis — even when using several cathe-
Angioplasty of a single stenosis in the tibial posterior artery in a patient with critical limb ischemia and occlusions of two arteries
A) Before the procedure;
B) After the procedure

ters. In addition, the use of a sheath enables a precise determination of the site of dilatation, due to the contrast medium application via its side-arm. Following the angiographic examination, the stenosis has to be precisely located, preferably during digital subtraction angiography (DSA). Prior to the passage of the guidewire into the popliteal trifurcation we intra-arterially administer a spasmolytic drug (nitroglycerin or calcium channel-blockers). The sounding is performed with either the "Terumo"-guide wire or one of the different steerable guide wires. This is especially important in dilations of the anterior tibial artery. In this case, also the right 5-F coronary catheter according to Judkins can be used. Through this catheter, a coronary balloon catheter of 2.5 mm can then be introduced coaxially.

Simple lesions (Fig. 1 A, B) are treated with a 5-F single Teflon or gliding catheter. In lumen of 2 to 3 mm diameter the "Tegwire" balloon-catheter, a balloon-on-the-wire, is recommended (Fig. 2 A, B).

Angioplasty of popliteal obliterations

Clear indications in the popliteal region are segmental occlusions with a short history of less than 2 weeks (Table 2), as well as embolism or thrombosis, where a combined technique is feasible. Plain old balloon-angioplasty (POBA), percutaneous aspiration thrombectomy (PAT), or local thrombolysis can treat acute leg ischemia in several cases. Only after dissection, also in the popliteal artery, or in cases with a collaps-