

Advantages to Ultrasound Guidance for Lower Extremity Angioplasty and Stenting

NOTES

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Purpose

The standard technique of balloon angioplasty with or without subintimal dissection of infrainguinal arteries requires the use of contrast arteriography and fluoroscopy. We attempted to perform this procedure under duplex guidance to avoid the use of nephrotoxic contrast material and eliminate or minimize radiation exposure.

Methods

Over the past 22 months, 196 patients (57% males) with a mean age of 73 ± 10 years (range 47 to 97 years) had a total of 253 attempted balloon angioplasties of the superficial femoral artery (SFA) and/or popliteal artery under duplex guidance in 218 limbs. Critical ischemia was the indication in 38% of cases, and disabling claudication in 62%. Hypertension, diabetes, chronic renal insufficiency, smoking, and coronary artery disease were present in 78%, 51%, 41%, 39%, and 37% of patients, respectively. Group I included 159 cases (63%) with arterial stenoses (32 SFA, 10 popliteal, 117 combined). Of these, 117 were primary cases and 42 were restenoses. Group II had 94 cases (37%) with arterial occlusions (63 SFA, 13 popliteal, 18 combined). Of these, 87 were primary cases and 7 were reocclusions.

The common femoral artery was cannulated under direct duplex visualization. Still under duplex guidance, a guidewire was directed into the proximal SFA, across the diseased segment(s), and parked at the tibioperoneal trunk. The diseased segment was then balloon dilated. Balloon diameter and length were chosen according to arterial measurements obtained by duplex. Whenever indicated, stents (153 of 236 cases) were selected and placed under duplex guidance. Completion duplex examinations and ankle/brachial indices (ABIs) were obtained routinely before hospital discharge.

Results

Although the overall technical success was 93% (236 of 253 cases), it was 100% for group I (159 cases) and 82% for group II (77 of 94 cases) ($p < .0001$). End-stage renal disease was the only significant predictor of failure in these patients (5 of 17 cases). Intraluminal stents were deemed necessary in 96 of 159 (60%) cases in group I and in 57 of 77 (74%) cases in group II ($p < .05$). Overall pre- and postprocedure ABIs ranged from 0.28 to 1.2 (mean 0.69 ± 0.16) and 0.55 to 1.23 (mean 0.95 ± 0.13), respectively ($p < .0001$). Overall 30-day survival rate was 100%. Overall limb salvage rate was 99% at 3 months. Three-month patency rates for groups I and II were 93% and 84%, respectively ($p = 1.0$).

Conclusions

Duplex-guided balloon angioplasty and stent placement appears to be a safe and effective technique for the treatment of infrainguinal arterial occlusive disease. Technical advantages include direct visualization of the puncture site, accurate selection of the proper size balloon and stent, and confirmation of the adequacy of the technique by hemodynamic and imaging parameters. Additional benefits are avoidance of radiation exposure and contrast material.