Coronary excimer laser angioplasty: reduced complications and indium-111 platelet accumulation compared with thermal laser angioplasty.


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ABSTRACT:

The relative safety and thrombogenicity of pulsed excimer and thermal laser angioplasty systems were compared in 20 normal coronary artery segments in a total of seven pigs. Using similar over the wire catheter systems and laser delivery periods of 3 to 5 s, thermal laser angioplasty was achieved with a 1.3 mm metal probe heated with 10 W of continuous argon laser energy and excimer laser angioplasty was performed with a 4.5F excimer laser catheter consisting of 13 concentrically arranged 200 microns fiber optics delivering 35 to 40 mJ/mm2 of xenon chloride (308 nm) excimer laser irradiation at a repetition rate of 25 to 30 Hz and a pulse duration of 120 ns. On angiography, the incidence of vessel perforation (1 in 10 versus 3 in 10) and abrupt vessel closure (0 in 10 versus 2 in 10) was less with excimer compared with thermal laser angioplasty. Macroscopically, there was a greater incidence of mural and occlusive thrombus formation after thermal laser than after pulsed excimer laser angioplasty. Histologic examination confirmed that this thrombogenicity was associated with greater charring and coagulation necrosis of the media. Quantitative indium-111-labeled platelet deposition was significantly increased after thermal laser angioplasty (median 87.2 x 10(6)/cm length) compared with excimer-treated (0.4 x 10(6)/cm length) or control (1.2 x 10(6)/cm length) segments (p less than 0.001). Thus, excimer laser angioplasty was found to result in fewer complications and, as a consequence, less thrombosis and platelet accumulation than did thermal laser angioplasty.

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