Coronary Stent Implantation


Optimal dosing of intravascular low-power red laser light as an adjunct to coronary stent implantation: insights from a porcine coronary stent model.


University Hospitals, Leuven, Belgium.

BACKGROUND: It is believed that restenosis following coronary interventions is the result of endothelial denudation that leads to thrombus formation, vascular remodeling, and smooth muscle cell proliferation. Low-power red laser light (LPRLL) irradiation enhances endothelial cell growth in vitro and in vivo, and reduces restenosis in animal models. The present study investigated the optimal dose of intravascular LPRLL therapy in the prevention of in-stent stenosis in a porcine coronary stent model. METHODS AND RESULTS: Selected right coronary artery segments were pretreated with a LPRLL balloon, delivering a dose of 0 mW during 1 min (group 1, n = 10), 50 mW during 1 min (group II, n = 10), or 100 mW during 1 min (group III, n = 10) before stenting. Quantitative coronary analysis of the stented vessel was performed before stenting, immediately after stenting, and at 6 weeks follow-up. The pigs were sacrificed, and histologic and morphometric analyses were conducted. At 6 weeks, minimal luminal stent diameter was significantly narrower in the control group compared to the 50-mW dose group (p < 0.05). These results were confirmed by morphometric analysis. Neointimal area was also significantly decreased in the 50-mW dose group. CONCLUSIONS: Intravascular LPRLL contributes to reduction of angiographic in-stent restenosis and neointimal hyperplasia in this animal model. The optimal dose using the LPRLL balloon system seems to be approximately 5 mW delivered during 1 min.


Intravascular Red Light Therapy after Coronary Stenting N Angiographic and Clinical Follow-up Study in Humans.

Kaul U, Singh B, Sudan D, Ghose T, Kipshidze N.

Director, Interventional Cardiology, Batra Hospital and Medical Research Centre 1, Tughlakabad Institutional Area, Mehrauli Badarpur Road, New Delhi-110 062, India.
In animal models of coronary restenosis, intravascular red light therapy (IRLT) using a diode laser source has been shown to reduce neointimal hyperplasia following balloon-induced injury and coronary stenting. We studied the safety and efficacy of catheter-based IRLT for preventing restenosis after coronary stenting in 22 patients with angina pectoris. IRLT was performed using a diode laser (650 nm) at an energy level of 10 megawatts delivered through a rapid exchange balloon system containing the fiberoptics. The procedure was successful in all patients, with no procedural or in-hospital complications. Two patients with recurrence of symptoms had angiography at 3 and 4.1 months respectively. Angiographic follow-up was also done after 6 months in the 20 remaining asymptomatic patients. The mean minimal lumen diameter (MLD) for the whole group at 6 months follow-up was 2.57 +/- 0.62 mm. The calculated late lumen loss was 0.49 +/- 1.12 mm with a late loss index of 0.21 +/- 0.54. Four patients (2 symptomatic and 2 asymptomatic) in the series developed angiographic restenosis. Clinical events at follow-up of 10.9 +/- 3.5 months were repeat angioplasty in 2 patients for symptomatic restenosis with a 91% event free survival. These preliminary results demonstrate that IRLT after coronary artery stenting is safe and feasible; it is associated with low rates of angiographic indices of restenosis.