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Current status of rotational atherectomy
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Despite the increasing use of percutaneous transluminal coronary angioplasty and intracoronary stent placement for the treatment of obstructive coronary artery disease, a large subset of coronary lesions cannot be adequately treated with balloon angioplasty and/or intracoronary stenting alone. Such lesions are often heavily calcified or fibrotic and undilatable with the present balloon technology and attempts to treat them with balloon angioplasty or intracoronary stent placement often lead to vessel dissection or incomplete stent deployment with resultant adverse outcomes. Rotational atherectomy remains a useful niche device for the percutaneous treatment of such complex lesions, usually as an adjunct to subsequent balloon angioplasty and/or intracoronary stent placement. In contrast to balloon angioplasty or stent placement that widen the coronary lumen by displacing atherosclerotic plaque, rotational atherectomy removes plaque by ablating the atherosclerotic material, which is dispersed into the distal coronary circulation. Other lesion subtypes amenable to treatment with this modality include ostial and branch-ostial lesions, chronic total occlusions, and in-stent restenosis. This review discusses the technique and principles of rotational atherectomy, the various treatment strategies for its use (including adjunctive pharmacotherapy), the lesion-specific applications for this device, and the complications unique to this modality. Recommendations are also made for its use in the current interventional era. Catheter Cardiovasc Interv 2004;62:485-498. Copyright 2004 Wiley-Liss, Inc.
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Coronary rotational atherectomy in current practice: acute and mid-term results in high- and low-volume centers
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We conducted a prospective observational study to evaluate the indications, technique, in-hospital and 9-month results of consecutive patients treated with rotational atherectomy (RA) in 12 centers during 1 year, as well as their relationship with volume of RA activity. The study included 345 lesions in 289 patients treated (4.4% +/- 2.6% of procedures at the participating centers). The lesions were mostly calcified (63%) and type B2 or C (74%). Procedural success was obtained in 94% of patients, with a major adverse cardiac event (MACE) rate of 4.5%. At 9 months, MACE occurred in 17.3%. Multivariate analysis identified multivessel disease and slow flow as negative predictors of procedural success, whereas balloon pressure <or= 6 atm and hypercholesterolemia were associated with decreased MACE at 9 months. Center RA volume was not associated with in-hospital or 9-month outcome. We conclude that RA, even when used sporadically in selected complex lesions, can provide good immediate and mid-term results.
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Randomized trial of Rotational Atherectomy Versus Balloon Angioplasty for Diffuse In-stent Restenosis (ROSTER)
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BACKGROUND: Various autopsy and intravascular ultrasound (IVUS) studies have shown neointimal proliferation as the main mechanism of in-stent restenosis (ISR) responsible for >95% of luminal narrowing while stent struts are not compressed. ISR of diffuse type has a high incidence of recurrence (up to 70%) after balloon angioplasty (PTCA). Tissue ablation with percutaneous rotational coronary atherectomy (PRCA) may be more efficacious compared to tissue compression or extrusion after PTCA for the interventional treatment of diffuse ISR. METHODS: The Rotational Atherectomy Versus Balloon Angioplasty for Diffuse In-Stent Restenosis (ROSTER) trial is a single-center, randomized trial comparing PRCA to PTCA (both with IVUS guidance) in the treatment of diffuse ISR in 200 patients. In the PRCA group (n = 100), rotablation was performed using a burr-to-artery ratio >0.7 followed by adjunctive balloon dilatation at low pressure (4-6 atm). In the PTCA group (n = 100), high-pressure (>12 atm) balloon dilatation was performed using an optimal size balloon. The study's primary end point was target lesion revascularization (TLR) at 9 months and secondary end points included clinical events at 1 year and angiographic restenosis in a substudy of the last 75 patients enrolled. RESULTS: Baseline clinical and angiographic variables were comparable between the 2 groups with similar procedural and angiographic success, but a higher rate of repeat stenting occurred in the PTCA group (31% vs 10%; P <.001). Although the angiographic acute luminal gain was similar between the 2 groups, IVUS analysis revealed lower residual intimal hyperplasia area after PRCA versus PTCA (2.1 +/- 0.9 mm2 vs. 3.3 +/- 1.8 mm2; P =.005). At a mean follow-up of 12 +/- 2 months, there were 2 deaths, 3 myocardial infarctions, and 3 coronary artery bypass graft procedures in each group. TLR incidence was 32% in the PRCA group and 45% in the PTCA group (P =.042), with a similar trend noted in the angiographic substudy. CONCLUSION: The ROSTER trial for diffuse ISR revealed both PRCA and PTCA to be safe and effective, but PRCA resulted in less residual intimal hyperplasia, lower repeat stent use, and decreased TLR.
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