Rotational atherectomy in complex lesions

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Rotational atherectomy (RA) is used primarily in complex lesions with moderate to severe calcification, where interventional cardiologist feels balloon angioplasty and stenting alone will not be sufficient. RA is also used as a "bail-out" therapy after a balloon could not be delivered to the lesion and/or balloon angioplasty had failed. In general, it helps to improve procedural success and improve stent expansion at the lesion.

In the DES era, it is used less often in two other indications: in-stent restenosis and to preserve the patency of side-branches in bifurcation and ostial lesions by debulking large plaque burdens while preventing plaque shifting from one vessel to another during balloon or stent expansion.

Since its introduction in the 1990s, RA alone was associated with high rate of restenosis (38% at 6 month). With the introduction of BMS implantation, the TVR remained relatively high (15-36% at 6 to 9 months). Finally, the usage of DES significantly improved the results (TVR of 2-10.6% at 6 months up to 3 years). RA may also improve drug delivery to the subintimal tissue by limiting trauma to the DES coating during deployment in rigid lesions.

It is often necessary to use more than one burr in a procedure. With the indication to facilitate stent implantation, RA is performed with a relatively small burr-to-vessel ratio (0.5-0.6), as the main goal is not to get maximal luminal gain but

to alter the compliance of a calcified lesion in order to optimize stent expansion. In patients without stent implantation a burr-to-vessel ratio is often higher but it is recommended to be <0.7 to reduce the incidence of serious angiographic complications.

Main complications are: vessel spasm, no-reflow, perforation and burr entrapment. To prevent vessel spasm and no-reflow phenomenon we suggest to use smaller burr (burr-to-vessel ratio), lower burr speed (130.000 — 140.000 rpm) and longer pauses between each burr passage to enable better washing out of microcirculation.¹⁻³

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