

## COMPARISON OF DIPYRIDAMOLE-THALLIUM SCINTIGRAPHY AND AMBULATORY ECG MONITORING IN THE PRE-OPERATIVE ASSESSMENT OF CARDIAC RISK FOR VASCULAR SURGERY

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We performed dipyridamole-thallium scintigraphy (DTS) and ambulatory ECG monitoring (AM, averaging 22 hrs) in 48 Pts prior to aortic (n=31), peripheral vascular (n=15) or non-vascular (n=2) surgery. Pts were judged to have an intermediate pre-test cardiac risk on the basis of possessing 1 or 2 of the following risk factors: history of angina (34%), prior MI (46%), or CHF (8%), Q waves on ECG (30%), diabetes (22%) or ventricular arrhythmias (4%) requiring therapy, and age  $\geq$  70 yr (40%). 25/48 (52%) of Pts demonstrated reversible abnormalities on DTS; 13/48 (27%) developed ischemic ECG changes on AM; 7 (15%) Pts either suffered a perioperative cardiac event, or were subsequently found to have left main (LM) or 3 vessel (3V) coronary artery disease. DTS identified all 7; AM identified 4 of the 7 including both Pts who developed unstable

		AM	
		+	-
DTS	+	10 2 UA $\rightarrow$ CABG 4 LM/3V	15 1 MI 2 LM/3V
	-	3 no endpoints	20 no endpoints
TOTAL		13	35

angina (UA) and re-quired urgent CABG; 25 AM failed to identify one Pt who sustained a postop MI and 2 Pts shown to have LM or 3V. 48 Relative concordance of the 2 methods is shown.

**Conclusions:** In this small cohort DTS was a very sensitive (100%) test for evaluation of cardiac risk but its specificity (56%) was relatively low. AM was more specific (86%) but failed to identify several Pts at high risk (sens of 57%).

## EX-VIVO AND EARLY CLINICAL RESULTS USING A NEW PULLBACK ATHERECTOMY CATHETER (PAC)

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In order to evaluate the feasibility of performing definitive atheroma removal using a novel retrograde cutting (Pullback) atherectomy catheter, pullback atherectomy (PA) was performed in 14 severely diseased cadaveric superficial femoral arteries and in 4 patients with peripheral vascular disease. The device consists of a flexible outer "closing catheter," and an inner "cut-collect" catheter which is rotated (2000 rpm) by a hand-held motor drive unit. A circumferential arc of atheromatous material is cut, and collected within a "collection chamber" with each pass. Experiments were performed using (non-fixed) cadaver arteries either mounted in a perfusion/mounting chamber (n=11) or left *in-situ* (n=3). In general, a single cut was made with sequentially larger atherectomy catheters (2.5-3.5 mm diameter devices). The results were evaluated by angiography and by light microscopy. 10/14 experiments were performed in totally occluded vessels. Tissue was excised in 14/14 experiments and 52/53 passes. The mean stenosis was improved from 95 $\pm$ 3% prior to PA to 19 $\pm$ 5% after pullback atherectomy. The device was recently used successfully in four patients with severe stenoses of the superficial femoral artery. "Stand alone" PA was performed in 2/4 cases with adjunctive balloon angioplasty in the other two cases. Clinical and angiographic success, without vessel perforation or embolic complications was achieved in all cases. A multicenter clinical trial of pullback atherectomy for the treatment of peripheral vascular disease is in progress.

**Conclusions:** 1) Retrograde atherectomy with the Pullback Atherectomy Catheter (PAC) is a feasible mean of performing definitive atherectomy. 2) Further clinical experience will be required before the utility of such a device is adequately defined.

## INTRAVASCULAR ULTRASOUND OF RENAL ARTERIES IN PATIENTS UNDERGOING PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY: FEASIBILITY, SAFETY AND INITIAL FINDINGS, INCLUDING 3 DIMENSIONAL RECONSTRUCTION OF RENAL ARTERIES

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The reported high incidence of restenosis complicating renal artery angioplasty (PTRA), as well as inherent difficulties in balloon sizing, underscores need for refinements in technique and assessment of results. We employed intravascular ultrasound (IVUS) as an adjunct to contrast angiography (Angio) in 5 consecutive pts (4F/1M; mean age=64y, range 29-79) undergoing PTRA. Stenoses (ostial-2, proximal-2, and mid-vessel-1) were due to atherosclerosis (ATH) in 4 and fibromuscular dysplasia (FMD) in 1. Balloons (diameter 4.5 to 6.0 mm, mean=5.3) and IVUS (4.7 fr, 20 MHz) were introduced via 8 fr guides. PTRA was successful with no complications in 5/5 (100%) cases; stenosis by Angio was 91 $\pm$ 3 pre- and 29 $\pm$ 2 post-PTRA. Systolic BP declined from 189 $\pm$ 6 pre- to 146 $\pm$ 5 (p=.01) post-PTRA. Mean creatinine was 2.2 pre- and 2.4 post-PTRA (p=NS). IVUS disclosed plaque-cracks at interventional sites in 4/4 (100%) ATH cases, but not in FMD case. Luminal dimensions were easily measured for normal and interventional sites in 5/5 (100%). In one ATH pt, IVUS findings of residual luminal compromise not evident on Angio prompted dilatation with larger balloon and improved result. In FMD pt, 3-dimensional reconstruction of IVUS images into a profile familiar to the angiographer demonstrated circumferential ridges consistent with Angio findings. This preliminary experience demonstrates that IVUS during PTRA 1) is feasible; 2) can be performed without complications; 3) may help determine optimal device size and assess results. Further experience with this new modality may reduce contrast requirements during PTRA.

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Poster Displayed: 2:00PM-5:00PM

Author Present: 4:00PM-5:00PM

Hall F, West Concourse

Laser Angioplasty

## COMBINED ATHEROSCLEROTIC PLAQUE ABLATION AND AUTOFLUORESCENCE SPECTROSCOPY IN VITRO USING AN EXCIMER LASER SYSTEM

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To reduce the risk of vessel perforation during angioplasty with a dye or a Ho:YAG laser, an additional He-Cd laser has already been applied to induce tissue fluorescence for spectroscopy. This *in vitro* study was performed to find out whether the ultraviolet emission of a single excimer laser would be appropriate to combine plaque ablation and autofluorescence excitation.

The beam of a XeCl excimer laser (308 nm) was coupled to a 600  $\mu$ m silica fiber through the central borehole of a concave mirror. Each laser pulse (14 - 28 mJ/mm<sup>2</sup>) ablated tissue and simultaneously induced autofluorescence whose light emanated retrogradely from the fiber and was collected by the concave mirror for spectroscopy (320 - 650 nm). Samples of human aorta were studied in air, saline, and blood. Two spectral scores (I, II) based on 3 intensity ratios varied within the following ranges for normal media (NM), lipid plaques (LP), and calcified plaques (CP):

	Air (I)	Saline (II)	Blood (II)
NM (n = 26)	2.6 - 7.9	7.9 - 16.4	7.1 - 11.9
LP (n = 26)	9.2 - 18.3	3.9 - 6.1	4.0 - 6.6
CP (n = 27)	20.3 - 36.6	4.5 - 8.2	15.9 - 61.7

As verified histologically, the spectra of NM, LP, and CP could clearly be differentiated qualitatively and quantitatively in air and in blood. Only the spectrum of CP proved to depend considerably on the surrounding medium. In saline, there was no clearcut spectroscopic difference between LP and CP, but NM and atherosclerotic material could still be well discriminated.

In conclusion, using a XeCl excimer laser for combined plaque ablation and tissue fluorescence excitation, spectroscopy can be performed *in vitro* without a second laser.