

The curves show increasing survival advantage over time consequent to early TIMI grade 3, (compared with all lesser grades) between 30 days (arrow) and 12 months. The one year mortality risk reduction for grade 3 flow is 54% (again vs TIMI grades 0, 1, & 2 combined) $p < 0.0001$. Notably the total fatality rate from 30 days to one year in the grade 3 group was only 1.4%. **Conclusion:** The enlarging cumulative survival advantage associated with early establishment of grade 3 flow has been shown (in a robust, prospectively followed population) to be progressive at least through one full post MI year.

ADULT CARDIOTHORACIC SURGERY

901-8 One-Year Follow-up of Patients Treated with Prolonged Low-dose of rt-PA for Refractory Unstable Angina

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We have previously shown an in-hospital beneficial effect of prolonged thrombolysis with rt-PA in patients with refractory unstable angina. The aim of this study was to assess whether the short term effect of this therapy is sustained after one year. The study population included 67 patients (pts) with unstable angina refractory to common antianginal therapy. Thirty-six pts (group A) were randomized to receive rt-PA (0.03 mg/kg/hour for 3 consecutive days) plus heparin (ACT 250-400 sec), and 31 pts to receive heparin (ACT 250-400 sec) plus placebo infusion. Both groups also received conventional therapy with nitrates, β -blockers and Calcium channel blockers. One pt of group A and 4 of group B (3% vs 13%, $p < 0.01$) developed acute myocardial infarction during hospitalisation. Eight pts of group B underwent coronary artery surgery because of persistence of symptoms during hospitalization. Group B pts more frequently shown recurrent angina (8% vs 19%, $p < 0.05$) and total ischemic burden >60 min/day on ambulatory ECG monitoring (8% vs 19%, $p < 0.05$). After a mean follow up of 14 ± 6 months 3 pts from group A and 7 pts from group B suffered an acute myocardial infarction (9% vs 30%, $p < 0.05$). Seven patients died for cardiac related causes (3 in group A and 4 in group B), 38 patients (20 in group A and 18 in group B, 57% vs 78.3%) underwent PTCA or CABG. Eight pts from group A and 1 patient from group B (23% vs 4% $p < 0.05$) remained angina free on medical therapy.

In conclusion, the benefits of prolonged low-dose of rt-PA for refractory unstable angina persist for at least one year.

901-9 QT Dispersion and Prognosis After Myocardial Infarction

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QT dispersion (QT max minus QT min) is an important measure of arrhythmia risk, providing information about heterogeneity of ventricular repolarisation. We studied QT dispersion for all cause mortality in patients from the placebo arm of a large therapeutic intervention trial in acute myocardial infarction. Standard 12 lead electrocardiograms (ECGs) were analysed from day 2 or 3 of the acute infarction; and if available, from a later period of life (more than 1 month post infarct). The only exclusions were patients with chronic atrial fibrillation or paced rhythm, or those with ECGs of too poor quality to be analysed. The ECGs were scanned, and the image divided into 12 files corresponding to the 12 leads of the standard ECG. Specially designed software then skeletonised and joined each file, which is then available for either user-interactive or automatic measurement of QT dispersion, again using specially designed software. The following results are all user interactive, and are rate and lead corrected (rate corrected QT max minus QT min divided by the square root of the number of leads with a measureable QT interval). For the group known to have deceased 163 patients had ECGs analysed during the early stage of acute myocardial infarction, and 53 had ECGs recorded later in life. 163 age and sex matched survivors in the same study have been analysed, of these 82 have had ECGs recorded later in life. Mean adjusted QT dispersion for the death group is 36.6 ms (SD 14.7), and for survivors 35.2 ms (SD 13.9), p -NS; for ECGs recorded on day 2 or 3 of acute myocardial infarction. ECGs recorded later in life have an adjusted QT dispersion of 31.2 ms (SD 13.9) for the deceased group, and for survivors of 24.5 ms (SD 9.5), $p < 0.01$. QT dispersion is prolonged in the early stages of acute myocardial infarction, and for long term survivors then falls towards more normal values. **Conclusions:** The failure of QT dispersion to normalise in patients who subsequently deceased is an important observation, and may provide insight into the causes of mortality in this group.

901-10 Demonstration of Blood Flow Through Transmyocardial Laser Channels

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Transmyocardial laser revascularization (TMR) is a new procedure under investigation for treatment of patients with myocardial ischemia who are unresponsive to other conventional therapies. In theory, TMR channels passing from the LV chamber directly into the myocardium allow oxygenated blood to directly perfuse the myocardium, bypassing the coronary vessels. However, experimental evidence that blood actually flows through the channels has not been available previously. Therefore, the purpose of this study was to test whether blood can reach the myocardium by passing through laser channels. An average of 28 channels/heart were made over the LAD distribution in 5 canine hearts using a pulsed holmium:YAG laser (20 pulses, 0.6J/pulse) with energy delivered from the endocardium through a 400 μ fiber optic cable introduced via the left atrial appendage. The heart was then excised while coronary perfusion pressure was maintained constant at 120 mmHg by retrograde aortic blood flow provided by a second dog (aortic valve always remains closed). The proximal LAD and epicardial collaterals were ligated. Collateral flow to the ischemic region, measured by colored microspheres injected into the coronary artery, was 20.5% of normal (0.42 ± 0.28 ml/g/min vs. 2.05 ± 0.68 ml/g/min in the non-ischemic region). Colored spheres were then injected into blood placed within the LV chamber to achieve peak LV pressure generation of 20 mmHg (low loading) and then 60 mmHg (high loading) (this blood is not ejected into the aorta). The number of spheres detected per gram of myocardium in the circumflex (LCX) region (control area without TMR channels) and in the LAD region with TMR channels are shown in the table as a function of LV loading:

Region	Low loading	High loading
LCX without channels	33.4 \pm 64.5	5.84 \pm 13.9
LAD with channels	290.8 \pm 249.8*	220.5 \pm 382.3*

* $P < 0.0001$ vs. control

The number of spheres in the channel region was significantly higher than in the control region but did not vary with loading conditions. These data provide direct evidence that blood from the LV can reach the myocardium through TMR channels in the acute setting. Quantification of the flow and whether this can be maintained in the chronic setting are important questions for future research.

901-11 Late Clinical and Echocardiographic Follow-up After Left Ventricular Endoaneurysmorrhaphy

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Infarct expansion and aneurysm (LVA) formation has a poor prognosis. Traditional techniques of LVA resection may be associated with suboptimal results, and do not fully restore LV geometry. LV endoaneurysmorrhaphy (LVEA) is a newer operative technique which utilizes an endocardial patch to exclude the aneurysm and normalize LV geometry. Late clinical and echocardiographic features of these patients (pts) is unknown. We prospectively followed 51 consecutive pts who had undergone LVEA. Average duration of follow-up (F/U) was 4.6 years (range 2-10 years). All pts had clinical evaluation and review of medical records.

Results: There were 2 (4%) peri-operative deaths, 2 (4%) in-hospital deaths, and 13 (24%) late deaths. Clinical improvement was noted in all 34 survivors:

NYHA Class	Pre-op		F/U		CCS Angina	Pre-op		F/U	
	n	(%)	n	(%)		n	(%)	n	(%)
I	5	(15)	21	(62)	I	12	(35)	29	(85)
II	9	(26)	8	(24)	II	3	(9)	5	(15)
III	13	(38)	4	(12)	III	5	(15)	0	
IV	7	(21)	1	(3)	IV	14	(41)	0	

30 surviving pts had F/U 2D echocardiograms (2DE). Near normal LV geometry was restored in all pts, and no patch aneurysms were noted at late F/U. 24/30 2DEs were adequate for quantitative analysis. The average LVEF post-op was 40.2% using the modified biplane analysis.

Conclusions: LV endoaneurysmorrhaphy was associated with a 72% overall survival after average 4.6 year F/U. All survivors had improvement in clinical status and normalization of LV geometry.