grids, and linepairs, overall image quality was evaluated by the following criteria: frequency of sensitometry strip and flat field density testing, optimal film density, tube to intensifier linearity, line pair resolution, pincushion distortion, automatic brightness control (% field Cover), film graininess (standard deviation of the mean 8-bit pixel density of the central portion of the MONAS phantom), and film contrast (ratio of the mean 8-bit pixel background density and the first MONAS phantom contrast ring).

N = 46	Median	Mean	Range
Sensitometry Strip/FFD (#/yr)	365/365	333/188	43–365/1–365
Optimal Density/Automatic Brightne	0.9/53	0.8/50	0.7–1.1/40–90
% linear Distortion: Low/High FOV	8.9/2	8.1/1.9	0–13/0–6.4
Resolution (lp/mm): Low/High FOV	1.8/2.5	1.8/2/6	1–2.2/1.6–3.1
% Pincushion Distortion: Low/High FC	14/2.4	14/2.7	6.4–24/0–7.7
Film Contrast/Graininess	23/3.3	22/3.5	5–38/1.1–7.3

FOV = Field of View, lp = line pair, FFD = Flat Field Density

Based on these findings, 5 laboratories were determined to produce cine-film images that were below research quality. *We conclude that* 1) marked variations exist in cinefilm processing quality assurance standards, image resolution, and overall film quality among different clinical sites, 2) 11% of the laboratories reviewed produced cinefilms whose quality was inadequate for research purposes, and 3) Angiographic Core Laboratory site reviews are an important component of the overall quality assurance program to reduce measurement variability in angiographic restenosis studies.

1003-26 Identification of "Plaque-Free" Reference Segments Using Standard Quantitative Angiography

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Assessment of lumen dimensions in the "normal" reference (Ref) segments before coronary intervention remains problematic using quantitative angiographic (QCA) techniques, due to the inherent inability of QCA to identify "plaque free" arterial segments. To identify which of several QCA methods "best" identifies and assesses lumen dimensions of "plaque-free" Ref segments, we reviewed the QCA and ultrasound (IVUS) findings before intervention in 150 pts undergoing DCA. IVUS Ref diameter was selected as the least diseased segment 10 mm proximal to lesion, but before side branches. Off-line QCA was performed using the CMS and ImageComm systems using user-defined (mean of smooth, 10 mm segments proximal and distal to the lesion), proximal, and interpolated (CMS only) Ref segment measurements

N = 150	QCA	IVUS	Pearson correlation	p value
CMS Reference, mm				
Interpolated	3.29 ± 0.50	3.56 ± 0.51	0.559	< 0.0001
Proximal	3.38 ± 0.50	3.56 ± 0.51	0.544	< 0.0001
User-Defined	3.27 ± 0.45	3.56 ± 0.51	0.596	< 0.0001
ImageComm Reference, mm				
Proximal	3.18 ± 0.47	3.56 ± 0.51	0.563	< 0.0001
User-Defined	3.08 ± 0.43	3.56 ± 0.51	0.611	< 0.0001

We conclude: Compared to IVUS, QCA underestimates Ref measurements, likely due to its inability to precisely localize "plaque-free" regions. IVUS and QCA Ref measurements are moderately correlated. User-defined Ref segments had the highest correlation with IVUS-determined "plaque-free" reference diameters.

1003-27 Angiographic Predictors of Myocardial Infarction: Independant Value of Stenosis Symmetry and Steep Outflow Angles

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Univariate analyses have found that stenosis severity, stenosis symmetry and steep outflow angles could characterize coronary lesions that will induce an acute occlusion (culprit). To test whether symmetry and outflow angles had a predictive value independant from the severity, we studied 37 patients (pts) (55 ± 9 y.o.; 82% male) who have had a myocardial infarction (MI) less than 12 months (m) after a first coronary angiography (angio), and no history of a prior revascularisation procedure. We compared, within each patient, the initial characteristics of the culprit lesions with the most severe of the remaining non thrombotic coronary lesions (control) in The MI was documented by a post-infarct angio to allow for the identification of the culprit. Lesions at first angio were defined as every 10 to 95% diameter stenosis and quantitatively analyzed (CMS software). Percent stenosis (PS), symmetry index (from 0 — totally excentric — to 1 — perfectly concentric), average outflow angle and maximal outflow angle were derived from the diameter function. The results are given with mean ± SD.

	Culprit (%)	Control (%)	Paired P
Percent stenosis	49.8 ± 13.9	49.8 ± 13.3	0.99
Symmetry index	0.69 ± 26	0.55 ± 29	0.04
Average Outflow angle	16.8 ± 11.98	11.5 ± 8.98	0.01
Maximal Outflow angle	30.3 ± 10.85	25.6 ± 9.18	0.01

Although stenosis severities (PS) between culprit and control were virtually identical, a more symmetric pattern as well as steeper average and maximal outflow angles were still significantly associated with a future thrombotic lesion in these non revascularized patients.

It is concluded that symmetry and outflow angles predict an acute occlusion independantly from stenosis severity. It suggests that stenosis geometry is strongly involved in the outcome of a given coronary lesion.

1003-28 Correlation Between Radiocontrast-Induced Urinary Urodilatin Excretion and Fractional Excretion of Sodium (FeNa) After Cardiac Angiography

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Urodilatin (URO) is a recently identified natriuretic peptide which differs from cardiodilatin/ANF by an N-terminal 4 aminoacid extension. URO is synthesized in the kidney and excreted in the urine. The natriuretic effect of exogenously administered URO has been well documented. Endogenous URO is thought to participate in extracellular volume regulation. We tested the hypothesis that the acute volume expansion following the administration of radiocontrast agents induces the release of URO into the urine and a parallel increase in the FeNa. Urinary creatinine, electrolytes and URO were measured in 15 patients immediately before and after coronary angiography and/or PTCA, such that each patient served as his/her own control. URO was measured by RIA using a specific antibody that does not cross-react with cardiodilatin/ANP. The serum creatinine concentration of the patients ranged from 0.7 to 1.8 mg/dL. Most patients underwent left ventriculography with 55 ml of the ionic, hyperosmolar radiocontrast agent diatrizoate and a mean of 234 ml of the non-ionic, low-osmolar dye iopamidol during subsequent coronary angiography/PTCA. The urinary URO/creatinine ratio increased significantly ($p < 0.05$) from 1.1 ± 0.5 to 3.6 ± 0.7 (x ± SEM; n = 15) after angiography with a parallel significant increase in the FeNa from 0.6 ± 0.3 to 2.2 ± 1.3%.

The results demonstrate an increased urinary URO excretion and a natriuresis in response to radiocontrast in patients after cardiac angiography. This is consistent with a functional role of URO as an endogenous renal natriuretic peptide counteracting acute extracellular volume increases and may have clinical implications in the context of radiocontrast-associated acute renal failure.

1004 Myocardial Perfusion Imaging/Post Myocardial Infarction

Wednesday, March 27, 1996, 9:00 a.m.–11:00 a.m.
Orange County Convention Center, Hall E
Presentation Hour: 10:00 a.m.–11:00 a.m.

1004-29 Comparative Value of Redistribution and Reinjection Thallium-201 Imaging for the Prediction of Cardiac Events Following Myocardial Infarction

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Previous studies have demonstrated the value of thallium perfusion imaging for the prediction of cardiac events following myocardial infarction (MI). In recent years, thallium reinjection (RE) imaging has been advocated in order to enhance the detection of ischemic, viable myocardium. However, the value of this supplemental information for predicting cardiac events is unknown. Accordingly, we studied 72 pts following MI who underwent stress/redistribution (RD) and RE thallium scintigraphy. Follow-up information was obtained by telephone contact and chart review, with a mean follow-up duration of 33 ± 9 months. Studies were read by an observer blinded to the clinical data. Studies were scored semi-quantitatively on a 0–4 scale using a 20 segment