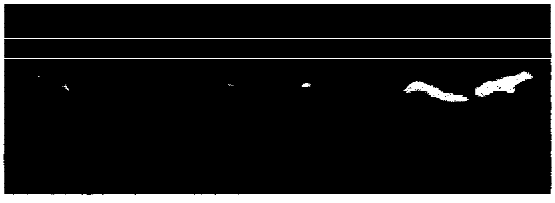
4:30 p.m.

866-3 **Computer Vision in Echocardiography: Observer-Independent, Autonomous Echo Analysis Using Wavelet Footprints**

Christian H. Jansen, Muthuvel Arigovindan, Michael Sühling, Michael Unser, Stephan Marsch, Patrick Hunziker, University Hospital of Basel, Basel, Switzerland, Swiss Federal Institute of Technology, Lausanne, Switzerland

Background: Echocardiography is largely subjective with high observer dependence. Computer-assisted echo image analysis is demanding because of strong noise, absence of continuous boundaries and lack of constant intensities within objects.
Method: Multidimensional multiscale wavelet analysis produces highly specific "footprints" from heart structures. We exploited this fact to create an automatic analysis environment that is based on shape and motion specific wavelet footprints of individual heart structures. To test the feasibility of user-independent analysis, we applied the system for identification of the mitral valve autonomously in 182 echo loops. Gold standard for mitral valve location in the echo sequences was an experienced echocardiographer.
Results: Autonomous analysis was successful in 165 of 182 ultrasound sequences corresponding to 91% accuracy. The use of multidimensional multiscale footprints led to strong enhancement of the predefined structure (mitral valve, middle image) and significantly suppressed noise and non-related cardiac structures as shown in pixel statistics of the mitral valve region versus non related image parts ($p < 0.05$), yielding reliable automatic valve delineation (right image).
Conclusion: Computer vision technology is applicable to clinical echo and allows observer-independent, automatic analysis of predefined cardiac structures, transforming the subjective and qualitative art of echo into a objective and quantitative science.



4:45 p.m.

866-4 **Divx Compression Allows Medically Lossless Intranet or Internet Exchange of Coronary Angiograms**

Patrick Henry, Isaac Azancot, Lariboisiere, Paris, France

Background: Coronary Angiograms (CA), even compressed, cannot be actually reasonably sent via Internet networks due to their very large size. The aim of this study was to assess if DivX compression can generate medically lossless dynamic sequences, and could permit the exchange of dynamic CA.
Methods: We compared 30 random runs from 15 different CA/PTCAs by 13 independent blinded cardiologists. Two different DivX compression rates were analysed: the standard compression (StDivX) and an optimised compression (OpDivX) adapted for CA. For each run, the non compressed file (NCF) and each corresponding divX compressed file were simultaneously and randomly displayed on 2 identical monitors using the same video player. For each run the following score was given - 0: no visual difference - 1: one screen aesthetically better - 2: small differences not clinically relevant - 3: differences eventually leading to misinterpretation - 4: major differences certainly leading to misinterpretation. **Results**: Compared to the non compressed files DivX compressions induced a huge decrease in the file size of each run (mean size in MB: NCF: 55.2 - StDivX: 0.8 - OpDivX: 1.1). Table shows that the repartition of the scores between the corresponding 390 NCF and DivX compressed video dynamic sequences was mainly 0 or 1 score with no 3 or 4 score for OpDivX. **Conclusion**: OpDivX compression is associated with a huge decrease in file size allowing Intranet/Internet based video communication, while providing medically lossless information.

	DivX Better					NCF Better				
	4	3	2	1	0	1	2	3	4
Standard DivX	0%	0%	1%	7%	34%	44%	13%	1%	0%
Optimized DivX	0%	0%	0%	10%	57%	31%	2%	0%	0%

Special Topics

ORAL CONTRIBUTIONS

871 Coronary Revascularization: Ongoing Issues and Outcomes

Wednesday, April 02, 2003, 8:30 a.m.-10:00 a.m.
McCormick Place, Room S401

8:30 a.m.

871-1 **Modeling the Impact of Patient and Lesion Characteristics on the Cost-Effectiveness of Drug-Eluting Stents**

Dan Greenberg, Ameet Bakhai, Nancy E. Neil, Ronna H. Berezin, Kalon K. Ho, Donald E. Cutlip, Richard E. Kuntz, David J. Cohen, Harvard Clinical Research Institute, Boston, MA, Beth Israel-Deaconess Medical Center, Boston, MA

Drug-eluting stents (DES) are a promising technology for reducing restenosis after PCI. However, the cost-effectiveness (C/E) of these devices is unknown. **Methods** We used a decision-analytic model to project 2-year costs and outcomes for patients undergoing single-vessel PCI, by either conventional stenting (CS) or DES. Angiographic restenosis rates with CS were estimated using a previously validated logistic regression model. Costs were assessed from a societal perspective. We assumed that 60% of patients with angiographic restenosis would require clinically driven target vessel revascularization and that DES would reduce restenosis rates by 90% at an incremental cost of $2,000/stent. **Results**. C/E ratios were calculated as cost per repeat revascularization (RepRev) avoided and are displayed below (see Table). Compared with CS, DES was projected to have a C/E ratio < $10,000 per RepRev avoided (similar to other accepted PCI techniques) for patients with reference vessel diameters ≤3.0 mm and either lesion lengths ≥15 mm or diabetes. DES was less attractive for patients with focal lesions in larger vessels (C/E ratio > $20,000 per RepRev avoided). **Conclusions**. At an incremental cost of $2,000 per stent, DES appears to be cost-effective for a large segment of patients undergoing single vessel PCI. Lower incremental costs would render this technology cost saving for a wider target population.

C/E ratio ($ per repeat revascularization avoided) for diabetic and non-diabetic patients

	Lesion Length (mm)				
Diabetic Patients					
Vessel diameter (mm)	**10**	**15**	**20**	**25**	**30**
2.5	Cost-saving	Cost-saving	Cost-saving	Cost-saving	Cost-saving
3.0	3,748	1,320	Cost-saving	Cost-saving	Cost-saving
3.5	14,462	11,470	9,018	5,237	2,454
4.0	38,328	29,387	22,996	18,198	11,470
Non-Diabetic Patients					
2.5	1,320	Cost-saving	Cost-saving	Cost-saving	Cost-saving
3.0	11,470	9,018	5,237	2,454	316
3.5	29,387	22,996	18,198	11,470	9,018
4.0	51,730	51,730	38,328	29,387	22,996

8:45 a.m.

871-2 **Safety of an Early Discharge Strategy Following Primary Intervention With Adjunctive Glycoprotein IIb/IIIa Inhibition: The CADILLAC Trial**

David E. Kandzari, James E. Tcheng, Cindy L. Grines, David J. Cohen, Ameet Bakhai, David A. Cox, Thomas D. Stuckey, Mark Effron, John J. Griffin, Mark Turco, John D. Carroll, Martin Fahy, Roxana Mehran, Gregg W. Stone, Duke Clinical Research Institute, Durham, NC, Cardiovascular Research Foundation, New York, NY

Background- Early hospital discharge (D/C) following primary percutaneous coronary intervention (PCI) for acute myocardial infarction (AMI) may be limited by early in-hospital complications. Glycoprotein IIb/IIIa inhibitors, by reducing early recurrent ischemia, may facilitate early D/C and reduce hospital costs.
Methods- The CADILLAC trial randomized 2,082 patients (pts) with AMI to 1 of 4 reperfusion strategies in a 2x2 factorial design: (1) PTCA (2) PTCA with abciximab (abcx), (3) stent implantation or (4) stenting with abcx. In pts randomized to abcx post procedural heparin was withheld, and D/C was scheduled on post MI day 2 (low-risk patients) or 3 (high-risk patients) if clinically stable. Patients not receiving abcx were discharged at the treating physician's discretion. Early clinical outcomes and safety endpoints within 7 days following the index procedure were compared relative to treatment assignment and timing of D/C.
Results- Within the first 72 hours after primary PCI, abcx was associated with significant