* = significant differences to the control group, # = significant differences to the HTN group

| | pVEL (cm/s) | pSR (1/s) | WTed (mm) | LVEDD (mm) | EF (%) |
|---|---|---|---|---|---|
| Controls | 5±0.9 | 4±0.7 | 8.6±1.1 | 41±3 | |
| HTN | 3.5±1.2 * | 2.6±0.6 * | 12.7±1.6 * | 43±5.5 | 70±8 |
| AOS | 3.3±1 * | 1.6±0.6 *# | 12.9±2 * | 48±6.4 * | 61±14 |

Noon

1001-38 **Molecular Imaging of Human Thrombus With Computed Tomography**

Patrick M. Winter, Himanshu P. Shukla, Shelton D. Caruthers, Ralph W. Fuhrhop, Michael J. Scott, Patrick J. Gaffney, Samuel A. Wickline, Gregory M. Lanza, Washington University, St. Louis, MO

**Background**

Recognition of early atherosclerotic plaque disruption, heralded by mural microthrombus formation, could trigger early intervention and prophylaxis against myocardial infarction or stroke. Although fast, multi-slice CT is emerging as a high-resolution modality for angiographic detection of coronary stenosis, it lacks the sensitivity to resolve subtle mural disease. In this study, we report the first targeted CT contrast agent for sensitive detection of thrombus.

**Methods**

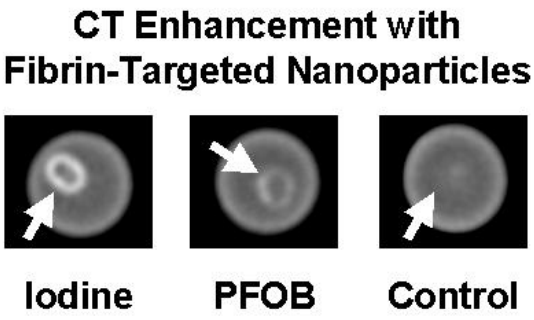
Fibrin-targeted nanoparticles incorporating iodinated, fluorocarbon (PFOB), or safflower oil were imaged and characterized over a spectrum of clinically relevant CT parameters (resolution, tube voltage and current) alone and targeted to human plasma clots via anti-fibrin monoclonal antibodies.

**Results**

Both in suspension and targeted to fibrin clots, iodinated nanoparticles provided the highest x-ray attenuation regardless of resolution, tube voltage or current (Figure). Iodinated nanoparticles provided higher CNR (26 ± 3) compared to fluorocarbon nanoparticles (8 ± 1).

**Conclusions**

Fibrin-targeted, iodinated nanoparticles are the first molecular imaging agent designed to augment the noninvasive diagnosis of coronary disease with CT. Given the speed and resolution of CT angiography, the addition of sensitive early detection, localization and characterization of unstable plaque could help propel CT into a state-of-the-art initial approach for patients presenting with positive stress tests.




Noon

1001-39 **DOCS 2004, Online Cardiology Staff Scheduling Using Monte-Carlo Simulation**

Dave Denes, Marie Oatman, Dan Phifer, Melvin Mudgett-Price, Don Scipione, Tom Betlach, John Elkins, Acme Express, Inc., Cleveland, OH

Staff scheduling is an arduous, time consuming, and thankless job. The scheduler must assign staff according to very complex work requirements; apply intricate rotation rules; satisfy on and off requests; ensure that proper expertise is available; and equitably distribute the burden of premium day-types such as holidays and weekends.

Doctors on Call Schedule (DOCS) assigns staff by using an accounting framework combined with a Monte-Carlo optimization technique that shuffles staff within the schedule. A ledger of accounts is created with an account for each staff/assignment/day-type combination. Each account is debited according to work required and is credited for work assigned. The account balance quantifies the work owed by staff to each assignment for each day-type.

The scheduling of staff is driven by the account balance: staff who owe the most are most likely to be scheduled, staff who owe the least are least likely to be scheduled, and staff who owe an equal amount are equally likely to be scheduled. For each schedule cell (assignment and day) the software simulates a "wheel of fortune." Staff occupy an area on the wheel proportional to their account balance (work owed). Those owing a lot have a large area while those who worked in excess have a small sliver. DOCS determines who is assigned to the schedule cell by spinning the wheel.

The software fills the entire schedule and then enters an optimization mode that shifts staff in order to make the schedule more equitable. Using this Monte-Carlo simulation, an accurate, optimum and equitable schedule is found in a matter of minutes. Schedulers report a savings of up to 80% in time spent making the staff schedule.

DOCS 2004 is an online implementation of this simulation that is currently scheduling 100 medical groups, both large and small. The scheduler can operate DOCS 2004 from work, home or wherever. Schedule changes are available to others in real time and selected assignments may be viewed from the hospital intranet. The development of DOCS 2004 was funded by a Small Business Innovation Research (SBIR) grant from the National Institutes of Health National Center for Research Resources.

Noon

1001-40 **Cardiac Catheterization Simulator**

Syed T. Zaidi, Aurora Sinai Medical Center, milwaukee, WI

**BACKGROUND:**

Cath. Lab simulator is a computer-based software game designed to simulate real time intervention cardiology experience. It is designed as a teaching tool to increase the level of knowledge, problem solving and catheterization skills of intervention cardiology student. Increasing the knowledge and skill in this area will lead to better patient safety and out come in the catheterization laboratory.

**METHODS AND RESULTS:**

The game may start in the emergency room setting where the patient presents with acute myocardial infarction or as an outpatient with a positive stress test. Relevant history, physical exam, labs, and EKGs are displayed.

The game allows a full visual display of the cardiac cath lab. The player has an option to move the cursor (or imaginary hand) in the cath room and pick different types and sizes of guide wires, sheaths, angioplasty balloons or stents needed for a specific patient. The item is picked up by a single click and dropped by a double click.

The player starts cardiac cath by pointing appropriate sized needle for arterial puncture towards either left or right groin. Lifetime guide wire, balloon and stent catheter manipulation experience is provided by using Cardio stick. It is a specialized joystick with wires and catheters which can be manipulated as in real life. Turning and pushing the wires and catheters on Cardio stick will advance those on fluoroscopic display.

Balloon inflation for angioplasty and stent deployment can be done by pressing specific function buttons on the tool bar menu located in the lower panel of the screen.

The game also allows the player to recognize various problems and complications arising in the cardiac catheterization lab and to address them promptly. These include pressure damping on engaging left system if critical left main artery stenosis is present, coronary artery dissections, hypotension or arrhythmias etc. If not promptly addressed , these situations can lead to lethal complications.

The game scores the player on three aspects: Technical, clinical decision making and problem solving.

**Conclusion:** A fun and entertaining way to learn Cardiac Cath Skills and Knowledge.

FEATURED POSTER

1059

## Monday Featured Poster Presentations

Monday, March 08, 2004, 9:00 a.m.-5:00 p.m.
Morial Convention Center, Hall G
Presentation Hour: Noon-1:00 p.m.

Noon

1059-1 **Excessive Ventilation During Cardiopulmonary Resuscitation Decreases Survival Rates in a Porcine Model of Cardiac Arrest**

Gardar Sigurdsson, Demetris Yannopoulos, Scott McKnite, Ronald Pirrallo, Tom Aufderheide, Keith G. Lurie, University of Minnesota, Minneapolis, MN

Background: Recent data suggests that chest compressions but not active rescuer ventilation are essential for circulation and survival in the first several minutes after starting cardiopulmonary resuscitation (CPR). Yet many still believe that immediate ventilation is critical for survival. A recent study we performed with professional rescuers demonstrated that the average ventilation rate for out-of-hospital cardiac arrest was 30 breaths/min (range 15-48), despite training using American Heart Association guidelines that recommend 12-15 breaths/min during CPR. We hypothesized that rapid ventilation rates increase intrathoracic pressures, impede venous return to the heart, and thus decrease coronary perfusion and survival rates.

Methods and Results: Part one of the study was performed with 9 pigs (weight 24-32.8 kg). After 6 minutes of untreated ventricular fibrillation (VF) chest compressions were performed continuously at 100/min with synchronous 5:1 positive pressure ventilation for 2 minutes and then three successive 2-minute periods of asynchronous 12, 20 or 30 breaths/min in random order. With 12, 20 and 30 breaths/min, the coronary perfusion pressures (mmHg) were 23.4±1.0, 19.5±1.8 and 16.9±1.8 respectively (p=0.03) and mean intrathoracic pressures (mmHg/min) were 7.1±0.7, 11.6 ±0.7 and 17.5±1.0 respectively (P<0.0001). Part two of the study was performed with 21 pigs (weight 25-37.2 kg). After 6 minutes of untreated VF compressions were started at 100/min with synchronous 5:1 positive pressure ventilation for 2 minutes and then randomized to 4 minutes of three different ventilation methods: 1) 12 breaths/min - 100% O2, 2) 30 breaths/min - 100% O2, or 3) 30 breaths/min with 5% CO2 and 95% O2 (+CO2). The 1 hour survival rates with < 3 biphasic shocks were 6/7, 1/7 and 1/7 with 12,