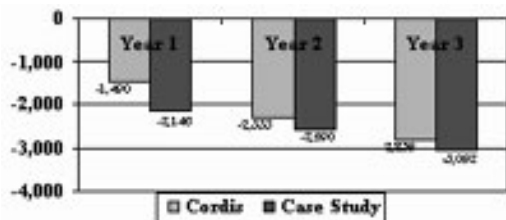procedures that use DES.

Figure 1: Predicted contribution margin reduction at a case study hospital (in 000s)

1040-75   **Population Rates of Invasive Cardiac Procedures in British Columbia, 1995-2001**

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Background: This audit examined the age-sex standardized population rates of coronary angiography (CA), percutaneous intervention (PCI) and coronary artery bypass surgery (CABG) in British Columbia (BC) between 1995 and 2001.
Methods: Data sources were as follows: CABG-BC Cardiac Registry, CA and PCI- BC Medical Services Plan, Acute Coronary Syndromes (ACS, ICD9 codes 410,411,413)-Hospital Separation database,population data-BC Statistics. All rates are age and sex standardized per 100,000 BC resident adults over 20 years.
Results: The rates of diagnostic CA and PCI have increased from 352 and 101 per 100,000 in 1995 to 400 and 154 per 100,000 respectively in 2001 (p<0.01). Single stage 'ad hoc' PCI increased from 38% in 1995 to 68% in 2001. The stenting rate increased dramatically from 25% of PCI procedures in 1995 to 90% in 2001 (p<0.01). The rate of CABG remained stable at between 70-79 per 100,000. There was a downward trend in the annual hospitalized incidence of ACS (477 to 430, p=0.04). The incidence of ACS and the rates of CA, PCI and CABG were higher for men in all age groups. PCI was more common than CABG in all groups.
Conclusion: The incidence of ACS in British Columbia is falling. The rates of SCA and PCI are increasing. This may reflect an appropriate evidence-based response to data supporting greater application of coronary angiography following acute coronary syndromes after publication of several studies supporting a routine invasive approach.
Table:

Age-sex standardized rates per 100,000 BC residents

	1995	1996	1997	1998	1999	2000	2001
Acute Coronary Syndromes	477	484	434	442	440	430	
Coronary Angiography	352	354	352	356	368	393	400
Percutaneous Coronary Intervention	101	108	113	122	131	144	154
Coronary Artery Bypass Grafting	73	75	76	79	77	75	70

1040-76   **30-Day Mortality Trends Following Acute Myocardial Infarction in the Elderly**

Judith H. Lichtman, Yun Wang, Sharon-Lise Normand, Rhuna Shen, Lawrence M. Brass, Harlan M. Krumholz, Yale University School of Medicine, New Haven, CT

Background. Despite numerous innovations in prevention, diagnosis and treatment of acute myocardial infarction (AMI), relatively little is known about how these changes have modified short-term mortality outcomes over time, especially for elderly patients. Current estimates have generally been derived from small geographic areas, or voluntary registries that may not be generalizable beyond participating locations or institutions. We sought to examine national 30- day mortality trends following an AMI among elderly Medicare beneficiaries (benes).
Methods. All fee-for-service (FFS) Medicare benes 65 years of age or older, discharged with an AMI (ICD-9 410.xx) from 1993-1999 were included in the study. AMI patients discharged from non-acute facilities, transfers, repeat admissions within 8 weeks, or those with less than 12 months of continuous FFS status were excluded. Risk adjustment variables included demographics, and comorbidities and cardiac procedures identified from hospitalizations within the prior year. Observed and expected 30-day mortality rates were calculated for age (65-74, 75-84, 85+) and gender subgroups. Logistic regression models compared annual mortality rates relative to 1993, with adjustment for demographic and clinical factors.
Results. There were a total of 1,814,196 AMI discharges from 1993-1999. Annual unadjusted mortality rates remained stable over time (range of 19-20%), despite trends of increasing comorbidities, cardiac procedures, and advancing mean age of the AMI benes over the time period. Women had a modest decline in mortality within all age groups, but rates for men remained relatively stable, with a slight increase for men 85+ years of age. Risk adjusted annual mortality rates remained essentially unchanged over time (OR 1.01, 95% CI 1.00-1.03; 1.03, 1.01-1.04; 1.01, 0.99-1.02; 0.99, 0.97-1.00; 0.98, 0.97-1.00; and 1.01; 1.00-1.03).

Conclusions. Despite minor decreases in mortality for women within all age groups, the absolute decreases in mortality rates are negligible. It is unclear whether the static rates signal limitations of current therapeutic options, the increasing complexity of AMI patients, or a combination of these factors.

POSTER SESSION

1058   Medical Simulation: Tools for Learning on the Horizon

Sunday, March 07, 2004, 3:00 p.m.-5:00 p.m.
Morial Convention Center, Hall G
Presentation Hour: 4:00 p.m.-5:00 p.m.

1058-67   **Durability of Bioprosthetic Aortic Valves: What Is the Re-Operation Risk for My Patients?**

John Puvimanasinghe, Johanna Takkenberg, Marinus Eijkemans, Ewout Steyerberg, Lex van Herwerden, Eric Jamieson, Gary Grunkemeier, Dik Habbema, Ad Bogers, Erasmus Medical Center, Rotterdam, The Netherlands, Providence Health System, Portland, OR

Background: A drawback to the choice of bioprostheses for aortic valve replacement (AVR) is their limited durability and resultant need for re-operation. The purpose of this study was to quantify and compare structural valvular deterioration (SVD), re-operation-free life expectancy and the lifetime risk of re-operation after aortic valve replacement with three widely used bioprostheses respectively.
Methods: We used long-term follow-up data on Carpentier-Edwards standard porcine (CE-S), Carpentier-Edwards bovine pericardial (CE-P) and Carpentier-Edwards supra-annular porcine (CE-SA) bioprostheses to generate age-dependent Weibull curves to describe SVD. These curves were used to calculate the median time to SVD at different patient ages of implantation. We also conducted a meta-analysis of the literature (CE-S – 3,161 patients and 22,326 patient-years; CE-P – 2,685 patients and 12,250 patient-years; CE-SA – 3,796 patients and 20,127 patient-years) to estimate the hazards of other valve-related events. The results of the Weibull analysis and meta-analysis were used to parameterize a micro-simulation model, which calculated the re-operation-free life expectancy and lifetime risk of SVD in these patients.
Results: For example, for a 65-year-old male, median time to SVD was 15.3, 20.1 and 22.2 years for the CE-S, CE-P and CE-SA valves. Re-operation-free life expectancy was 9.3, 9.9 and 10.1 years and the lifetime risk of re-operation due to SVD was 31%, 17% and 14% respectively. For a 70-year-old male, this lifetime risk of re-operation due to SVD was 20%, 10% and 8% respectively.
Conclusions: Estimates of SVD in the second-generation pericardial and supra-annular bioprostheses are comparable and provide an advantage over the first-generation standard valve. Both second-generation bioprostheses offer a low lifetime risk of re-operation for elderly patients requiring aortic valve replacement. Microsimulation provides detailed insight into the prognosis after AVR and assists in the choice of a valve for a given patient.

1058-68   **A Virtual Heart Model for Image Orientation and Teaching Three-Dimensional Echocardiography**

Nico Bruining, Gernoth Grunst, Thomas Berlage, Bernhard Mumm, Johannes Waldinger, Jos R. Roelandt, Erasmus MC, Rotterdam, The Netherlands, GMD, Sankt_Augustin, Germany

The interest and clinical applications of three-dimensional echocardiography (3DE) is rapidly growing. While initially used as a research tool, real-time 3DE is currently implemented in state-of-the-art ultrasound consoles. However, most echocardiographers are familiar with two-dimensional imaging and real-time 3D volume rendered images of cardiac pathologies often pose difficulties in understanding both the origin and orientation of the reconstructed tomographic views used for analysis. This phenomenon is referred to as "lost in space". We developed a virtual reality heart (VR) model and a demonstrator, which can be linked to 3DE data sets, using three specific anatomical landmarks, providing spatial information and the geometric position of the heart within the 3DE data. The demonstrator, which consists out of a dummy thorax, a space locator system and a database that can be filled with 3DE data sets of cardiac pathologies, is used for virtual echocardiographic patient examinations (fig.).We examined the usefulness of the VR heart model integrated in commercially available 3D reconstruction and analytic software (TomTec, Munich, Germany) in 61 3DE data sets obtained in 58 patients (24 transesophageal and 37 transthoracic examinations). In 70.3% of the cases the VR heart model was linked to the 3DE data sets and successfully implemented in 3D reconstruction software