1018-53 Pravastatin Prevents Restenosis After PTCA of High Grade Stenotic Lesions — Results of SHIPS (SHIga Pravastatin Study)

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The Shiga Pravastatin Study (SHIPS) is a 5 center randomized, double blind placebo controlled trial to test whether pravastatin, 10 mg twice daily begun at least 10 days prior to elective PTCA in patients with total cholesterol (T-Chol) hess than 280 mg/dl can decrease restenosis. The endpoint is a between group comparison of frequency of restenosis defined as a more than 50% loss of gain at PTCA site at 3 months follow-up by automated quantitative coronary arteriography. 179 lesions (85 pravastatin, 94 placebo) in 124 patients (62 pravastatin, 62 placebo) were randomized. The two groups were comparable for baseline clinical and angiographic characteristics. T-Chol decreased from 204 to 172 mg/dl in pravastatin group ($P < 0.001$), but not in placebo (201 vs 202 mg/dl). Although restenosis rate was not different in the two groups (29.4% in pravastatin vs 39.4% in placebo, $P = 0.16$) as a whole, it was reduced to about 1/5 (8.8%) in pravastatin group compared to 44.8% in placebo ($P = 0.0011$) when the analysis was restricted to high grade lesions (≥75% diameter stenosis by automated analysis, which is equivalent to ≥90% stenosis by visual analysis; 34 lesions in pravastatin, 29 lesions in placebo). The effect of pravastatin in prevention of restenosis in high grade lesions was equally seen both in the groups with baseline T-Chol of above (10.5 vs 45.5%, $P = 0.029$) and below 200 mg/dl (6.7 vs 44.4%, $P = 0.015$).

Conclusion: Pravastatin prevents restenosis after PTCA of high grade lesions irrespective of baseline T-Chol level.

1019 Cardiac Surgery

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Presentation Hour: 4:00 p.m.–5:00 p.m.

1019-23 Use of a Cost Outcome Risk Score to Simultaneously Stratify Mortality, Morbidity, and Cost Outcomes for Cardiac Valve Patients

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To investigate whether risks in postoperative outcomes (mortality, morbidity and costs [not charges]) can be simultaneously stratified preoperatively, data were reviewed for 551 consecutive patients who underwent valve surgery. Patient age 64.0 (±15.4) years and 43.4% females. There were 279 (50.6%) aortic valve procedures, 177 (32.1%) mitral valve procedures, 7 (1.3%) tricuspid valve procedures, 88 (16.0%) combined valve procedures, and 158 (28.7%) valve plus coronary procedures. The average total hospital stay was 13.7 (±14) days and postoperative stay was 11.0 (±12.6) days. To develop a cost outcome risk score, multivariate analysis of hospital costs via the Cox proportional hazards model was applied. This model adjusts for patient's death, patients's health status at discharge and is not distorted by cost outliers. Patient age, gender, body surface area, body mass index, surgeon case-volume, procedural urgency, preoperative ejection fraction, history of diabetes, infective endocarditis, pulmonary hypertension, history of CABG, prior MI, and type of procedures were incorporated.

Score	N	Hospital† Costs ($)	Hosp. Total† Mortality	Hosp. Cardiac† Mortality	Hospital† Morbidity
2–6.9	72	15,571	0.00	0.00	2.78
7–11.9	137	18,414	2.92	0.73	13.14
12–17.9	120	23,040	4.17	2.50	20.00
18–27.9	97	27,906	10.31	5.15	31.96
≥ 28	125	41,605	22.40	10.40	52.80
ALL	551	25,982	8.53	3.99	25.59

†$p < 0.001$ for testing differences among risk groups. Hospital costs = hospital adjusted direct costs

Conclusions: 1) When patients are stratified for hospital costs by preoperative risk factors, the same scoring system accurately predicts mortality and morbidity outcomes. 2) Using this analysis framework, with agreed upon preoperative risk factors, cost efficiency as well as other outcomes can be compared across programs, physicians, and geographic regions.

1019-24 Atrial Fibrillation is Strongly Associated with Prolonged Hospital Stay After Open Heart Surgery Even After Correcting for Common Predictors of Morbidity

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Atrial fibrillation (AF) has been shown to be associated with prolonged hospital stay after open heart surgery. It has been difficult to establish whether AF is causally related to prolonged hospitalization or is simply a marker for more complicated patients. We identified 110 patients in sinus rhythm off antiarrhythmic medications prior to open heart surgery who developed at least 6 hours of AF after surgery and compared them to 96 randomly selected controls who did not develop AF.

Results: Patients that developed AF had a longer mean hospital stay after open heart surgery than did patients without postoperative AF (11.7 ± 8.1 vs. 7.2 ± 4.4 days, $p < 0.0001$, 95% CI 2.7 – 6.3 days). Only 15 patients (14%) had AF identified as the sole reason for extending their hospitalization at least one full day (2.5 ± 1.6 days per patient). Nevertheless, after controlling for history of congestive heart failure, myocardial infarction, or diabetes, age, ejection fraction, sex, the type of surgery performed, and bypass pump time, AF remained a highly significant ($p < 0.0001$) predictor of the duration of hospitalization after surgery.

Conclusion: The specific treatment of AF alone probably accounts for only a small portion of the prolonged hospitalization associated with new AF after open heart surgery. Despite this finding, the significantly prolonged hospitalizations of patients that develop AF and the powerful predictive value of AF for explaining prolonged hospital stay even after correcting for other clinical variables suggests that AF is not simply a marker for more complicated patients but in a causal manner contributes to prolonged hospitalization. Effective prevention and treatment of AF should significantly shorten the mean duration of hospitalization after open heart surgery.

1019-25 A Comparison of Preoperative Risk Factors for Early and Late Hospital Death in Cardiac Surgeries

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Influence of preoperative risk factors on hospital mortality in cardiac surgeries has been investigated, but no one has identified differences in risk factors on early (postop day ≤ 2) and late death (postop day ≥ 3). To explore proper preventive strategies for each death, data were reviewed in 4351 adult patients who underwent cardiac surgery between 1/1/90 and 6/30/94. There were 93 (2.14%) early deaths and 171 (4.02%) late deaths in this series. Patients who died are older (early: 67.8 vs. 64.2, $p = 0.002$; late: 71.1 vs. 63.9, $p < 0.001$). Proportion of females is higher in late deaths (41.5% vs. 29.7%, $p = 0.001$), but not in early deaths (32.3% vs. 30.2%, $p = 0.6$). The early and late mortality are 1.65% and 2.78% for isolated CABGs (n = 3037), 1.82% and 4.0% for isolated valves (n = 713), 3.79% and 9.61% for CABG + valve (n = 422), 7.82% and 12.73% for others (n = 179). To adjust influence of preoperative risk factors on each type of death, stepwise logistic regression was applied.

Early Death			Late Death		
Risk Factor	Odds Ratio	p	Risk Factor	Odds Ratio	p
Cardiac arrest	5.98	<0.001	Cardiogenic shock	6.93	<0.001
Refuse blood	5.84	<0.001	Renal disease	5.50	<0.001
Age ≥ 85 years	5.01	0.008	CV disease	4.08	<0.001
Emergency	3.67	<0.001	MI <30 days	3.36	0.004
Re-operation	2.85	<0.001	Cardiac arrest	3.31	<0.001
Rheumatic dis.	2.79	0.001	Respiratory dis.	3.19	<0.001
Preop EF <35%	2.71	<0.001	Liver disease	3.04	0.051
Hypotension	2.26	0.009	Age ≥ 75 years	2.80	<0.001
MI < 10 days	2.10	0.005	Rheumatic dis.	2.19	0.002
IABP support	1.92	0.042	Emergency	1.56	0.035
Age 65–84 years	1.77	0.017	Heart Failure	1.48	0.050
			Diabetes	1.47	0.055
			Chronic Isch. HD	0.37	<0.001

Conclusions: (1) Acute cardiac factors dominate early mortality. (2) Chronic organ system function is more important in late deaths than in early deaths. (3) Risk adjusted mortality does not differ significantly in genders.