OBJECTIVES: The study aimed at performing an economic analysis in an American setting of the use of trandolapril in postinfarction patients with left ventricular dysfunction, based on the TRACE trial’s individual data. METHODS: The TRACE study was a prospective placebo-controlled clinical trial designed to determine the long-term effect of trandolapril in postinfarction patients with left ventricular dysfunction. From 1992 to 1995, 1749 patients were followed. Our analysis was differential and was conducted from a Payer and a Medicare Perspective in an American setting. Unit costs were attached to uses of resources. Mean costs per Diagnosis Related Groups (DRGs) enabled to value hospital stays for cardiovascular events. Costs of treatments were obtained by multiplying the duration of exposure by daily tariffs. The cost analysis included a longitudinal analysis and multivariate regressions to identify cost drivers. The CE analysis consisted in the estimation of the additional cost per life-saved of treating patients with trandolapril. Uncertainty surrounding the estimate of the CE ratio was taken into account through a bootstrap analysis. RESULTS: The mean costs of treatment with trandolapril reached US$550 in the Payer Perspective. It was over compensated by financial savings in hospitalisations (US$–1308). The total medical cost was lower (not significantly) in the trandolapril arm, with US$9607 versus US$9953. There was a trend towards an increase in the cost differential in favor of trandolapril on the long run. Main cost drivers were diabetes (OR: 1.88; 95% CI: 1.4,2.5) and nitrate use (OR: 1.67; 95% CI: 1.3,2.1) at inclusion. Among 5000 resamples of cost and mortality differentials, trandolapril was respectively cost-effective and cost-saving in 33.3% and 66.7% of the cases. The CE analysis provided similar results in the Medicare perspective. CONCLUSIONS: These results obtained in an American setting could be considered as highly cost effective.

IMPACT OF ANEMIA ON HF HOSPITAL LENGTH OF STAY: LONGITUDINAL ANALYSIS OF A LARGE ADMINISTRATIVE DATABASE

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OBJECTIVES: Anemia is known to affect clinical and physiological outcomes in heart failure (HF) patients. We investigate how changing hemoglobin levels influence hospital length of stay (LOS) in HF patients across multiple hospitalizations. Methodological obstacles in applying 2-stage least squares (2SLS) panel data methods in administrative data are also discussed. METHODS: A panel dataset was assembled from claims data representing 1363 patients with 2 or more HF inpatient stays in 21 hospitals nationwide during the 1-year period, October 1, 2000 through September 30, 2001. LOS is modeled as a function of hemoglobin level, patient demographics, procedures performed during hospitalization and hospital characteristics. To address endogeneity of hemoglobin and LOS, hemoglobin level is instrumented for, using indicator variables for hematinc prescriptions and deficiency anemia diagnoses. Encounter data are not collected at equal intervals. Thus, a key methodological hurdle is identifying the minimum interval between encounters meeting assumptions of 2SLS-panel methods. Validity of model specifications is explored. Between-effects and fixed-effects models are developed and compared. RESULTS: For all hemoglobin levels, there is a slight secular decrease in LOS in the second hospitalization during the study period. However, patients experiencing the greatest decrease in LOS are those who move from being anemic in their first stay to having normal hemoglobin levels in their second stay. Between-effects models indicate that a 1% improvement in hemoglobin level between patients is associated with a 0.5 % (p < 0.001) decrease in LOS versus the other patients, controlling for other factors. Fixed-effects models show that a 1% increase in individual hemoglobin level is associated with a 3.6% (p < 0.001) decrease in LOS for that individual. CONCLUSIONS: Results suggest the impact of hemoglobin levels on LOS is greater within individual patients hospitalized for HF than between individual patients. Findings must be confirmed in randomized, controlled trials.

COST-EFFECTIVENESS OF RAMIPRIL IN PREVENTING CARDIOVASCULAR EVENTS IN HIGH-RISK PATIENTS

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OBJECTIVES: The Heart Outcomes Prevention Evaluation (HOPE) study showed significant mortality and morbidity benefits associated with ramipril in high-risk patients. Cardiac mortality was significantly reduced from 8.1% in placebo to 6.1% in ramipril (RR, 0.74; p < 0.001). The objective of this study is to contrast multiple cost-effectiveness (CE) scenarios of ramipril in preventing CV events in high-risk patients. METHODS: Applying retrospective decision analytic technique, CE analysis from a payer perspective was conducted using direct medical costs of clinical events from the literature and efficacy data from the HOPE study. Expected cost was estimated using probabilities associated with fatal and non-fatal myocardial infarction, stroke and other CV events. CE analysis was conducted under three alternate scenarios of within-trial analysis based on cost and outcome during the trial period of 4.5 years, persistent benefit analysis based on the assumption of therapy being discontinued beyond trial period and an extended benefit analysis assuming patients continued on therapy beyond trial period. Based on life expectancy for a similar cohort reported in the literature, persistent-benefit of therapy was assumed for a period of 11.6 years. Extended benefits were obtained by extrapolating within trial efficacy beyond the study duration. CE analysis was conducted to
estimate the ratio of incremental expected cost of ramipril therapy to the incremental life year gained (LYG). All costs were discounted at 3% per year. RESULTS: Discounted cost for within-trial CE analysis was $2600 for ramipril compared to $1554 for placebo (incremental cost, $1046). With a 2% absolute risk reduction in within-trial cardiac mortality, the incremental cost/LYG was $11,622. Cost/LYG under the persistent benefit was $4509. For extended benefit of therapy, cost/LYG was $4014. Sensitivity analysis ranged from cost/LYG of $3143 to $12,689. CONCLUSIONS: Ramipril is CE in preventing CV events in high-risk patients across multiple therapy benefit scenarios.

**PEV41**

**HOSPITAL COSTS AND CHARGES ATTRIBUTABLE TO THE DEVELOPMENT OF ARI/ARF AFTER CABG**

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**OBJECTIVES:** To estimate hospital costs and charges attributable to the development of acute renal insufficiency (ARI) and acute renal failure (ARF) after coronary artery bypass grafting (CABG). METHODS: A retrospective analysis of patients undergoing CABG at University of Pittsburgh Medical Center from June 1998 through May 2002 was conducted. Patients were matched with respect to severity of illness by APACHE III scores. A Wilcoxon signed-rank test was used to assess differences in costs and charges. RESULTS: There were 3741 total patients that resulted in 644 matched pairs. The mean and median hospital charges among cases were approximately $221,864 and $158,312 respectively. The mean and median hospital charges among controls were approximately $110,863 and $91,738 respectively. The difference in median hospital charges was $66,500 (Wilcoxon signed-rank test, \(p < 0.001\)). The difference in median hospital charges among controls was $110,863 and $91,738 respectively. Distribution of the hospital charges were positively skewed (Shapiro-Wilk test, \(p < 0.001\)). The mean and median hospital costs among cases were $44,180 and $28,901 respectively. The mean and median hospital costs among controls were $22,471 and $18,038 respectively. The difference in median hospital costs was $10,863 (Wilcoxon signed-rank test, \(p < 0.01\)). The mean and median ICU costs among cases were $35,966 and $21,183 respectively. The mean and median ICU costs among controls were $17,634 and $13,655 respectively. The difference in median ICU costs was $18,328 (Wilcoxon signed-rank test, \(p < 0.01\)). CONCLUSIONS: Although patients were matched using APACHE III scores, a severity of illness scoring system, patients with ARI/ARF after CABG had significantly higher hospital and ICU costs and charges than patients without ARI/ARF. These differences can be attributed to the development of renal complications after CABG.

**PEV42**

**COST EFFECTIVENESS STUDY OF IMPLANTABLE CARDIOVERTER DEFIBRILLATOR VS. CONVENTIONAL TREATMENT IN PREVENTING SUDDEN DEATH AMONG PATIENTS WITH HEART FAILURE**

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Sudden death is one of the two main causes of mortality in congestive heart failure. Implanted cardioverter defibrillator (ICD) is an expensive but highly effective treatment in preventing sudden death. The gain of primary prophylactic ICD in preventing sudden death in heart failure has not been clearly established. **OBJECTIVE:** Compare the cost-effectiveness of prophylactic ICD with conventional treatment for preventing sudden death. METHODS: A lifetime decision model was built. The perspective is societal. The target population is U.S. HF patients, aged 60, with NYHA functional Class II and III. Estimates of cost, utility and probabilities are taken from literature, clinical experts, CMS fee schedule payment, and the Bureau of Labor Statistics. In all cases, we assume that ICD is effective in preventing all sudden death, and the ICD would be reimplanted at ninth year. In our base case, we assume that total annual mortality rate is 20%, of which sudden death accounts for 40%; the utility of ICD is 10% less during the 1st year after implantation, and reverts back to pre-implantation level in the 2nd year. We did a one-way sensitivity analyses on all model parameters. RESULTS: The lifetime cost is $117,093 for patients with prophylactic ICD and $24,709 for patients with conventional treatment in 2002; the QALYs gained were 2.9088 and 1.9045 respectively. The CE ratio was $91,990 per QALY saved. We failed to show that ICD is cost-effectiveness under any plausible scenario if we use $50,000 per quality-adjusted-life-year saved as the cut-off point. CE ratio is sensitive to the utility at the second and subsequent years after ICD implantation, and the proportion of sudden death in all HF-related deaths. CONCLUSIONS: Using conventional cost effectiveness benchmarks of $50,000 per life year saved, it is unlikely that ICD would be cost-effectiveness in preventing sudden death compared to conventional treatment for heart failure patients. Future research should focus on patient utility with and without ICD.

**PEV43**

**PREDICTING THE BURDEN OF CONGESTIVE HEART FAILURE (CHF) IN A MANAGED CARE SETTING: A NEW MODEL TO PREDICT OUTCOMES AND EVALUATE THE COST-BENEFIT OF CHF MANAGEMENT**

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**OBJECTIVES:** Previous studies have used Markov models to predict future CHF hospitalizations based on