nism in Heart Failure Outcome Study with Tolvaptan (EVEREST) trial showed that tolvaptan, combined with standard therapy, improved many heart failure signs and symptoms without serious adverse events. This study evaluated the hospital resource utilization associated with tolvaptan usage among heart failure (HF) patients with hyponatremia based on the EVEREST trial. METHODS: A decision model was constructed to evaluate the impact of tolvaptan on hospital resource utilization among HF patients. The Healthcare Cost and Utilization Project (HCUP) 2008 Nationwide Inpatient Sample (NIS) database was used to estimate hospitalization length of stay (LOS) and hospital cost, for HF-associated diagnosis related group hospitalizations (DRG) of adult patients (age ≥18 years). EVEREST trial data for patients with hyponatremia were used to estimate the reduction of LOS associated with tolvaptan vs. placebo. RESULTS: Among EVEREST trial HF patients with hyponatremia (13.5% vs. 15.9%), tolvaptan patients had a shorter hospitalization LOS than placebo patients (9.72 vs. 11.44 days, respectively), with a relative LOS reduction of 15%. 933,189 HF-associated DRG hospitalizations were identified from the HCUP NIS database. The mean LOS was 4.8 days with mean total hospital costs of $7,545, and mean daily hospital costs of $1,562. Using an inpatient tolvaptan treatment duration of 3 days with a daily wholesale acquisition cost of $250, the cost offset model estimated a LOS reduction among US HF hospitalizations of 0.73 days with a hospital cost reduction averaging $1,134 per HF admission. The cost neutral break-even treatment duration of tolvaaptan inpatient therapy is 4.54 days. CONCLUSIONS: Based on the EVEREST trial, tolvaptan is associated with a shorter hospitalization LOS than placebo among hyponatremic HF patients, resulting in an estimated mean hospital cost reduction of $1,134 per admission in the US.

PCV38

POTENTIAL ECONOMIC IMPACT OF DYSPNEA ASSOCIATED WITH TICAGRELOR USE

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OBJECTIVES: To estimate the socio-economic burden of venous occlusive disease (VOD) on patients with a history of acute coronary syndrome (ACS), including aspirin and clopidogrel or prasugrel. Ticagrelor is a new anti-platelet agent, not yet available on the market; in clinical trials ticagrelor was associated with significantly higher rates of dyspnea than clopidogrel. ACS patients presenting with dyspnea require additional medical attention to rule out possible heart failure which may lead to increased costs. This study used real world data to quantify the direct medical costs of dyspnea among patients with a history of ACS. METHODS: Patients with an emergency room (ER) visit for dyspnea (ICD-9-CM 786.0a) in 2008 or 2009 were identified using the MarketScan Research Databases1. Patients were required to have six months continuous medical enrollment prior to the ER visit, with a history of ACS (ICD-9-CM 410.xx, 411.1a). Procedure utilization and expenditures were evaluated for the ER visit and associated outpatient services, as well as the proportion of ER visits which led to an inpatient stay. Costs were adjusted to 2009 US dollars. RESULTS: A total of 8,433 ER visits for dyspnea were identified. The average cost per dyspnea episode was $6,958, of which $1,621 was outpatient costs associated with the ER visit (SD = $3,269). Among patients with a history of ACS, patients with dyspnea often have an electrocardiogram (71.3%), chest radiograph (75.9%) and, occasionally, a B-type natriuretic peptide (BNP) test (14.9%) or chest CAT scan (12.2%). These procedures contributed 35.1% of the average outpatient costs. Over a quarter (25.8%) of dyspnea ER visits led to an inpatient stay, with an average hospitalization cost of $3,269. CONCLUSIONS: Dyspnea is a significant event associated with high medical resource utilization and hospital costs. Considering that the increased risk of dyspnea for ticagrelor is well-documented, these costs may be important to health plan decision makers when evaluating costs associated with each anti-platelet agent.

PCV39

CHARACTERIZATION OF COSTS ASSOCIATED WITH STROKE REHABILITATION: A REVIEW OF THE LITERATURE

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OBJECTIVES: The economic burden of stroke is approximately 3% of total health care costs or 0.3-1.8% of Gross National Product in developed countries. Identifying what drives value and cost in post-stroke care can advance development of cost-effectiveness improvement that improve long term outcomes. This review characterizes costs associated with stroke rehabilitation. METHODS: PURMED was searched between 2000 and 2010, search terms included stroke, rehabilitation, costs, pharmacoeconomic and price. Countries of interest were Canada, China, France, Germany, Italy, Japan, Spain, UK, and US. Data were synthesized qualitatively. RESULTS: 28 meta-inclusion criteria. Manual searching: 4 additional sources. The main factor determining cost was the country in which the study was conducted. Patients with severe stroke are routinely considered for rehabilitation; those with mild-moderate stroke (60-75% of patients) are typically discharged home. Among patients, only 10-15% receive rehabilitation. Countries spending a large proportion on long term care for patients post-stroke, spent proportionally less on inpatient care. Inpatient costs account for an average of 76% of costs in the first year following stroke. Long term rehabilitation costs are often not included in economic analyses. CONCLUSIONS: Stroke care improvements improve long term outcomes as compared to conventional treatment. There are few data on indirect costs despite the recognition that they are likely to be substantial. CONCLUSIONS: Cost studies in stroke are heterogeneous, lack specific economic data and rarely include long term rehabilitation cost of care. Future studies should aim to differentiate 1) direct costs of various rehabilitation services, 2) location for provision of rehabilitation services, and 3) indirect costs to demonstrate cost-effectiveness and value of rehabilitation on long term outcomes.

PCV40

COST AND PRACTICE OF TREATMENT OF ACUTE ISCHEMIC STROKE IN REAL WORLD SETTINGS IN RUSSIA

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OBJECTIVES: To evaluate typical practice and cost of treatment of patients with acute ischemic stroke in leading medical hospitals in Russia, to compare treatment patterns and cost of treatment in “real world settings” and according to national standard of care. METHODS: Retrospective analysis of case records of patients with acute ischemic stroke. Treatment patterns in “real world settings” and according to national standard of care in stroke were compared. Direct cost of treatment was estimated from state health care system point of view. RESULTS: Data from 140 case records were retrieved. Significant inconsistencies in the list of medicines between protocol and care and typical practice have been identified. Particularly, the frequency prescription of anticonvulsants and myorelaxants in recent world settings was lower than in protocol. Low frequency of psychological (70%- in typical practice, 80%- in protocol) and rehabilitation methods of treatment (33%- in typical practice, 70%-80%- in protocol) was revealed. Patients also didn’t receive prophylactics of tromboembolism (6% - in typical practice, 80%- in protocol). Average total cost of treatment of one patient with ischemic stroke in typical practice was 905 dollars (302 dollars – cost of drug therapy, 187 dollars – cost of medical diagnostic, 416 dollars – accommodation costs). Average period of inpatient stay was 20 days. Average total cost of treatment of one patients with ischemic stroke according to the protocol was 1466 dollars (322 dollars – cost of drug therapy, 686 dollars – cost of diagnostic and therapeutic services, 438 dollars – accommodation costs). CONCLUSIONS: Significant variations in practice and management patterns in patients with ischemic stroke in typical practice and national standard have been revealed. Direct costs of inpatient care in typical practice are approximately twice lower than costs calculated from national protocol of care.

PCV41

AN ESTIMATE OF SOCIETAL MONETARY BENEFITS OF SIMVASTATIN IN CANADA

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OBJECTIVES: To estimate the societal monetary benefit of simvastatin to three separate groups: 1) developing manufacturer (DM), 2) generic manufacturer (GM) and 3) society. METHODS: The monetary benefits for DM and GM were estimated by calculating annual revenues based on IMS sales data between 2000 and 2009. We used a dynamic Markov model to estimate the monetary benefits for society over the same time period in terms of cost avoidance associated with prevented cardiovascular events including stroke and myocardial infarction and lost productivity due to disability and premature death in the working population. Input estimates for dynamic populations were derived from the IMS sales data. Input estimates for prevalent and incident events and costs were derived from systematic review and meta-analysis when possible. Input estimates for reduction in health care utilization and disability days were estimated from multivariate regressions using data in the 2005 Canadian Community Health Survey. All costs and benefits were expressed in 2010 Canadian dollars. CONCLUSIONS: The continual reduction in costs of simvastatin over the years (2000 to 2009) was estimated at $4 billion. Of this, DM accounted for 23%, GM 31%, and society 46% (health care 34% and productivity losses 12%). Of note, the trend was different among the three parties. The benefit to DM levelled out from 2002 when the pharmaceutical was no longer under patent protection when the benefit to GM started to increase. The benefit to society increased consistently over the study period. CONCLUSIONS: The results indicate that simvastatin is associated with significant benefit to both society and industry, including DM and GM. A comprehensive evaluation of benefits of pharmaceutical innovation should therefore consider benefits to all beneficiaries.

PCV42

A DECISION MODELING APPROACH TO EVALUATE THE COST-EFFECTIVENESS OF PRASUGREL VERSUS CLOPIDOGREL IN PATIENTS WITH PLANNED PERCUTANEOUS CORONARY INTERVENTION

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OBJECTIVES: To evaluate the cost-effectiveness of prasugrel versus clopidogrel in combination with aspirin, in patients undergoing planned percutaneous coronary intervention (PCI) from the healthcare provider’s perspective in the United States. METHODS: Second-order Monte Carlo simulation was conducted using TreeAge Pro (2009) following the ISPOR task force guidelines for modeling. Model branches included PCI type (bare metal stent and drug eluting stent), CYP2C19 polymorphism, and clinical outcomes. Model inputs such as costs (2009 dollar value), probabilities were identified through systematic literature review. All future costs and QALYs were discounted by 5%. Life expectancy was estimated in 2005 Canadian dollars. CONCLUSIONS: Costs of PCI for patients with hemiparesis 67% for patients with hemiparesis. Evidence suggests that stroke unit care improves long term outcomes as compared to conventional treatment. There are few data on indirect costs despite the recognition that they are likely to be substantial. CONCLUSIONS: Cost studies in stroke are heterogeneous, lack specific economic data and rarely include long term rehabilitation cost of care. Future studies should aim to differentiate 1) direct costs of various rehabilitation services, 2) location for provision of rehabilitation services, and 3) indirect costs to demonstrate cost-effectiveness and value of rehabilitation on long term outcomes.
in lifetime costs and utilities of $17,208 and 10.4124 QALYs compared with $16,780 and 10.4057 QALYs for prasugrel therapy. The ICER for clopidogrel was $63,840/QALY. The acceptability curve showed that prasugrel was not likely cost-effective with >80% certainty at any WTP threshold. One-way sensitivity analyses (WTP decision threshold: $100,000/QALY) showed that prasugrel is the most cost-effectiveness strategy when probability of MI is increased by >12%, probability of bleeding is decreased by >24%, and discontinuation rate among MI is >16.5%. When only patients with variant CYP2C19 were considered, the ICER was found to be $2,313,333/QALY for clopidogrel. CONCLUSIONS: Inconclusive results indicate that there is no benefit in prescribing one therapy over the other for the entire patient population. CYP2C19 polymorphism should be given consideration during the decision making process. For the base-case scenario, prasugrel therapy was the preferred strategy in patients with variant CYP2C19.

OBJECTIVES: To evaluate the cost-effectiveness of rivaroxaban compared with dabigatran and enoxaparin for the prophylaxis of venous thromboembolism in patients undergoing elective total hip replacement (THR) in the context of Russian health care system. METHODS: A decision-tree model on the choice of regimens for thromboprophylaxis after THR was adopted from the model, developed by McCulloch et al. (2009). Primary outcomes were mortality, occurrence of distal and proximal DVT, PE, hospitalization attributable to gastrointestinal bleeding, stroke and death was also included into the model. Delphi method was used to determine typical practice and cost of management of DVT and PE. It was assumed that patients with DVT were treated for 90 days, patients with PE – for 180 days. All patients in the model received thromboprophylaxis with one of three regimens: rivaroxaban dose of 10 mg/day orally for 31-39 days (RECORD 2), dabigatran dose of 220 mg/day orally for 28-35 days (RE-NOVÉ), enoxaparin dose of 40 mg/day subcutaneously for 10-14 days (RECORD 2). Incremental cost-effectiveness ratios (ICERs) were calculated. RESULTS: The cost of prophylaxis with enoxaparin was $6911 USD, with dabigatran - $7076 USD, with rivaroxaban - $7147 USD. Although rivaroxaban has more effectiveness in preventing DVT (0.016 vs. 0.082 vs. 0.046) and PE (0.0012 vs. 0.005 vs. 0.004) than enoxaparin and dabigatran correspondingly. ICER to prevent 1 case of deep vein thrombosis after THR in rivaroxaban versus enoxaparin was $23.6 USD, and in dabigatran versus enoxaparin was 22.9 USD. ICER to prevent 1 case of pulmonary thromboembolism after THR in rivaroxaban versus enoxaparin was $567.6 USD, and in dabigatran versus enoxaparin was $850.3 USD. CONCLUSIONS: Despite of higher cost of prophylaxis of DVT and PE with rivaroxaban, compared to enoxaparin and dabigatran, rivaroxaban prophylaxis was more effective with acceptable ICERs.

OBJECTIVES: To evaluate and compared the long-term costs and outcomes of four warfarin treatment strategies of CYP2C9, VKORC1, both CYP2C9 and VKORC1 genotype-guided dosing, and standard warfarin dosing among nonvalvular VTE patients in the societal perspective. METHODS: A discrete event simulation model was developed to simulate anticoagulation as the disease process, and capture its associated costs (2007 U.S. dollars) and quality of life. Data was extrapolated with the criteria of including VTE patients of age >18 years on warfarin with INR target of 2-3. Probabilities, costs and humanistic properties were obtained from a literature review, HCUP (NIS & SEDD), and the Medicare Reimbursement Schedule databases. Sensitivity analysis was performed for uncertainty parameters in the model. All costs and benefits were discounted at 3%. RESULTS: There was a significant difference in the prevalence of bleeding complications between standard anticoagulants (6.1%) and the genotype-guided strategy (5.5%) ($400 or be restricted to patient at high risk for bleeding complications (RR: 5.8%). The mean cost and QALYs per patients were $14,340 and 8.125. The genotype-guided warfarin anticoagulation strategies projected higher cost and higher QALYs. However, considering the threshold of $100,000/QALY, VKORC1 genotype-guided was indicated to be cost-effective among all strategies. Sensitivity analysis demonstrated 25% of the replications of both CYP2C9 and VKORC1 genotype-guided strategy to be <$100,000/QALY. CONCLUSIONS: This study showed that testing for multiple genotypes of CYP2C9 and VKORC1 to guide warfarin anticoagulation therapy is not cost effective in all population and that patient with higher risk of complications are more likely to benefit from this new innovation. For the genotype-guided test to be cost-effective in the population with VTE, the cost of the test would have to be <$400 or be restricted to patient at high risk for bleeding complications (RR: 5.8%).

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