Targeting Specific Physician Groups to improve adherence to Established Diagnostic Guidelines in the Evaluation of Syncope

David Graham1, Heidel E. Robert1, Mark Rasnake1,1 Medicine, University of Tennessee Knoxville, Knoxville, TN, United States. (Control ID: 1340163)

Background: The 2009 European Society of Cardiology Task Force for the Diagnosis and Management of Syncope states that CT or MRI in uncomplicated syncope should be avoided unless indicated by neurological evaluation. It further states that for all practical purposes, a TIA concerns a focal deficit without loss of consciousness and syncope the opposite. The 2006 American Heart Association Statement on the Evaluation of Syncope recommends that neurological causes of syncope should only be pursued if suggested by the history or physical. Syncope is defined as a transient loss of consciousness due to transient global hypoperfusion characterized by a rapid onset, short duration, and spontaneous complete recovery. Studies have looked at educating Internal medicine residents on the workup of syncope in attempts to avoid prodigal usage of diagnostic tests with no change in clinical practice. Our study intends to identify if our physicians’ ordering tendencies in the evaluation of syncope are according to established guidelines and to categorize the physician groups ordering these tests to identify those whose ordering tendencies should be targeted for intervention.

Methods: All patients admitted to our hospital from 9/30/09 to 9/30/11 with the primary diagnosis of syncope (ICD-9 code 780.2) were included. Of 166 patients, 26 patients were excluded for having neurologic deficits or prolonged seizure activity documented by history or exam. Of the 140 patients meeting criteria, frequency statistics were utilized to calculate the prevalence of a) CT Head (CT) ordered for patients with and without head trauma, b) CT, MRI, and Carotid Ultrasound (US) tests ordered for patients with and without neurological deficits or prolonged seizures indicated by history or physical exam, b) US ordered for patients with and without a carotid bruit c) significant test results, d) costs per significant test result, and e) specialty of physician ordering CT, MRI, and US tests. All analyses were conducted using SPSS Version 19. A significant test result is a diagnostic test result that contributed to, confirmed, or established a diagnosis or management decision including follow up for further evaluation.

Results: Of the 140 patients meeting inclusion criteria, only 29 (20.7%) had documented head trauma, yet 98 people received CT and only 2/98 (2.0%) yielded significant results. ED attendings ordered 71.4% of these. Only 5 patients had carotid bruits, yet 73/140 (52.1%) received US. Hospitalists, Internal Medicine (IM) residents, and Family practice (FP) residents accounted for 75.3% of the US's ordering physicians. MRI brain and stem was ordered for 41/140 (29.2%) of the patients, of which hospitalists and IM residents accounted for 68.3% of the ordering physicians. Interestingly, $142,238 was spent on the MRI studies of which none were significant. Notably, $53,949 and $28,175 were spent per significant result for CT and US respectively.

Conclusions: To improve cost effective utilization and adherence to established guidelines in the diagnostic evaluation of syncope, ED physicians should be targeted for intervention and training in guiding the selective usage of CT; IM residents and Hospitalists targeted for guiding the usage of MRI; and FP residents, IM residents and Hospitalists targeted for guiding the usage of US.
Improving the Efficiency of Blood Pressure Treatment with Benefit-Based Decision-Making

Jeremy Sussman¹,², Sandeep Vijan²,³, Rodney A. Hayward¹,³ ¹ Department of Internal Medicine, University of Michigan, Ann Arbor, MI, United States. ² VA Center for Clinical Management Research, Ann Arbor Veterans Affairs Hospital, Ann Arbor, MI, United States. ³ Robert Wood Johnson Clinical Scholars Program, University of Michigan, Ann Arbor, MI, United States. (Control ID: 1339911)

Background: Current guidelines for blood pressure (BP) medication use, such as the Joint National Committee (JNC 7), focus on achieving BP targets with limited attention to the effectiveness of medications in reducing cardiovascular (CV) events. Since many factors beyond BP, such as cardiac risk, influence the chance that BP treatment will prevent a CV event, we hypothesized that BP treatment could be made more efficient. We developed a BP treatment strategy based on an individualized estimate of the expected benefit of advancing BP treatment (tailored treatment) and compared it with JNC 7 guidelines.

Methods: We developed a data-driven Monte Carlo simulation model to estimate the clinical implications of each strategy. Model inputs were drawn from nationally representative CVD risk factor data, randomized studies of blood pressure reduction, and CVD outcome data. We used a society perspective to assess the benefits of each strategy – the JNC 7 guidelines and the tailored treatment strategy that we developed on a representative population of U.S. adults aged 30 to 75 years with no history of CV disease (primary prevention). Our primary outcome measure was lifetime change in quality-adjusted life-years (QALYs) for 5 years of treatment by the JNC7 vs. the tailored treatment regimens. We also examined the implications of these different strategies on representative individuals.

Results: Compared with the standard JNC 7 regimen, the tailored treatment approach is more efficient. Using JNC 7 guidelines 42% of adults aged 30-74 would receive BP medications (mean number of BP medications per patient treated = 2.27) compared to 38% treated with a mean of 2.24 BP medications for tailored treatment. In spite of treating fewer people and using fewer BP medications, tailored treatment prevented 300,000 more major CV events than following JNC 7, an almost 20% gain in relative effectiveness. Treatment by JNC 7 guidelines would save 260 QALYs per 1000 persons treated, while tailored treatment would save 300 QALYs per 1000 persons treated. Tailored treatment had greater efficiency due to treating higher CV risk patients more intensively and lower CV risk patients less intensively, particularly people with known cardiac risk factors, such as smokers. The greater efficiency of tailored treatment was generally robust to broad variations in model assumptions in our sensitivity analyses.

Conclusions: Compared to the traditional treat-to-target approach to hypertension therapy, tailored treatment has the potential to prevent more CVD events while limiting polypharmacy, treatment side effects, and costs. Prevention of CVD can be made more efficient and effective by basing BP treatment decisions on a patient’s estimated CV event reduction, rather than purely on a patient’s BP level.
Cost-Effectiveness of Pneumococcal Conjugate Vaccination Strategies in US Adults Aged 65 and Older

Kenneth J. Smith¹, Angela Wateska¹, Mary Patricia Nowalk¹, Mahlon Raymund¹, Richard K. Zimmerman¹ ¹
University of Pittsburgh, Pittsburgh, PA, United States. (Control ID: 1310720)

Background: The 13-valent pneumococcal conjugate vaccine (PCV13) awaits US adult licensure. Its potential role in adults aged ≥65 years is unclear, particularly since it could prevent nonbacteremic pneumococcal pneumonia, which the presently recommended 23-valent pneumococcal polysaccharide vaccine (PPSV23) has not been consistently shown to do.

Methods: Using a Markov model, we estimated the cost-effectiveness of vaccination strategies using PCV13 and PPSV23 alone or in combination in 65- and 75-year-old cohorts. For the base case, we assumed no prior vaccination; we also examined prior vaccination and hyporesponsiveness to repeated vaccination scenarios. We estimated age- and comorbidity-specific pneumococcal disease rates, indirect effects on adults from childhood vaccination with PCV13, and costs using CDC Active Bacterial Core surveillance data and US national databases. An expert panel estimated vaccine-related protection. We took a societal perspective and discounted outcomes 3%/yr. One-way and probabilistic sensitivity analyses were performed to test the robustness of results.

Results: The table summarizes incremental cost-effectiveness ratios (ICER) for non-dominated strategies. PPSV23 strategies were dominated (more costly, less effective) by PCV13 strategies. Results were most sensitive to varying vaccine effectiveness estimates. Probabilistic sensitivity analyses, where parameter values were simultaneously varied, supported baseline results. When we assumed prior vaccination and 80% effectiveness of subsequent vaccinations, base case ICERs increased by 37-78% for single dose strategies and 29-35% for multiple dose strategies. In addition, PCV13 strategies are less favored if greater indirect effects due to childhood vaccination occur.

Conclusions: Single dose PCV13 strategies may be worth considering for elderly patients. Multiple dose strategies are more expensive, particularly when prior vaccination and the possibility of hyporesponsiveness with repeated vaccination are considered.
Cost-Effectiveness of Procalcitonin-Guided Antibiotic Use in Community Acquired Pneumonia

Kenneth J. Smith¹, Richard K. Zimmerman¹, Angela Wateska¹, Mary Patricia Nowalk¹, Mahlon Raymund¹, Michael J. Fine¹ ¹University of Pittsburgh, Pittsburgh, PA, United States. (Control ID: 1315469)

Background: Although prior randomized trials have demonstrated that procalcitonin (PCT) guided antibiotic therapy effectively reduces antibiotic treatment rates and duration for patients with community acquired pneumonia (CAP), the cost implications of PCT protocols remain unclear.

Methods: We used a decision model examining hypothetical patient cohorts to estimate the cost-effectiveness of PCT protocols vs. usual care in low-risk patients hospitalized for CAP, taking a third-party payer perspective over the duration of that hospitalization. Since studies show no outcome differences between PCT and usual care strategies, we assumed no length of stay (LOS) or quality of life utility differences in the base case, biasing against PCT use, but relaxed these assumptions in sensitivity analyses. Two PCT protocols were evaluated: 1) PCT levels only at hospital admission, affecting only the decision to begin antibiotic therapy; and 2) PCT levels drawn at admission and on days 3, 5, and 7 as indicated, affecting both prescribing and therapy duration decisions. In clinical trials, PCT protocols decreased absolute antibiotic prescription risk (mean 9.9%) and therapy duration (mean 4.5 days) in CAP patients. Medicare reimbursement for PCT is $38.36. These and other parameter values were varied in sensitivity analyses.

Results: PCT protocols performed only on admission were cost saving compared to usual care if the total per patient cost (including administration) of the antibiotic regimen was >$387 in usual care patients. If PCT was drawn on admission and every two days thereafter while on antibiotic, PCT protocols were cost saving if antibiotic costs were >$23/day; the Figure shows a 2-way sensitivity analysis, varying both antibiotic costs and decreased antibiotic duration. Either PCT protocol was cost saving if total hospital costs decreased >$119 (or LOS decreased >0.18 days) through their use. If PCT use improved quality of life utility through decreased antibiotic side effects or shorter hospitalization, PCT protocols cost <$100,000/QALY if they gained ≥0.0012 QALYS (~10.5 hours) when oral azithromycin (regimen cost $39) was used, with even more favorable cost-effectiveness ratios when more expensive antibiotic regimens were evaluated. Results favoring PCT use were otherwise robust in sensitivity analyses.

Conclusions: PCT regimens for low-risk patients hospitalized with CAP are likely to be either cost saving or cost-effective compared to usual care in an analysis biased against PCT use. Further pragmatic trials of PCT-guided therapy and other evidence-based antibiotic decision rules in CAP are warranted.
Effectiveness, patient preference and compliance of split-dose polyethylene glycol (PEG) compared with standard dose PEG in hospitalized patients at a tertiary care hospital. A pilot study

Ali Raza¹, Kashif Ahmed¹, Jonathan Kushner¹ ¹ The University of Cincinnati, Cincinnati, OH, United States. (Control ID: 1313013)

Background: The importance of good quality bowel preparation cannot be overstated. The likelihood of missing a small lesion is higher in patients with poor bowel preparation. Split-dose PEG is shown to be better than standard PEG in the outpatient setting. The aim of this study is to evaluate if similar results can be accomplished in hospitalized patients, thus decreasing the need of re-scoping and prolonging hospital stay.

Methods: In this on-going prospective, single blind study, we have enrolled 22 hospitalized patients who required colonoscopy for their care. Patients were randomized to receive split-dose PEG (2 liters the evening prior to colonoscopy and 2 liters the morning of colonoscopy) or standard PEG (4 liters the evening prior to colonoscopy, ending before morning). Both groups were placed on the same dietary restrictions (clear liquids the day prior to colonoscopy and nothing to eat or drink except PEG after midnight). Patients with bowel obstruction, intractable nausea and vomiting before PEG administration, or massive gastrointestinal bleed were excluded from the study. Patients with a past experience of a different PEG dosing schedule were asked to answer a question comparing the ease of current and past experience. An independent operator, who was blind to the nature of the PEG regimen received, evaluated each patient’s colonoscopic findings using an Ottawa score. Patient’s ability to finish the PEG was also recorded.

Results: Twelve of 22 patients were males. Median age of the sample was 50 years (Range 23 to 81 years; mean, ± SD 54 ± 17 years). Thirteen patients received standard PEG-ELS bowel regimen while 9 received the split-dose regimen. Six (42%) of 13 patients receiving standard regimen could finish it, compared to 7 (78%) of 9 patients receiving the split-dose regimen (Fisher’s exact test p-value 0.184, odds ratio 4.08). Mean Ottawa score for standard regimen was significantly higher than the split-dose regimen (8.33 and 2.22 respectively; p-value 0.023). Four patients in the split-dose regimen group had a standard regimen in the past. All of these patients (100%) preferred the split-dose regimen over the standard regimen. No patient in standard PEG-ELS group ever received a split-dose PEG-ELS regimen in the past.

Conclusions: Split-dose PEG was significantly better than standard PEG in terms of quality of bowel preparation. Patients having the split-dose bowel preparation were four times more likely to finish the whole solution compared with patients having standard PEG. All patients in the split-dose PEG arm who had standard bowel preparation in the past, found split-dose preferable. Split-dose may reduce the length of hospital stay in patients requiring colonoscopy by improving quality and adherence to the regimen.
The 12-Month Cost-Effectiveness of Telephone-Delivered Collaborative Care for Post-CABG Depression

Julie M. Donohue¹, Bea Herbeck Belnap¹, Aiju Men¹, Fanyin He¹, Mark S. Roberts¹, Bruce L. Rollman¹
¹Medicine, University of Pittsburgh, Pittsburgh, PA, United States. (Control ID: 1312829)

Background: Depressive symptoms commonly follow coronary artery bypass graft (CABG) surgery and are associated with poorer clinical outcomes. We demonstrated that telephone-delivered collaborative care (CC) for post-CABG depression provided in concert with patients’ PCPs reduces mood symptoms, and improves health-related quality of life (HRQoL) and physical functioning more than usual care (UC) at 8-months follow-up (Rollman BL, et al. JAMA 2009). We now report the cost-effectiveness of our intervention so as to guide clinicians, employers, insurers, and health systems on whether to adopt similar treatment strategies for treating depression following an acute cardiac event.

Methods: From 3/04-9/07 we enrolled 302 post-CABG patients who screened positive for depression prior to hospital discharge; had at least a moderate level of mood symptoms two weeks later (PHQ-9 ≥ 10); met all eligibility criteria; and were randomized to either our 8-month intervention or to UC. Later, we obtained insurance claims data for 189 (63%) patients with ≥ 12 months continuous enrollment from Medicare and the two largest health insurers in our region. We applied 2007 Medicare prices to inpatient and outpatient claims and approximated intervention costs (e.g., care manager time, pharmacotherapy) to estimate incremental costs between UC and CC from the payor’s perspective, and used generalized linear models with gamma distribution to correct for skewness in cost data. Then we converted SF-36 MCS scores collected at baseline, 2-, 4-, 8-, and 12-months follow-up to preference-based utilities, and calculated the incremental cost per quality-adjusted life year (QALY) gained for CC relative to UC.

Results: At baseline, the 189 patients with continuous 12-month claims data were similar by: (a) sociodemographic and clinical characteristics to the 113 excluded from our analyses due to incomplete claims data; and (b) randomization status (90 CC and 99 UC; mean age: 67 years, 61% male). At 12-months, CC patients had $449 lower mean total costs than UC ($18,172 vs. $18,621), at an incremental cost effectiveness ratio of -$9,889 per QALY vs. UC (95% CI: -$11,940 to -$7,838).

Conclusions: Telephone-delivered collaborative care for post-CABG depression is both more effective and less costly than PCPs’ usual care and compares very favorably to other medical interventions at improving HRQoL. Future studies should examine: (1) how Accountable Care Organizations can provide similar treatment strategies for treating post-CABG depression in routine care; and (2) whether our treatment strategy is as effective and cost-effective at treating depression in patients with other cardiovascular disorders.