Development and Implementation of an Evidence-Based Protocol for Management of Hypoglycemia

McEuen, J., Gardner, P., Locke, C., Barnachea, D., Backhaus, B., Hughes, S., Portland Veterans Affairs Medical Center, Portland, OR

Purpose: The purpose of this project was to implement an evidence-based hypoglycemia protocol in a tertiary care, Magnet designated teaching center.

Synthesis of the Evidence: In 2008, the American Diabetes Association reported that 17.5 million people in the United States have a diabetes diagnosis. Diabetic patients have increased use of inpatient services and are at higher risk for complications. Barriers identified in achieving adequate glycemic control include: 1) healthcare professionals' fear of hypoglycemia, and 2) nursing time required to follow protocols. The Institute for Healthcare Improvement recommends protocol use as a method to optimize abilities of healthcare providers and reduce errors. Consequences of hypoglycemia can be life threatening, develop rapidly and can occur at any time in diabetics. Since the identified causes are difficult to predict, a standardized treatment protocol can ensure safe, effective treatment of hypoglycemia.

Proposed Change in Practice: Develop an evidence-based protocol that: 1) can be used across multiple clinical areas, and 2) is easy to implement at the point of care.

Implementing Strategies: First, we established a hypoglycemia definition and determined the areas of use. The existing protocol was then evaluated and modifications were made to reflect the current evidence base. Standardized documentation was developed and a one-page treatment algorithm was created to support ease of use at the point of care. Once all components were approved through a multi-step organizational approval process, staff education occurred.

Evaluation: We evaluated rates of severe hypoglycemia (CBG <40 mg/dL) as a measure of protocol effectiveness and safety. Rates in the medical-surgical setting ranged from 0.0% to 0.70% pre-implementation and 0% to 0.23% post-implementation. This decline from baseline suggests that implementation of our hypoglycemia protocol is an effective strategy to appropriately manage hypoglycemic episodes.

Contact: kpaigegardner@gmail.com

Comparison of Point-of-Care and Laboratory Glucose Values in Cardiothoracic Surgery Patients

Denfeld, Q., Goodell, T., Stafford, K., OHSU, Portland, OR

Purpose: To determine the difference between blood glucose values from point-of-care (POC) glucometers and laboratory blood glucose values in cardiothoracic surgery patients.

Background/Significance: Protocols for tight glycemic control have become standard in many ICUs. Recently, some studies have demonstrated that POC glucometers have variable accuracy, particularly with low hematocrits. At our institution, adult ICU insulin infusion protocols may result in hypoglycemia as we base our therapy on POC glucometer results that may be significantly different from lab values.

Methods: A single sample of arterial blood was drawn on post-op day #0 cardiac surgery patients and analyzed both by the RN at the bedside with the Precision XCeedPro glucometer and in the hospital laboratory with the Beckman Coulter DXC 800 and LH 780 machines.

Results: Data was collected from 46 adults; of these, mean age was 60.8 years (SD 13.3), 44 (96%) were White, 29 (63%) were male, and 29 (63%) had undergone coronary artery bypass grafting. Mean hematocrit was 27.7 (SD 4.8), mean POC glucose was 110.2 mg/dL (SD 28) and mean lab glucose was 97.8 mg/dL (SD 24.7). The mean difference between POC and lab glucose was 12.3 mg/dL (SD 9.8), with POC glucose the higher value. The difference scores ranged from 33 mg/dL to -7 mg/dL. A paired t-test revealed $t = 8.5$, $p < .001$. Non-parametric correlation was used because hematocrit was not normally distributed; Spearman's rho correlation between the difference scores and hematocrit was -.43, $p = .003$.

Conclusion: Substantial differences occured between POC and lab tests of blood glucose on identical samples with POC values being the higher result. The difference between POC and lab measurements of glucose was inversely related to hematocrit, suggesting that more anemic post-operative patients were at greater risk of hypoglycemia. This raises concerns about the safety of tight glycemic control in post-operative cardiothoracic surgery patients.

Contact: denfeldq@ohsu.edu

The Economic Impact of Daily Quality Control Testing of Point of Care Blood Glucose Meters

Corl D., Whitney J., Wisse B., Harborview Medical Center, Seattle, WA

Purpose: To determine the economic impact of daily quality control (QC) testing of point of care (POC) Inform blood glucose (BG) meters compared to following the manufacturer's (ROCHE) recommendations.

Background: POC BG testing occurs frequently in hospitalized patients and results impact treatment decisions. Confidence in the accuracy of POC BG results is of great importance to avoid medical errors. Joint Commission (JC) requirement for daily QC testing of POC BG meters, one measure intended to assure POC BG accuracy, differs dramatically from the ROCHE's recommendations, which are triggered by several situations such as opening a new bottle of test strips. Cost of supplies and staff time is associated with this procedure.

Description: After a librarian assisted Pub Med search produced no studies supporting JC requirements, QC testing error rate was collected, along with cost and use statistics for QC supplies and salaries of staff performing the QC tests. Mean time/QC test was calculated.

Evaluation and Outcomes: True instrument failure, when both controls failed a repeated test, was zero in 2008. If ROCHE recommendations for QC testing were followed instead of the daily QC requirement, an estimated cost savings of $67,312 could be gained in supplies. Time savings was estimated at 1,899 hours/year. Based on this project, Harborview Medical Center (HMC) could save $100,928/year by following ROCHE's guidelines instead of JC requirements. Conclusions: Our data suggest that instrument malfunction or poor test strip quality are infrequent events and unlikely to contribute significantly to medical errors. Moreover, the accuracy of POC BG testing is influenced by many factors more likely to result in patient safety concerns. Importantly, the cost in time and materials of JC mandated daily POC meter quality control testing at Harborview is significant.

Contact: corld@u.washington.edu

Mission Impossible: Improving Nurse Staffing Without Adding Nurses

Sawin, L., Barnes, S., Greco, S., Bridges, L., University of Washington Medical Center, Seattle, WA

Purpose: Implement budget neutral scheduling in an ICU to optimize work flow and improve nurse satisfaction.

Background/ significance: Budget constraints do not allow for added staff, but increased acuity and workload cause stress and burnout. Replacing an ICU nurse is costly, so retention is imperative.

Description: A flex nurse role was created to provide added assistance to nurses during the traditionally busy times of day, without adding nursing hours. Flex RNs were not assigned patients, so were free to help with busy groups, lengthy admission and discharge processes, traveling with patients off the unit, and break coverage. These flex nurses, 2/day were shifted 3 hours from their 12hr day or night shift to cover the busiest times of the day. The flex nurses were scheduled 10-1230 and 16-0430. The unit staffed down from 0430-1000, a typically slower time of day, accounting for the extra hours used during the afternoon/evening. Unit nurses created the guidelines of the flex nurse model. Time of day most help was needed and qualifications to fulfill the role were agreed upon. A trial of the new model was implemented using current staff nurses. A post trial satisfaction survey was completed.

Evaluation/outcomes: A staff RN satisfaction survey demonstrated an overwhelmingly positive response to our flexible nurse model. A post-trial survey of 55 staff RNs revealed the following: getting more help with admissions/transfers(87%) and nursing tasks (69%); more often getting 30 minute lunch breaks (67%) and more 15 minute breaks (58%); on-time completion of tasks such as IV tubing and dressing changes (63%) and patients being admitted in a more timely manner (52%). 81% of staff RNs report the flex nurse model is working and want to continue to use this model.

Conclusions: This is an example of a RN driven, budget neutral initiative resulting in improved nurse satisfaction.

Contact: laurasawinbrown@yahoo.com