BACKGROUND AND SPECIFIC AIM

- **Hypoglycemia** is associated with increased risk of mortality and morbidity.1 Conversely, tight glucose control puts a patient at risk for developing hypoglycemia.2
- Studies have shown that diabetic patients have higher rates of wound infection following cardiothoracic surgery compared to those without diabetes.3-4
- In 2014, JCAHO/CMS stiffened the criteria on the SCIP-inf-4 performance measure. This measure states that cardiac surgery patients should have postoperative blood glucose (BG) less than or equal to 180 mg/dL eighteen to twenty-four hours after anesthesia ends. Previously measured satisfactory BG levels were 180-250 mg/dL.
- At this institution, early difficulties with this performance measure were due to the reactive nature of intravenous (IV) insulin titration, which is not optimal for tight glucose control.
- Hyperglycemia is associated with increased risk of mortality and morbidity; more aggressive dose titration, using a modified Yale Protocol targeting blood glucose 140-180 mg/dL, may be necessary.
- Tight glycemic control results in a decreased rate of in-hospital infection following cardiovascular surgery compared to those without diabetes.2,3
- Tight glycemic control puts a patient at risk for developing hypoglycemia.

METHODS

- This is a retrospective serial cross-sectional study. This design was chosen because multiple interventions were employed over the study period that may impact the results including staff education and possible unreported variables.
- The aim of this study is to evaluate the safety and effectiveness of the modified insulin infusion protocol in post cardiac surgery patients.

RESULTS

- The modified insulin infusion protocol implemented on June 2014 was assessed for safety and effectiveness.
- The baseline characteristics (Table 1) of the two groups were similar.
- The effectiveness of the modified protocol was assessed by the AUC0–24h and HI. AUC0–24h between the two protocol groups did not significantly change (Figure 1). However, the modified protocol resulted in a 52% reduction in HI (Figure 3).
- The implementation of the modified protocol and the number of postoperative SQ insulin doses (Figure 4 and 5) each had a significant impact on HI (Table 2).
- However, higher SQ insulin requirement was associated with an increase in HI (Table 2). This suggests that further protocol modifications with more aggressive upward titration may be necessary and preoperative insulin requirement should be considered.
- Hyperglycemia was the sole safety outcome for this study. Overall, hyperglycemia occurred in 43 patients (12.6%) with no difference between protocol groups despite more SQ insulin utilization in the modified protocol group.
- A positive trend in SCIP-inf-4 success was observed over time, albeit not statistically significant (Figure 2), but the success rate with this measure is approaching 95–100%.
- Limitations of this medication utilization evaluation include:
  - Electronic medical records may have incomplete or missing data.
  - Protocol adherence and potential confounders (multinatural intake, steroid use, and severity of illness) were not assessed.
  - A large percent of patients categorized as non-diabetics may have undiagnosed diabetes.

CONCLUSIONS

- At this institution, a switch to a more aggressive insulin titration protocol resulted in improved glucose control in post-cardiac surgery patients without increasing the rate of hypoglycemia.
- Use of preprandial SQ insulin in addition to IV insulin infusion was also associated with better post-operative glucose control without increasing the rate of hypoglycemia.
- We plan to continue this evaluation through December 2014 to look at twelve months of data.

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DISCLOSURE

- Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:
  - Judy Wong: Nothing to disclose
  - Marwin Nissan: Nothing to disclose
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