Best Practice Strategies in Avoiding SSIs: Post-Op Euglycemia
Diabetes and Hyperglycemia

• **Epidemic proportions**
  – 20 million people

• **Prevalence of DM in hospitalized patients**-
  – 12-26%

• **Prevalence of inpatient hyperglycemia**-
  – 38%
  – 1/3 with *newly discovered* hyperglycemia
Hyperglycemia – Scenarios

• Patient with known diabetes
  – defined as FBG > 126 mg/dl or random BG >= 200 on 2 or more occasions.

• Patient with previously undiagnosed diabetes

• Stress hyperglycemia
  – Normal A1C
  – Hyperglycemia doesn’t persist after hospital discharge
Morbidity and Mortality of Hyperglycemia

• Additional studies correlating hyperglycemia with morbidity/mortality….
  – Acute MI- Increased risk of CHF, cardiogenic shock, and mortality…
  – Cardiac Surgery- Greater mortality, increased deep-sternal wound infections, and more overall infections..
  – Acute CVA- Increased risk of mortality, poor functional recovery, and increased final infarct size…
  – Elective Surgery- Increased risk of nosocomial infection w/ early postoperative hyperglycemia
Does improving glucose control improve outcomes

- **Malmberg et al. RCT study of 620 acute MI patients**
  - controlling hyperglycemia with intensive insulin treatment reduces mortality by 11%

- **Van den Bergh, et. al RCT study of 1548 ICU patients**
  - intensive insulin therapy (maintaining glucose <110 mg/dL) reduces mortality, bloodstream infections, acute renal failure, and PRBC transfusions. Also reduced ICU stay time and mechanical ventilation time.
Does improving glucose control improve outcomes

- **Furnary prospective interventional study of 3554 CABG patients**
  - insulin infusion protocols improved in-hospital mortality in diabetic patients

- **Krinsley comparison study of 1600 ICU patients**
  - protocol involving intensive monitoring and treatment to maintain BG <140mg/dL showed a significant decrease in mortality, organ dysfunction, and ICU length of stay
Does improving glucose control improve outcomes?

- NICE-SUGAR Study (Finfer et. al)
  - very intensive/tight glucose control (81-108) actually has negative impact on patient outcomes
  - Increased mortality with lower target when compared to more traditional target (<180)

- Other studies showing little difference between intensive control and more traditional control (<180)
  - Wiener meta-analysis- ICU patients
    - No decrease in mortality, but risk of hypoglycemia
  - Van den Barghe- medical ICU RCT study
    - Reduced morbidity but not mortality
What are recommended insulin targets?

The AACE/ADA recommendations are:

- A target of 140-180 mg/dl is preferable for MOST patients.
- A target of 110-140 mg/dl may be appropriate in SELECTED patients (patients treated in sites with extensive experience and appropriate support: perhaps CABG surgical patients, sites with low rates of hypoglycemia, patients on TPN etc).
- A target > 180 mg/dl or < 110 mg/dl is NOT recommended.

Insulin requirements fluctuate with acute stress of illness or surgery.

- Inherently unstable nutritional intake in inpatient setting.
- Multiple medications and parenteral nutrition cause frequent glycemic excursions.
- Frequent monitoring and recording of data are needed.
- Coordination of testing, nutrition and insulin administration can be difficult.
- Transitions in care lead to multiple opportunities for breakdown in the consistency, quality and safety of care.
• Pre-op diabetes diagnosis and method of control
• Perioperative Glucose Value
• Insulin used in OR
• Highest BG Day 1 and Day 2 post-op
• Lowest BG within first 48 hours
Elements NOT Captured in SCOAP

- Type/route of insulin ordered
- Insulin adjusted appropriately
- Are values fasting or post-prandial
- How well was blood sugar controlled pre-operatively
- Other glucose values during hospital stay
Examples of Hospital Outliers

Problem:  Not checking blood glucose in diabetics perioperatively

Solutions:
• Create workgroups with Anesthesia providers
• Add to standard orders
• Utilize SCOAP surgical checklist
Examples of Hospital Outliers

Problem: Patients with >200 glucose perioperatively not getting insulin

Solutions:
• Create workgroups with Anesthesia providers
• Add to standard orders
• Utilize SCOAP surgical checklist
Examples of Hospital Outliers

Problem: Patients with >200 glucose within 48 hours post-op

Solution:
• Hospital-wide glucose management plan
Hospital-Wide Glucose Management Plan

Essential elements:

• Institutional support
• Multidisciplinary team or steering committee
• Data collection and reliable metrics
• Specific Aims or goals
• Standardized insulin order sets
• Algorithms, policies, and protocols
• Comprehensive education and certification programs

From: http://www.hospitalmedicine.org/ResourceRoomRedesign/GlycemicControl.cfm
Hospital-Wide Glucose Management Plan

SCOAP Hospital Stories

• University of Washington Medical Center

• Southwest Washington Medical Medical Center
  – From January 2006 to August 2007
    • Hospital average glucose level has decreased from 165.4 mg/dL to 148.5 mg/dL
    • 162.2 mg/dL to 143.9 mg/dL on the general surgery unit and from 182.7 mg/dL to 150.7 mg/dL on the orthopedic/neurologic surgery unit
    • In the Intensive Care Unit (ICU), the percent of readings in the range of 70–150 mg/dl increased from 66% to 74.4%

• Others?
Slide 1:


Slide 4:

Slide 5:

Slide 6:

Slide 7:
www.scoap.org