Selected Best Practices and Suggestions for Improvement

PSI 10: Postoperative Physiologic and Metabolic Derangement

Why Focus on Postoperative Physiologic and Metabolic Derangement?

- This indicator measures how often hospitalized patients experienced problems with glucose control (if diagnosed with diabetes) or renal failure (if no previous renal disease) after having an operation. Careful management of blood glucose and fluids after surgery, especially in patients who have underlying medical problems, can prevent many of these complications.[1]
- Patients that maintained blood glucose at or below 110 mg/dL in the postoperative period not only reduced mortality among critically ill patients, but also reduced bloodstream infections, acute renal failure, blood transfusions, mechanical ventilation, and intensive care.[2]
- Cases from the Nationwide Inpatient Sample that were flagged by this PSI had 19.8% excess mortality, 8.9 days of excess hospitalization, and $54,818 in excess hospital charges, relative to carefully matched controls that were not flagged.[1]
- At least part of this cost is likely to be shouldered by hospitals. In 2008 the Centers for Medicaid and Medicare Services (CMS) identified manifestations of poor glycemic control as one of a number of conditions for which hospitals do not receive the higher payment for cases when the condition was acquired during hospitalization.[3]
- As value-based purchasing evolves, quality will be increasingly linked to payment. This indicator is not currently part of Medicare's Hospital Value-Based Purchasing, but could be considered for future inclusion.[4]

Recommended Practice: Details of Recommended Practice	
Implement Blood Glucose Monitoring Requirements	Implement blood glucose monitoring for appropriate patients with results readily available to all care providers.
Manage Prevention Strategies for Postoperative Patients	Avoid risk factors for acute renal failure in postoperative patients.

Best Processes/Systems of Care

Introduction: Essential First Steps

- Engage key procedural personnel, including nurses, physicians and other providers, nutrition/dietitians, and representatives from the quality improvement department, to develop evidence-based protocols for care of the patient postoperatively at risk for physiologic and metabolic derangement.
- The above team:
    - Identifies the purpose, goals, and scope and defines the target population.
    - Analyzes problems with guidelines compliance, identifies opportunities for improvement, and communicates best practices to frontline teams.

- Establishes measures to indicate if changes are leading to improvement, identifies process and outcome metrics, and tracks performance using these metrics.
- Determines appropriate facility resources for effective and permanent adoption of practices.

Recommended Practice: Implement Blood Glucose Monitoring Requirements

- Ensure that all diabetic patients have diabetes documented in the medical record.[5]
- Consider obtaining an endocrinology consultation for diabetic patients. Involvement of specialists or specialty teams may reduce a diabetic patient's length of stay, improve glycemic control, and improve outcomes.[5]
- Consider obtaining a dietary consultation with a focus on inpatient dietary needs and an assessment of the patient's dietary self-management skills.[5]
- Carefully monitor and set up protocols to address the following risk factors for hypoglycemia[5,6]:

  - Status of nothing by mouth or reduction of oral intake.
  - Discontinuation of enteral feeds, total parenteral nutrition, intravenous dextrose discontinuation.
  - Premeal insulin with no/little meal consumption.
  - Unexpected transport from nursing unit after rapid-acting insulin administration.

- Implement process by which patients are monitored for physical symptoms of hyperglycemia (frequent urination/urination during the night, unusual thirst, fatigue, blurred vision, etc.) and hypoglycemia (rapid heart rate, sweating, confusion, disorientation, etc.).[5]
- Ensure that the nurse reviews each bedside blood glucose level and alerts the provider of levels outside of threshold as specified by protocol.
- Ensure that the provider reviews blood glucose levels at least daily and adjusts treatment as needed. If adjustments are made to the insulin regimen, assessments of blood glucose levels are to be conducted more frequently.
- Track markers of poor glycemic management outcomes:

  - Hypoglycemic events.[5]
  - Ketosis events.

Recommended Practice: Manage Prevention Strategies for Postoperative Patients

- Implement the following strategies to prevent acute renal failure into the care of postoperative patients[7-10]:

  - Identify patients at risk (e.g. older age, hypovolemia, infection, etc.).
  - Avoid nephrotoxins or use with caution (e.g. ace inhibitors, aminoglycocides, amphotericin, aspirin, cisplatin, cyclosporines, low molecular weight dextran, NSAID, radioactive dyes, etc.).
  - Limit increases in abdominal pressure. Intra-abdominal pressure increases can be due to bleeding, intestinal distension, peritonitis, paralytic ileus and ascites.
  - Use volume expansion, vasodilators, and inotropes cautiously and avoid hypovolemia.

Educational Recommendation

- Plan and provide education on protocols to physicians and other providers, nursing, dietary, and all other staff involved in caring for these patients. Education should occur upon hire, annually, and when this protocol is added to job responsibilities.

Effectiveness of Action Items

- Track compliance with elements of established protocol by using checklists, appropriate documentation, etc.
- Evaluate effectiveness of new processes, determine gaps, modify processes as needed, and reimplement practices.
- Produce monthly glycemic management outcome and renal failure reports and use to provide group and individual feedback to key stakeholders; physicians and other providers, nursing, nutrition and pharmacy staff; and senior medical and administrative leadership.
    - Develop plan of action for clinicians/units/teams whose patients consistently have above target blood glucose levels, frequent hypoglycemia events, and ketosis events.
- Mandate that all personnel follow the safety protocols developed by the team and develop a plan of action for staff in noncompliance.
- Provide feedback to all stakeholders (physicians and other providers, nursing, nutrition, and other ancillary staff; senior medical and administrative leadership) on the level of compliance with processes developed.
- Monitor and evaluate performance regularly to sustain improvements achieved.

Additional Resources

Systems/Processes

- Clement S. Braithwaite SS, Magee MF, et al. Management of diabetes and hyperglycemia in hospitals. Diabetes Care 2004;(27)2:553-91

Tools

- American Healthways. Inpatient management guidelines for people with diabetes http://www.healthways.com/success/library.aspx?id=873
- Campbell K, Braithwaite S. Preadmission treatment plan with history of blood glucose monitoring. In: Hospital management of hyperglycemia. Clin Diabetes 2004;22(2):81-88
- The Joint Commission. Specifications manual for National Hospital Inpatient Quality Measures discharges 04-01-11 (2Q11) through 12-31-11 (4Q11) http://www.jointcommission.org/specifications_manual_for_national_hospital_inpatient_quality_measures/

Staff Required

- Physicians and other providers, nurses, pharmacists, dietitians, clinical diabetic educator, and nursing assistants.

Equipment

- Point of care glucose monitors.

Communication

- Detailed communication between the provider, pharmacist, nurse, and patient (including the family if applicable) regarding medication reconciliation and the outpatient medication regimen.
- Communication between patient, provider, nurse, and diabetes educator regarding patient education and the patient's diabetic self-management plan as an outpatient.

Authority/Accountability

- Senior leadership mandating protocol for all providers.
- Providers involved with the postoperative care of patients are held accountable for following the protocol.

References

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8. Dwinnell BG, Anderson RJ. Diagnostic evaluation of the patient with acute renal failure. In Berl T, Bonventre JV, eds. Atlas of Kidney Diseases. Vol. 1. Chapter 12. Philadelphia, PA: Wiley-Blackwell; 1999.
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10. Godet G, Fleron MH, Vicaut E, et al. Risk factors for acute postoperative renal failure in thoracic or thoracoabdominal aortic surgery: A prospective study. Anesth Analg 1997;85:1227-32.