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Perioperative Glycemic Management

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Background

Perioperative hyperglycemia has been shown to double the risk of surgical site infections (SSI). This is hypothesized to be caused by the effects of hyperglycemia on immunity, increases collagenase activity, impairs leucocyte function, and reduces blood flow. While many surgeons are aware of these risks and efforts are made to optimize diabetic patients prior to surgery, some studies estimate almost half of perioperative hyperglycemia occurs in non-diabetic patients. Furthermore, studies suggest that the risk for SSI and wound complications is greater in non-diabetic patients experiencing a hyperglycemic event preoperatively.

Complicating glycemic control is the fear of hypoglycemia. Patients undergoing surgical procedures are prepared by withholding oral nutrition. Furthermore patients with existing adequate glycemic control are often taken off their home insulin and oral therapy in favor of hospital developed standard sliding scale, reactionary insulin therapy.

At Abington-Jefferson Health the standard practice for any diabetic patient is to place them on sliding scale insulin and withhold their home medication. Non-diabetic patients blood glucose is rarely continually monitored outside of scheduled basic metabolic panels and often mild to moderate hyperglycemia noted on these panels is not addressed due to lack of standardized protocols.

With an increase in healthcare quality based payment, improving perioperative glycemic control, in addition to better outcomes, can provide for significant cost savings and increased reimbursements for hospitals and health-systems. An estimated \$3 Billion a year is spent on SSI related expenses and procedures presenting real opportunity for the system to improve rates of SSI and related complications.

Proposal and Goals

- We propose creating a standard easy to use and safe protocol for glycemic management for same day/elective surgical patients
 - Collect pre/post intervention preoperative and post operative BGL
 - Collect rates of complications in pre/post intervention groups
- Following implementation in same day and elective surgical procedures, We propose expanding the protocol to be effective in urgent and emergent inpatient surgical procedures.
 - Collect pre/post intervention preoperative and post operative BGL
 - Collect rates of complications in pre/post intervention groups

Methods

Objective 1: Prevalence of Perioperative Hyperglycemic Events

Patients admitted for elective bariatric and colorectal surgery procedures will have pre and (immediate) post operative blood glucose levels measured prospectively as part of their routine perioperative orders. Existing complications rates and SSI rates will be obtained from NISQIP and MBSAQIP abstracting.

Objective 2: Development of Perioperative Glycemic Control Protocol

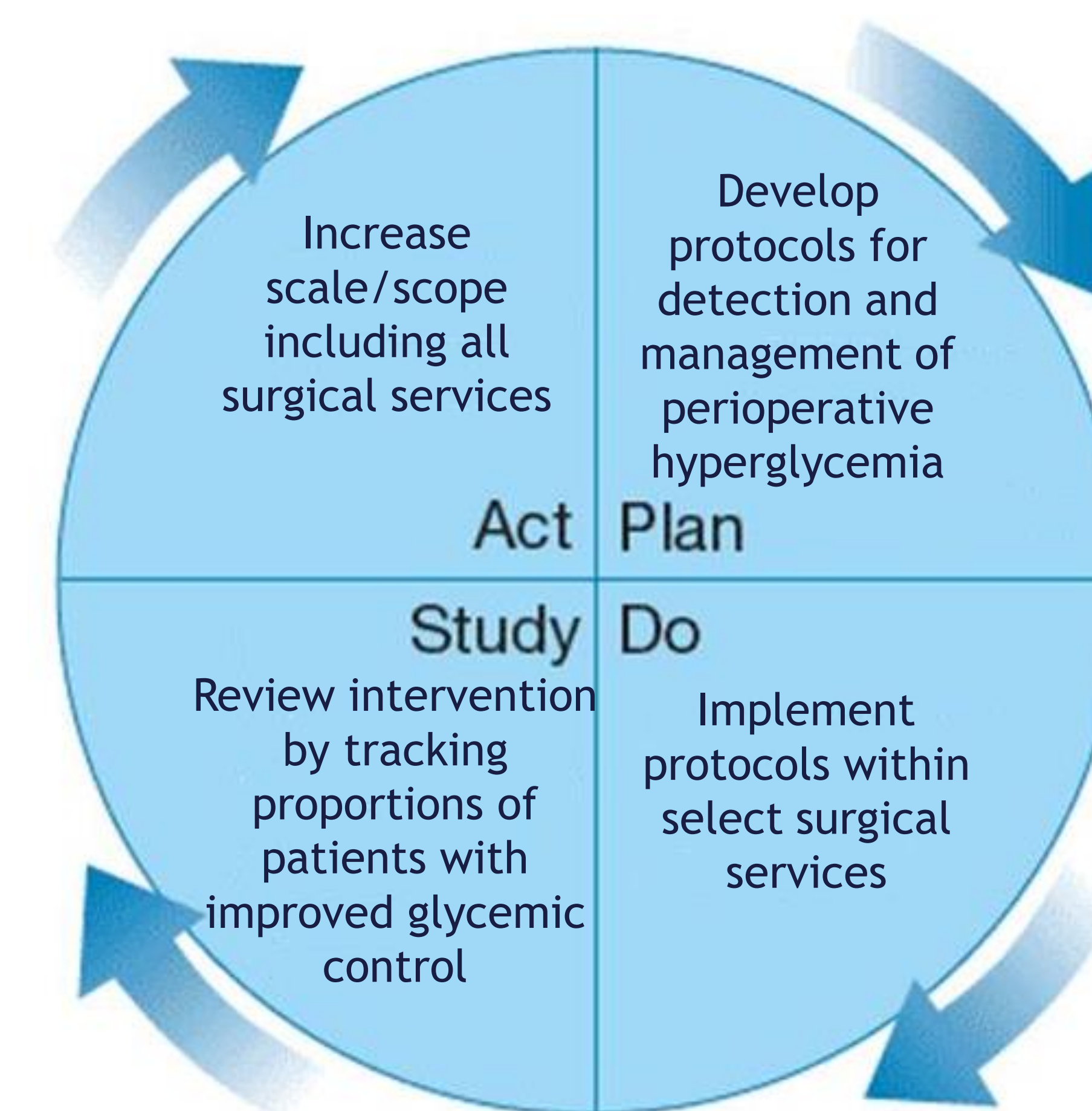
In conjunction with the Department of Endocrinology and Department of Anesthesia a simple IV insulin protocol will be developed and implemented in the Bariatric and Colorectal patient populations. Again Perioperative blood glucose levels and abstracted data from NISQIP and MBSAQIP will be obtained for rates of complications and SSI. The protocol will be adjusted as to optimize glycemic control.

Objective 3: Results of Intervention and Expansion

Following implementation of the protocol perioperative glycaemia will be measured in patients from other surgical service lines and the protocol implemented with the goal of implementation across all surgical services.

Current Proposed Glucose Control Protocol

Glucose	Initial		1 Hr Glucose Rising Dose Adjustment		1 Hr Glucose Falling
	Bolus (Units)	Rate (Units/hr)	Bolus (Units)	Increase Rate (Units/hr)	Decrease Rate (Units/Hr)
>230	8	7-8	8	7-8	0
221-230	7	6-7	7	6-7	0
211-220	6	5-6	6	5-6	0
201-210	5	4-5	5	4-5	0
191-200	4	3-4	4	3-4	0
181-190	3	2-3	3	2-3	0
171-180	2	1-2	2	1-2	0-25%
161-170	1	0.5-1	1	0.5-1	0-50%
141-160	0	0-0.5	0	0-0.5	25-75%
91-140	0	0	0	0	STOP
<91					STOP Give ½ amp D50



Future Direction, Next Steps

- Full implementation throughout all surgical services
- Full implementation for both same-day and inpatient surgery

Ultimately, improved glycemic control will yield better outcomes for our patients. Existing published protocols are complex and can be cumbersome and difficult to implement outside of an ICU setting. With the development of this protocol we hope to provide a simple method for glycemic control in the perioperative setting that is safe and can be easily implemented at smaller community hospitals.

Acknowledgements

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