

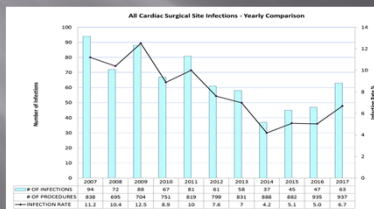
IMPACT OF BLOOD GLUCOSE MONITORING (BGM) IN THE CARDIAC SURGERY POPULATION PREVENTING SURGICAL SITE INFECTIONS

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Issue (1)

2014-2017
SSI rate in Cardiac surgery increased from 5.1% (2014) to 6.7% (2017)



Issue (2)

Surveillance data indicated that 40-71% of the patients who developed a surgical site infection (SSI) had a blood glucose level greater than 10mmol/L in the 72hrs perioperative period

Year	% blood glucose >10mmol/L
2014	46
2015	71
2016	53
2017	40

Issue (3)

Despite bundle initiatives to reduce SSI and yearly recommendations to control blood glucose in the peri-operative phase.

Pre-operative	Pre-op shower : 2%CHG wash cloth
	Hair removal with clippers
Intra-operative	Antibiotic prophylaxis
	Skin antiseptis 2% CHG with 70% alcohol
Post-operative	Prompt drain removal
	Removal of initial dsg
Recommendations given yearly from 2014	Control blood glucose to levels<10mmol/L in the peri-operative phase

Mini Project in 2017

- ❑ Real time glucose monitoring of all Cardiac surgery patients for 72 hours
- ❑ Weekly feedback to the Surgeons



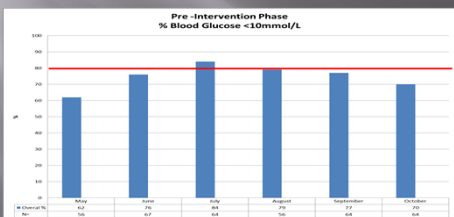
Project

- BGM on all patients undergoing cardiac surgery for 72hrs peri-operatively
- A multi-disciplinary team was formed:
 - Intensivist, Cardiac surgeon, endocrinologist, anesthesia, clinical educators, nursing, Infection Control and Pharmacy



Objective

Maintain a blood glucose level below 10mmol/L of the Cardiac surgery patients 80% of the time in the perioperative period (up to 72hrs post-op)



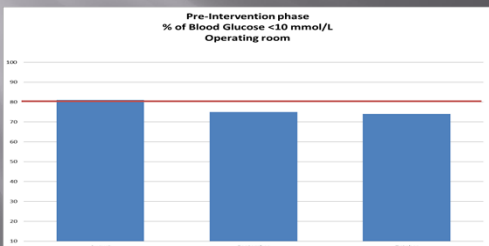
Findings (1)

- Patients who did not meet the target of maintaining blood glucose <10mmol/L 70% of the time are Diabetic

	Off target	On target	P-value
Number	17 (18%)	75 (82%)	=
Age (mean ± SD)	66.8 ± 9.4	66.1 ± 11.6	NS
Sex	16 (94%)	71 (95%)	NS
BMI (mean ± SD)	30.5 ± 6.5 (data available for n = 15)	27.2 ± 4.3 (data available for n = 70)	0.078
Diabetes	12 (71%)	19 (25%)	0.0001*
HbA1c of patients with DM	6.8 ± 0.9 (data available for n = 7)	6.6 ± 1.0 (data available for n = 9)	NS
Pre-operative Medicine consult	3 (18%)	16 (21%)	NS

Findings (2)

- Minimal use of IV insulin intra-operatively



Findings (3)

- IV insulin being discontinued during transfers from the OR to ICU and from ICU to SDU



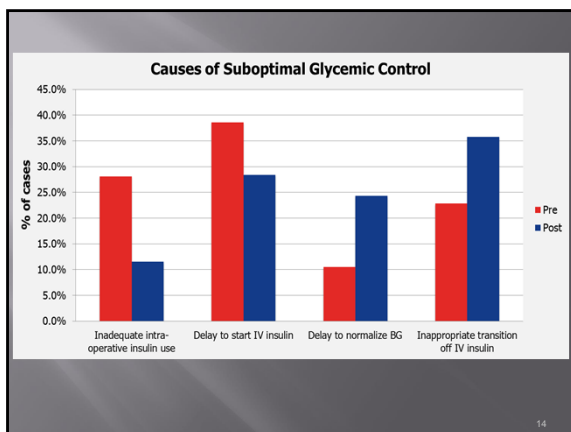
Findings (4)

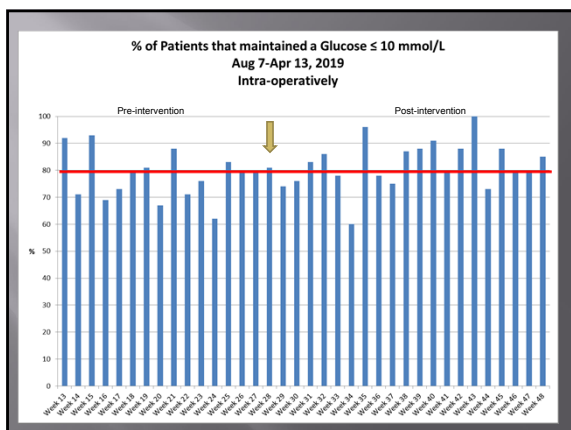
- Current Insulin protocol targets for a blood glucose range of 7-10mmol/L

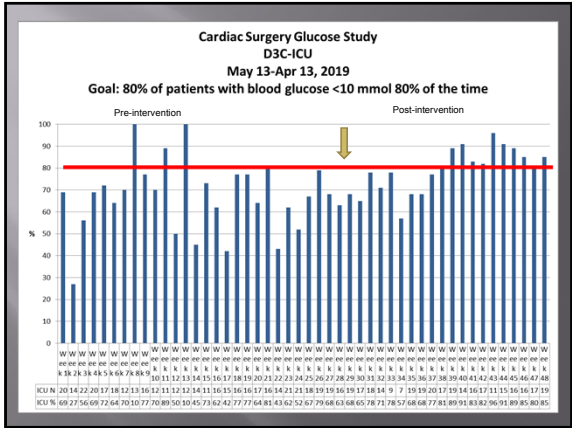
Section	Content
Indications	Patients requiring IV insulin therapy in a Critical Care Area.
Contraindications	None.
Monitoring	Continuous monitoring of blood glucose levels.
Management	Initial bolus of 1-2 units/kg, followed by a continuous infusion of 0.5-1.0 units/kg/hr.

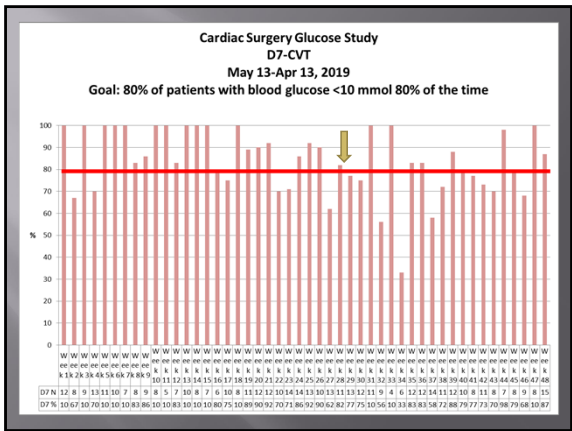
Proposed Solutions

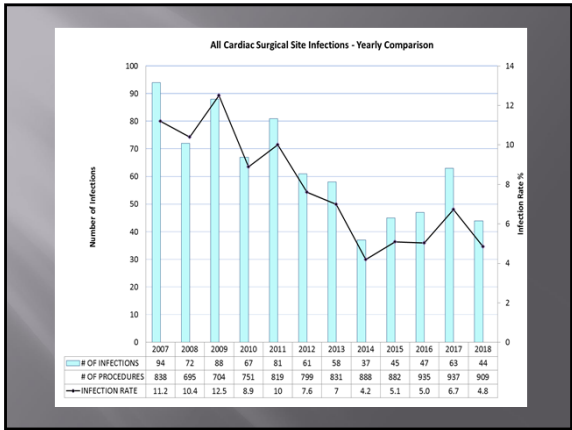
Causes of suboptimal glycemic control	Proposed solutions
Pre-existing diabetes	Consult Endocrinology
Clinical inertia: Blood glucose target of 7-10 mmol/L too high.	Tighten blood glucose targets from 7-10 to 6-8 mmol/L with use of a modified insulin protocol
Minimal use of IV insulin intra-operatively	Encourage more routine use of insulin infusions intra-operatively
Discontinuation of IV insulin during transfers from OR to ICU and from ICU to SDU	Continue IV insulin infusion during transfers intra-operatively
Prescription of SC insulin correction scale after discontinuation of IV insulin	Consult Endocrinology for assistance with appropriate transition off IV insulin, especially if infusion rate >2units/hr











Conclusion: Key findings

- ❑ Overwhelming proportion of patients not meeting glycemic control have preoperative diagnosis of DM
- ❑ 4 main postulated reasons for suboptimal glycemic control:
 - BG off target prior to leaving OR
 - IV insulin not initiated within 2 hours of arrival to ICU
 - failure to normalize BG within 9 hours of initiation of IV insulin
 - inappropriate transition off IV to SC insulin
- ❑ Overall improved BG control intra-op with more use of IV insulin in OR

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Lessons learned

- ❑ Detailed process mapping helped identify reasons for poor BGM in cardiac surgery patients and corrections at each of the identified steps helped to reduce SSI

Thank you



AT THE HEART OF THE MATTER
