

Region-Wide Audit of Perioperative Diabetes Management in Elective Patients

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Introduction

- 10% of elective surgery patients have diabetes
- Increased morbidity and mortality
- National guidance for best practice
- Multiple single-site audits demonstrate poor implementation
- Region-wide data collection to assess implementation
- Paired with survey of anaesthetists
- Proof of concept for multi-centred projects in NW



Method

- Ethics waiver, registered with individual audit departments
- Identify criteria
- Paper data collection sheet, electronic collation
- Local patient identification plan (piloted)
- Data collection over 2 week period, office hours (7-18/10/13)
- Inclusion: all adult, diabetic, elective, non-obstetric patients
- Central analysis
- Feedback to local sites



Main recommendations

Organisation and planning of care

1. Careful planning, taking into account the specific needs of the patient with diabetes, is required at all stages of the patient pathway from GP referral to post-operative discharge.
2. The patient should be involved in planning for all stages.
3. Hospital patient administration systems should be able to identify all patients with diabetes so they can be prioritised on the operating list.
4. High-risk patients (poor glycaemic control/complications of diabetes) should be identified in surgical outpatients or at pre-operative assessment and plans should be put in place to manage their risk.
5. Early pre-operative assessment should be arranged to determine a peri-operative diabetes management strategy and to identify and optimise other co-morbidities.
6. Routine overnight admission for pre-operative management of diabetes should not be necessary.
7. Starvation time should be minimised by prioritising patients on the operating list.
8. Surgical and anaesthetic principles of the Enhanced Recovery Partnership Programme should be implemented to promote earlier mobilisation with resumption of normal diet and return to usual diabetes management.
9. Multi-modal analgesia should be combined with appropriate anti-emetics to enable an early return to normal diet and usual diabetes regimen.
10. The patient should resume diabetes self-management as soon as possible where appropriate.
11. A policy which includes plans for diabetes management should be in place for safe discharge.
12. Outcomes should be audited regularly.

Diabetes specialists

13. Clear guidelines should indicate when the diabetes specialist team should become involved.
14. All hospitals should implement a Diabetes Inpatient Specialist Nurse (DISN) service.

Peri-operative use of intravenous insulin

15. The term 'variable rate intravenous insulin infusion' (VRIII) should replace the ambiguous term 'sliding scale'.
16. Patients with a planned short starvation period (no more than one missed meal in total) should be managed by modification of their usual diabetes medication, avoiding a VRIII wherever possible.
17. Patients expected to miss more than one meal should have a VRIII.
18. The recommended first choice substrate solution for a VRIII is 0.45% sodium chloride with 5% glucose and either 0.15% potassium chloride (KCl) or 0.3% KCl.
19. Insulin should be prescribed according to National Patient Safety Agency (NPSA) recommendations for safe use of insulin.

Peri-operative blood glucose monitoring

20. Capillary blood glucose (CBG) levels should be monitored and recorded at least hourly during the procedure and in the immediate postoperative period.
21. Hospitals should have clear guidelines for the management of blood glucose when it is outside the acceptable range.
22. Training for blood glucose measurement and diabetes management should be introduced for clinical staff caring for patients with diabetes.
23. The WHO surgical safety checklist bundle should be implemented. The target blood glucose should be 5-10 mmol/L (acceptable range 4-12 mmol/L).

High-risk patients are identified and plans made to manage risk

Starvation time is minimised

Patients expected to miss one meal do not receive a VRIII

Patients expected to miss more than one meal receive a VRIII

CBG levels are monitored hourly intra-operatively and immediately in recovery

The WHO checklist bundle is implemented. Target blood glucose should be 6-10 mmol L⁻¹; acceptable range 4-12 mmol L⁻¹

Results: Patient Characteristics

		All Patients	
n		247	(100%)
Age (years)		64.4	(13.5)
BMI (Kg M ⁻²)		31.1	(6.6)
Gender			
	Male	134	(54%)
	Female	113	(46%)
ASA class			
	I	0	(0%)
	II	125	(51%)
	III	117	(47%)
	IV	5	(2%)
Diabetes mellitus			
	Type 1	32	(13%)
	Type 2	215	(87%)
Primary mode of anaesthesia			
	Sedation	8	(3%)
	General	169	(68%)
	Regional	30	(12%)
	Neuraxial	40	(16%)



High-risk patients (HbA1c >69 mmol mol⁻¹) should be identified pre-operatively and plans (referral to diabetes team) should be put in place to manage their risk

- 70 (28%) patients, preoperative HbA1c not recorded
- 58.0±16.9 mmol mol⁻¹ average HbA1c
- 34 (20%, n = 168) patients had an HbA1c greater than 69 mmol mol⁻¹
- 52 (23%, n = 230) were already under the care of a diabetes specialist team
- 9 (4%, n = 230) patients were referred
- 14 (9%, n = 164) patients had an HbA1C >69 mmol mol⁻¹ and were not under specialist diabetes care



Starvation time should be minimised by prioritising patients on the operating list.

- 12:20 \pm 4:00 (n = 220) hours average fasting time
- 124 (51%, n = 244) first on list



Patients with a planned short starvation period (no more than one missed meal in total) should be managed by modification of their usual diabetes medication, avoiding a VRIII wherever possible.

Patients expected to miss more than one meal should have a VRIII.

	VRIII used	VRIII not used
Long starvation	12 (5%)	25 (11%)
Short starvation	27 (11%)	171 (73%)

CBG levels should be monitored and recorded at least hourly during the procedure and in the immediate postoperative period.

- 1:42 (0:40 to 2:15, IQR, n = 225) hours, average operation length.
- 0.58 CBGs per operation.
- 131 (56%) of operations had a CBG monitored hourly
- 165 (73 %, n=226) of patients had a CBG in recovery



**The WHO surgical safety checklist bundle should be implemented.
The target blood glucose should be 6-10 mmol L⁻¹ (acceptable range 4-12 mmol L⁻¹).**

- 234 (95%, n= 246) cases used the WHO check list.
- 19 (18% n = 104) of patients CBG remained in target range throughout the operation.
 - 38 (37%) above 10 mmol L⁻¹
 - 47 (45%) below 6 mmol L⁻¹
- 69 (67%) of patients CBG remained in acceptable range throughout the operation.
 - 16 (15%) above 12 mmol L⁻¹
 - 19 (18%) below 4 mmol L⁻¹



Summary of findings

- 78 Anaesthetists collaborated at 17 of the 19 hospitals in region
- 28% did not have a pre-op HbA1c recorded
- Average fasting time was 12h 20m
- 11% did not appropriately have a VRIII started
- 56% of operations had an hourly CBG performed
- 73% had a CBG performed in recovery
- 18% and 67% of patients' CBG remained within target and acceptable ranges, respectively



Discussion

- Good diabetic control linked to better outcomes
 - National recommendations lack reference to evidence
 - National recommendations not SMART
 - NW likely to be representative of national implementation
 - Local presentation and action plan
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- Proof of concept for future similar projects



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Questions?

