Incidence of diabetes mellitus and adequacy of pre-operative management

Please check with your local ethics service or governing body as to the process requirements for conducting an audit of your own practice. This audit has been kindly prepared by Dr Judith Killen, and does not reflect a formal position of ANZCA in relation to management of diabetes mellitus in a surgical population.

Background

The global prevalence of diabetes mellitus (DM) is increasing rapidly. It has been labeled the black death or silent pandemic of the 21st century.  
Traditionally, patients have been asked about their "usual blood sugar levels". However, there is a well validated test, the HbA1c, that gives a guide to glycaemic control. The HbA1c is starting to be used as a diagnostic test for Type 2 DM as well as for monitoring of the chronic control of the disease.  
The HbA1c is the glycated haemoglobin A compound. The amount of HbA that becomes glycated is proportional to the average blood glucose level over the previous 8-12 weeks. It has been available as a percentage of the total Hb but will in future will be in mmol HBA1c/mol Hb, i.e. mmol of glycated Hb/ mol of non-glycated Hb).
Higher HbA1c levels are associated with higher infection rates, increased all cause morbidity and mortality and length of stay. This has been particularly well documented in association with cardiac surgery.
All patients with Diabetes mellitus should have the HbA1c test performed before major* elective surgery to guide perioperative glycaemic management or even delay elective surgery to optimise glycaemic management.
* major surgery is defined as surgical procedure involving the patient staying in hospital at least one night after the procedure.

Aim and objectives

Measure the HbA1c preoperatively in all patients with DM presenting for major elective surgery.
Or
Measure the HbA1c preoperatively in ALL patients presenting for major elective surgery, if possible.

Research evidence/ best practice

Levy and Hall suggest preoperative HbA1c be measured for all patients scheduled for major elective surgery. This may be considered to add an unacceptable cost (approx. $22 NZ and $19 in Australia). Where this is not routinely performed for major elective surgery, only patients with diagnosed diabetes mellitus should be included in the audit.
The following table is suggested as ‘best practice’:
- HbA1c less than 6.0% (42 mmol/mol) - non-diabetic or very well controlled DM – no action required.
- HbA1c 6.0-6.5% (42-48 mmol/mol) - borderline DM or well controlled DM- no action required.
- HbA1c over 6.5% (48 mmol/mol) - diagnostic of DM or reasonable control of DM – no action required.
- HbA1c over 7.0% (53 mmol/mol) - diagnostic of DM; reasonable control of DM – no action required.
- HbA1c over 8% (64 mmol/mol) - diagnostic of DM. Control sub-optimal. Consider delaying elective surgery to improve management.
- HbA1c over 9% (75 mmol/mol) - diagnostic of DM. Strongly recommend delaying elective surgery.

It is important to note that a range of conditions affecting red blood cells (anaemia, haemoglobinopathies) can affect the accuracy of the HbA1c.

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<th>Suggested indicators</th>
<th>% of patients undergoing major elective surgery should have HbA1c levels tested.</th>
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<td>% of patients undergoing major elective surgery with a HbA1c level over 64 mmol/mol, that were advised that surgery should be delayed to improve management.</td>
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<td>% of patients undergoing major elective surgery with a HbA1c level over 75 mmol/mol that had surgery delayed and were referred to a diabetic clinic/specialist.</td>
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| Standards and criteria for best practice | It has been shown repeatedly that in-hospital hyperglycaemia is associated with increased peri-operative morbidity and mortality. Current statistics suggest an incidence of DM in Australia of over 5% but this is widely believed to be and under estimation. In NZ, approximately fifty patients are newly diagnosed with diabetes every day. Given the strongly suspected population of undiagnosed diabetic patients and the health care costs associated with their poorer outcomes, it has been suggested that all patients undergoing major elective surgery have a pre-operative HbA1c test, or at least those patients with known diabetes mellitus. |

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<tr>
<th>Method</th>
<th>Data for series of approximately 50 patients undergoing major elective surgery. Suggested data collection (refer to <em>Incidence of Diabetes Data Collection Form</em>):</th>
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</table>
|        | - Age  
|        | - Weight  
|        | - Comorbidities  
|        | - Procedure  
|        | - Diabetes status  
|        | - If HbA1c test has been undertaken and if so the patient’s level and whether surgery was delayed. |

| References | 1. Matthews DR, Matthews PC; Banting Memorial Lecture 2010 Type 2 diabetes as an “infectious” disease: is this the Black death of the 21st Century? Diab Med 2011 Jan  
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<td><strong>Acknowledgement</strong></td>
<td>Author: Dr Judith Killen FANZCA. July 2015.</td>
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Associated documents:

- [Incidence of Diabetes Mellitus and Adequacy of Pre-operative Management Data Collection Form](#)
- [Incidence of Diabetes Mellitus and Adequacy of Pre-operative Management Results Summary & Conclusions Form](#)