



# Peri-operative Management of Surgical Patients with Diabetes

National Confidential Enquiry into Patient Outcome and Death (NCEPOD)

## Anaesthetic Questionnaire

**CONFIDENTIAL**

### DETAILS OF THE CLINICIAN COMPLETING THIS QUESTIONNAIRE

Grade: \_\_\_\_\_ Specialty: \_\_\_\_\_

#### What is this study about?

NCEPOD is undertaking a study to identify and explore remediable factors in the process of care in the peri-operative management of surgical patients with diabetes. This study aims to review the whole patient pathway from referral to surgery (elective or emergency) to discharge from hospital.

##### Inclusions:

- Patients aged 16 and over:
- who have a diabetes mellitus ICD10 code (E10.0-E11.0 inclusive in any position)
- who were admitted as either an emergency, elective or unplanned admission (e.g. following day surgery)
- who had a hospital stay of at least one night post surgery
- and who had a major surgical procedure between 1st February - 31st March 2017 (inclusive)

##### Exclusions:

- Patients undergoing day surgery without an overnight stay
- Obstetric surgery
- Minor procedures - OPCS codes available on our website <http://www.ncepod.org.uk/pd.html>

#### CPD accreditation:

Consultants completing NCEPOD questionnaires make a valuable contribution to the investigation of patient care. It also provides an opportunity for consultants to review their clinical management and undertake a period of personal reflection. These activities have a continuing medical and professional development value for individual consultants. Consequently, NCEPOD recommends that consultants who complete NCEPOD questionnaires keep a record of this activity which can be included as evidence of internal/self directed Continuous Professional Development in their appraisal portfolio.

#### Questions or help?

If you have any queries about this study or this questionnaire, please contact:

[pd@ncepod.org.uk](mailto:pd@ncepod.org.uk) or telephone: 020 7251 9060

Thank you for taking the time to complete this questionnaire. The findings of the study will be published in late 2018.

Elective patients	- Section 1 and 3
Emergency patients	- Section 2 and 3

If you (the clinician completing the questionnaire) would like email confirmation of the completion of this questionnaire for your records, please supply your email address clearly below:

FOR NCEPOD USE ONLY

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4 7 2 8 4 6 5 5 8 8 4 8

## CODES FOR GRADE

01 – Consultant	02 – Staff grade/Associate specialist
03 – Trainee with CCT	04 – Senior specialist trainee (ST3+ or equivalent)
05 – Junior specialist trainee (ST1&ST2 or CT equivalent)	06 – Basic grade (HO/FY1 or SHO/FY2 or equivalent)
07 – Specialist nurse (nurse consultant, nurse practitioner, clinical nurse specialist)	08 – Senior staff nurse, enrolled nurse (EN) etc)
	10 – Non-registered staff (HCA etc.)

## DEFINITIONS

Diabetic ketoacidosis	Consistently high blood glucose levels can lead to a condition called diabetic ketoacidosis. This happens when a severe lack of insulin means the body cannot use glucose for energy, and the body starts to break down other body tissue as an alternative energy source. The diagnosis is made with a pH <7.3, bicarbonate concentration <15mmol/l and a glucose of >11 (or a history of diabetes), and ketosis (urine ketones more than ++ and/or blood ketone level >3mmol/l).
HbA1c	HbA1c (also referred to as A1c or haemoglobin A1c) refers to glycated haemoglobin. It develops when haemoglobin, a protein within red blood cells that carries oxygen throughout the body, joins with glucose in the blood, becoming 'glycated'. By measuring glycated haemoglobin (HbA1c), clinicians are able to get an overall picture of what the average blood sugar levels have been over a period of weeks/months. For people with diabetes this is important as the higher the HbA1c, the greater the risk of developing diabetes-related complications
Hyperosmolar hyperglycemic state	HHS is a complication of diabetes mellitus (predominantly type 2) in which high blood sugars cause severe dehydration, increases in osmolality (relative concentration of solute) and a high risk of complications, coma and death. It is diagnosed with blood tests. A glucose >30mmol/l, an osmolality of >320mOsmol/l with dehydration.
Hypoglycemia	Hypoglycemia occurs when blood glucose levels fall below 4 mmol/L (72mg/dL).
Link nurse	Link nurses are part of a system that shares information and provides formal, two-way communication between specialist teams and nurses in the clinical area. Many different clinical areas might employ such nurses, including tissue viability and diabetes
Macrovascular disease	Disease of the large blood vessels, including the coronary arteries, the aorta, and the large arteries in the brain and in the limbs. This sometimes occurs when a person has diabetes for a long time.
Microvascular disease	Disease of the finer blood vessels in the body, including the capillaries. The microvascular complications of diabetes such as neuropathy can lead to loss of sensation and the development of foot ulcers.
Pre-operative assessment clinic	The pre-operative assessment clinic is a nurse-led clinic that specialises in preparing patients for their planned surgery.
Variable Rate Intravenous Insulin Infusion (VRIII)	The infusion of intravenous insulin at a variable rate according to regular capillary blood glucose measurements with the aim of controlling serum glucose levels within a specified range. The VRIII is usually accompanied by an infusion of fluid containing glucose to prevent insulin-induced hypoglycaemia.

## ORAL HYPOGLYCAEMIC AGENTS

<b>Biguanides</b>	<b>Sulphonylureas</b>	<b>Thiazolidinediones (glitazones)</b>	<b>SGLT-2 inhibitors</b>
Metformin IR	Amaryl (glimepiride)	Avandia (rosiglitazone)	Forxiga (dapagliflozin)
Metformin SR	Daonil (glibenclamide)	Actos (pioglitazone)	Invokana (canagliflozin)
	Diamicon (gliclazide)	Rezulin (troglitazone)	Jardiance (empagliflozin)
<b>Meglitinides</b>	Diamicon MR (gliclazide)	<b>Alpha glucosidase inhibitors</b>	<b>Dipeptidyl peptidase IV inhibitors</b>
Repaglinide	Glibenese (glipizide)	Miglitol	Vildagliptin
Nateglinide	Minodiab (glipizide)	Voglibose	Saxagliptin
	Tolbutamide	Acarbose	Sitagliptin
			Linagliptin



1. Was this an elective or emergency admission?
- Elective (please complete Sections 1 and 3)
- Emergency (please complete Sections 2 and 3)

## Section 1 - Elective patients only

### PRE-OPERATIVE ASSESSMENT

2a. Did the patient attend a pre-operative assessment clinic (POAC)\*  Yes  No - go to Q6  
\*Definitions on page 2

2b. If Yes to 2a, who did they see in the pre-operative assessment clinic? \*Definitions on page 2

- Consultant  Non training grade doctor  Training grade doctor
- Diabetes specialist nurse  Dietitian  POAC nurse  Link nurse\*
- Other (please state):

3a. Was information on the management of the patient's diabetes in the community available at the pre-operative assessment clinic? (i.e. GP referral letter or GP notes)

- Yes  No  Unknown

3b. If Yes to 3a, what did it include: (please select all that apply) \*Definitions on page 2

- |  |  |
|--|--|
| <input type="checkbox"/> Evidence of regular blood sugar measurement   | <input type="checkbox"/> HbA1c* (within the last 3 months)           |
| <input type="checkbox"/> Patient co-morbidities  | <input type="checkbox"/> Urgency of referral                         |
| <input type="checkbox"/> Community diabetes specialist nurse assessment or notes                                     | <input type="checkbox"/> BMI   |
| <input type="checkbox"/> List of current medication  | <input type="checkbox"/> Blood pressure                              |
| <input type="checkbox"/> Evidence from primary care about the need to optimise the patient's diabetes before surgery | <input type="checkbox"/> Estimated glomerular filtration rate (eGFR) |

**Diabetes related complications** (please select all that apply)

- |  |                                      |  |
|--|--------------------------------------|--|
| <input type="checkbox"/> Cardiovascular  | <input type="checkbox"/> Neuropathy  | <input type="checkbox"/> Nephropathy                 |
| <input type="checkbox"/> Skin problems   | <input type="checkbox"/> Retinopathy | <input type="checkbox"/> Peripheral vascular disease |
| <input type="checkbox"/> Cerebrovascular (with full recovery)                              |                                      |  |
| <input type="checkbox"/> Cerebrovascular (with minor residual disability)                  |                                      |  |
| <input type="checkbox"/> Cerebrovascular (with major disability affecting day to day life) |                                      |  |

4a. Was a recent HbA1c\* (3 months prior to surgery) available at the pre-operative assessment clinic?

- Yes  No  Unknown

4b. If Yes to 4a, was the HbA1c >8.5% or 69 mmol/L?  Yes  No  Unknown

4c. If Yes to 4b, was there an attempt to improve control, before admission, by referral to:

- |  |                                       |  |
|--|---------------------------------------|--|
| <input type="checkbox"/> Diabetes team | <input type="checkbox"/> Primary care | <input type="checkbox"/> Admitted to secondary care for optimisation |
| <input type="checkbox"/> Dietitian     | <input type="checkbox"/> None         | <input type="checkbox"/> Unknown                                     |

Other (please state):



4d. If the answer to 4c was 'None', and if the patient's HbA1c was >8.5% or 69mmol/L, was a reason documented as to why not?

Yes       No       Unknown

4e. If Yes to 4d, please provide the reason:

5a. Following attendance at the pre-operative assessment clinic, were any changes made to the patient's diabetes management to optimise them for surgery?

Yes       No       Unknown

5b. If Yes to 5a, what changes were undertaken?

6a. Was this patient booked as a day case?       Yes       No       Unknown

6b. Was this appropriate?       Yes       No

6c. If No to 6b, please state why not:

6d. If No to 6a, should or could the patient have been booked as a day case?       Yes       No

7. Was a generic pre-assessment proforma completed for this patient?

Yes       No       Unknown

8. If surgery was considered more important than the need for diabetes optimisation and HbA1c was > 8.5% or 69 mmol/L was a variable rate intravenous insulin infusion\* (VRIII - previously known as sliding scale) commenced on admission?

\*Definitions page 2

Yes       No       Unknown       N/A

9a. Was the patient first on the scheduled operating list?       Yes       No

9b. If No to 9a, please state why not:

9c. What time of day was the patient booked to be on the operating list:

(hh:mm)       Unknown

10a. For how long was the patient fasted pre-operatively?        hours

10b. How many meals did the patient miss pre-operatively?     

11a. Did prolonged starvation result in a change in the management of the patient's diabetes?

Yes       No

11b. If Yes to 11a, did this include: (please mark all that apply)

Start of VRIII       IV fluids       Other (please state):

**End of Section 1 - please continue to Section 3**



## Section 2 - Emergency patients only

- 12a. Was the patient admitted whilst on an elective waiting list?  Yes  No - go to Q14
- 12b. Had the patient attended a pre-operative assessment clinic (POAC)\*  Yes  No
- 12c. If Yes to 12b, who did they see in the pre-operative assessment clinic?
- Consultant  Non training grade doctor  Training grade doctor
- Diabetes specialist nurse  Dietitian  POAC nurse  Link nurse\*
- Other (please state):
- 13a. Was information on the management of the patient's diabetes in the community available at the pre-operative assessment clinic? (i.e. GP referral letter or GP notes)
- Yes  No
- 13b. If Yes to 13a, what did it include: (please select all that apply) \*Definitions on page 2
- Evidence of regular blood sugar measurement  HbA1c\* (within the last 3 months)
- Patient co-morbidities  Urgency of referral
- Community diabetes specialist nurse assessment or notes  BMI
- List of current medication  Blood pressure
- Evidence from primary care about the need to optimise the patient's diabetes before surgery  Estimated glomerular filtration rate (eGFR)
- Diabetes related complications** (please select all that apply)
- Cardiovascular  Neuropathy  Nephropathy
- Skin problems  Retinopathy  Peripheral vascular disease
- Cerebrovascular (with full recovery)
- Cerebrovascular (with minor residual disability)
- Cerebrovascular (with major disability affecting day to day life)
14. If the patient had diabetic ketoacidosis\* was this being treated pre-operatively? \*Definitions on page 2
- Yes  No  N/A  Unknown
15. Did the patient go to a high care area prior to surgery for optimisation?
- Yes  No  Unknown

**End of Section 2 - please continue to Section 3**



### Section 3 - To be completed for ALL patients

#### PRE-OPERATIVE MANAGEMENT

16. On admission was there any record of: (please mark all that apply)
- Blood ketone measurement     Urine ketone measurement     None     Unknown  
 N/A (blood ketone measurement not required)
17. Which of the following staff were involved in the decisions around the overall management of this patient?
- Consultant surgeon     Consultant anaesthetist     Consultant diabetologist  
 Diabetes specialist nurse     Consultant in intensive care medicine
- 18a. On admission to hospital was a pre-operative assessment of risk made?     Yes     No
- 18b. If Yes to 18a, which of the following were used:
- P-POSSUM     SORT     ASA     American College of Surgeons risk assessment  
 Other (please specify):
- 18c. If ASA was used, please state the patient's ASA grade immediately prior to surgery:
- ASA I    A normal healthy patient  
 ASA II    A patient with mild systemic disease  
 ASA III    A patient with severe systemic disease  
 ASA IV    A patient with severe systemic disease that is a constant threat to life  
 ASA V    A moribund patient who is not expected to survive the operation
19. Was a pre-operative risk of post-operative nausea and vomiting carried out? (e.g. Apfel score)
- Yes     No     Unknown
- 20a. Following admission was there any further delays in order to optimise the patient's condition for surgery?
- Yes     No     Unknown
- 20b. If Yes to 20a, how long was the delay?      hours      days
- 20c. If Yes to 20a, was this related to:
- Diabetes control     Co-morbidities     Theatre availability     Other
- 20d. If 'co-morbidities' or 'other' please describe:
- 
- 21a. Following admission was the patient seen by an anaesthetist on the day of surgery?     Yes     No
- 21b. If Yes to 21a, please answer the following:
- i) Anaesthetist's grade:         Please use grade codes on page 2
- ii) Was the assessment carried out by the anaesthetist documented?     Yes     No
- iii) Was a diabetes management plan documented?     Yes     No
- iv) Were the patient's co-morbidities, related to their diabetes, documented in this assessment? \*Definitions on page 2
- Yes - macrovascular disease\*     Yes - microvascular disease\*  
 No



Q21b continued

- v) Were the patient's diabetes medications documented as part of this assessment?  Yes  No
- vi) If Yes to 21b-v, which diabetes medicines was the patient on?
- None - diet controlled

**Insulin**

- Once daily  Twice daily  3 times a day  4 times a day  5 times a day

**Oral hypoglycaemic agents** (please see page 2 for medicine references)

- Meglitinides  Biguanides  SGLT-inhibitors  Sulphonylureas  DPP IV inhibitors
- Alpha glucosidase inhibitors  Thiazolidinediones (glitazones)

**Other injectable therapy**

- GLP-1 (analogues)

22a. Was the patient on an enhanced recovery programme?  Yes  No  Unknown

22b. If Yes to 22a, did they undergo pre-operative carbohydrate loading?  Yes  No  Unknown

22c. If Yes to 22b, what was used?

- Pre-load  Pre-op nutrition and carbohydrate loading  Other (please specify):

22d. If Yes to 22b, was pre-operative carbohydrate loading given (please select all that apply):

- The night before surgery  2 hours before transfer to theatre
- The morning of surgery (>2 hours before transfer to theatre)

22e. Were capillary blood glucose measurements taken after carbohydrate loading?

- Yes (please state):    mmol/L  No  N/A

22f. If No to 22a, was the capillary blood glucose between 6-10 mmol/L on the day of surgery?

- Yes  No

23a. Were capillary blood glucose measurements recorded during surgery?  Yes  No  Unknown

23b. If Yes to 23a, was this recorded hourly?  Yes  No  Unknown

23c. If Yes to 23a, were all the capillary blood glucose measurements between 6-10mmol/L?

- Yes  No  Unknown

i) If No to 23c, what was the lowest capillary blood glucose?    mmol/L

ii) If No to 23c, what was the highest capillary blood glucose?    mmol/L

24a. Was any subcutaneous insulin administered?  Yes  No  Unknown

24b. If Yes to 24a, please state reason why?

25. Was a WHO surgical checklist performed?  Yes  No  Unknown

26. Was diabetes management discussed as part of the WHO checklist?  Yes  No  Unknown



27. Which IV fluids were administered separately from VRIII\*?

	Pre- operatively	Intra- operatively	Post- operatively
Hartmanns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4% dextrose saline in 0.18% saline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5% dextrose in 0.45% saline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dextrose saline in 0.18%	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5% dextrose in 0.9% saline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5% dextrose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.9% saline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Added magnesium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Added potassium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please state):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input style="width: 100%; height: 20px;" type="text"/>			

28. Was urine output monitored? (please select all that apply)

- Pre-operatively                       Intra-operatively                       Post-operatively  
 Not monitored                       Unknown

**ANAESTHESIA**

29a. What type of anaesthesia was used?

- Local only                       Regional only                       Regional and sedation  
 General only                       General and regional                       General and local infiltration

29b. Which of the following were used to minimise post-operative nausea and vomiting: (please select all that apply)

- 5HT3 antagonist (e.g. ondansetron/ granisetron)                       Dopamine antagonists (e.g. prochlorperazine)  
 Antihistamines (e.g. cyclizine)                       Dexamethasone  
 Total intravenous anaesthesia                       Other (please state):

30. What grade of anaesthetist administered the anaesthetic?   Please see grades on page 2

31. Was the anaesthetist who administered the anaesthetic the same as the one who saw the patient pre-operatively?

- Yes                       No                       N/A (patient not seen by anaesthetist pre-operatively)

32a. Did the patient arrive in theatre with a variable rate intravenous insulin infusion\* (VRIII) set up?

- Yes                       No                       Unknown                      \*Definitions on page 2

32b. If Yes to 32a, was this appropriate?                       Yes                       No

32c. If No to to 32b, please state why not:





32d. If the patient arrived in theatre with a VRIII set up, was this stopped:

- Prior to the operation       During the operation       Not stopped

32e. If stopped, when was VRIII re-started?   hours later       N/A not stopped

33a. If the patient did not arrive in theatre with a VRIII set up, was VRIII commenced intra-operatively?

- Yes       No       N/A

33b. If Yes to 33a, please state reason why:

34. If VRIII was used, was it recorded on the anaesthetic chart?       Yes       No       N/A

35. Which intravenous fluid was administered as part of VRIII?

36. Was invasive cardiovascular monitoring used?       Yes       No

37. Did the patient develop any of the following diabetes complications intra-operatively: \*Definitions on page 2

- Hypoglycaemia\* requiring treatment (<4mmol/L)       Diabetic ketoacidosis\*  
 Hyperosmolar hyperglycaemic state\*       Other (please state):

38a. Were intra-operative urea and electrolytes recorded as part of arterial blood gas measurements?

- Yes       No

38b. If Yes to 38a, were they abnormal?       Yes       No

38c. If Yes to 38b, please provide further details:

39. Were there any episodes of hypotension?       Yes       No

40a. Were there any untoward events?       Yes       No

40b. If Yes to 40a, please state:

## POST OPERATIVE MANAGEMENT

41. Was capillary blood glucose measured in the theatre recovery area?       Yes       No

42. Following theatre recovery, where did the patient go?

- Discharge lounge       Day surgery unit       Medical ward       Surgical ward  
 Critical care

43. Was multimodal analgesia prescribed?       Yes       No

44. Were nonsteroidal anti-inflammatory drugs part of the post-operative analgesia regimen?

- Yes       No       Unknown



45. How soon after surgery did the patient eat?   hours
46. Was the specialist diabetes team involved within the first 24 hours in the post-operative management?  
 Yes       No       Unknown
47. If the patient had Type 1 diabetes, how long after their first post-operative dose of subcutaneous insulin was the VRIII stopped?  
  hours        days       N/A patient did not have Type 1 diabetes
48. What arrangements were made to ensure the patient returned safely to their normal diabetes medication?  
 Diabetes post-operative pathway       Anaesthetic care plan       Surgical care plan  
 Diabetes team review       Other (please state):

49. Were there clear instructions documented as to how the patient should return to their normal diabetes medication?  
 Yes       No       Unknown
50. What was the discharge destination of this patient?  
 Usual place of residence       Patient died during this admission  
 Transferred to another hospital

51. Please provide any further comments relating to this case. With the benefit of hindsight, is there anything, in your opinion, that should have been done differently? Was this related to clinical or organisational aspects of care? (N.B. please continue your answer using the box on the following page if more space is required). Please know that all answers are confidential

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