Diabetes in the Last Hours and Days of Life

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With Special Thanks to

• Patient, Carer and Public Representatives
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Guidelines for the Management of Diabetes in Palliative Care

Dr E McKenna, Dr L Chapman, Mrs T Hutchinson
Summar of Current Guidelines

- Outlines the general principles of symptom control in diabetic patients approaching the end of life
- Provides dietary advice and oral medication advice for patients with type 2 diabetes
- Provides guidance of insulin dose reduction in type 1 diabetic patients towards the end of life
- Advises monitoring regimen for patients with different types of diabetes
• Gliclazide is the oral hypoglycaemic of choice [Grade B]
• Long acting insulins such as Glargine are the insulins of choice [Grade B]
• Diabetic control should be monitored using capillary blood glucose and venous blood glucose. Urinalysis should not be used for routine monitoring [Grade B]
• Sliding scales of insulin and the use of Actrapid should be avoided in the management of episodes of hyperglycaemia [Grade D]
Systematic Literature Review

April-May 2016
Our Questions using PICO

1. In patients with diabetes in the last hours to days of life (P), what method of monitoring glycaemic control (I) is the most effective to maximise symptom control (O)

2. In patients with diabetes in the last hours to days of life (P), what method of managing diabetes (I) is most effective to maximise symptom control (O)
Literature Search

- (Palliat* OR “End of life”) AND diabet* AND (monitor* OR Manag*)

- Medline, EMBASE and CINAHL databases:
  - 347 articles
  - 42 abstracts
  - 11 articles
  - 4 Full texts included

- Cochrane and NICE- No Evidence Found
Pilkey J, et al. (2012). Corticosteroid-Induced diabetes in Palliative Care. *Journal of Palliative Medicine, 15*(6); 681-689

Cohort Study

The risk of steroid induced diabetes correlates with dose of steroid and duration of use. Once steroid induced diabetes develops, reducing the dose does not improve blood sugars, and steroid induced diabetes may persist for months following discontinuation of steroids [Level 2-].
Included articles


Qualitative study of professional attitudes using questionnaires and focus groups

There is variable practice in terms of monitoring and management of diabetes at the end of life, further evidence-based guidance is needed. Discuss with diabetes experts if unsure [Level 3]

**Cohort Study**

Patients with poorly controlled type 2 diabetes die faster after progressing through chemotherapy then those with well controlled type 2 diabetes [Level 2-].
Included articles

Ford-Dunn S, Smith A, & Quinn J. (2006). Management of diabetes during the last days of life: attitudes of consultant diabetologists and consultant palliative care physicians in the UK. *Palliative Medicine, 20;*197-203

Qualitative study of semi-structured questionnaire of attitudes

Palliative care physicians agree with diabetologists mostly around stopping monitoring and treatment of type 2 diabetes at the end of life, but there is less agreement around how to manage type 1 diabetes [Level 4] (due to lack of analysis)

Diabetes UK

Offers guidance on how to alter monitoring, blood glucose targets and rationalise treatments in patients in the last year of life. Also contains guidance specific to last hours to days of life, including management of hyperglycaemia and hypoglycaemia.

It is a document based on expert opinion, not evidence based, and appears to contain no discussion or opinion of palliative care physicians.
Diabetes in the last hours to days of Life- Audit results

Undertaken September- October 2016

Professional Practice survey- 37 Responses
Case Note Audit- 83 Responses
Updated Guideline
Recommendations and Standards
Introduction

In 2006, 171 million people worldwide suffered from diabetes and this figure was predicted to increase dramatically into the future. The incidence of diabetes in patients with cancer is thought to be six times greater than that found in the general population.

It is difficult to maintain optimal glycaemic control in patients approaching the end of life. This is balanced against the need to maintain the dignity and comfort of patients approaching the end of life, where evidence about the benefit of glycaemic control in improving symptoms is lacking.

Nevertheless, strategies aimed at avoiding unpleasant osmotic symptoms or treatment related hypoglycaemia are felt to be in the interest of patients with diabetes approaching the end of life.
Introduction

In the absence of interventional studies examining the optimal monitoring and treatment strategies for patients with diabetes in the last hours to days of life, guidance has been provided by Diabetes UK\(^1\) on best practice when dealing with this clinical entity. These guidelines are based on the expert opinion of the diabetes clinical community. Whilst this guideline takes a comfort-focussed approach to the management of diabetes in patients in the last hours to days of life, its applicability in the different treatment areas (hospital, hospice or home) has not fully been considered, and it may not fully reflect the opinions of those in the palliative medicine community. In addition, some recommendations in said guideline are now out of date, requiring a fresh consensus around some practices.
General Principles of Monitoring

- Blood glucose acceptable range can be considered 6-15mmol/L\(^1\).
- Hyperglycaemia is defined as blood glucose >20mmol/L, Hypoglycaemia is <4mmol/L\(^1\)
- If a patient is felt to be imminently dying, and it would be inappropriate to treat any episode of hyper/hypoglycaemia identified, it would be reasonable to explain this to the patient and/or those important to them, document it, and discontinue monitoring.
- Repeat blood glucose measurements are uncomfortable for the patient\(^7\). Therefore, generally diabetes should be monitored as infrequently as safety permits, and using the least invasive methods possible [Level 4].
- Given the importance of prioritising comfort at the end of life, a patient with symptoms of hyper or hypoglycaemia in the last hours to days of life should have their capillary blood glucose checked\(^1\) [Level 4].
Monitoring in patients with Type 2 Diabetes NOT receiving medication

• Due to the low risk of patients with type 2 diabetes developing either diabetic ketoacidosis or hypoglycaemia (providing they are not receiving insulin or sulfonylurea therapy), regular monitoring can be discontinued in the last hours to days of life\textsuperscript{6,1} [Level 4].

• If the patient develops symptoms of hyper or hypoglycaemia, a capillary blood glucose measurement is indicated\textsuperscript{1} [Level 4].

• If on an individual clinical basis, regular monitoring is thought to be necessary, this should be done through capillary glucose monitoring [Level 4]
Monitoring in patients with Type 1 Diabetes and Type 2 diabetes receiving medication

• In type 1 diabetes patients it is often the case that treatment will be continued in the last hours to days of life\textsuperscript{6}. It is therefore recommended that glucose monitoring on a regular basis be continued to avoid episodes of hypoglycaemia during a period of reduced oral intake [Level 4].

• Glucose monitoring should take the form of blood glucose monitoring once daily at teatime if the patient is still eating\textsuperscript{6,1} but may be undertaken at any time if the patient is no longer taking any nutrition [Level 4].

• Whilst there is no data to recommend monitoring schedules for patients with type 2 diabetes still receiving treatment, extrapolating from type 1 diabetes care in whom treatment is not stopped, it is sensible to suggest regular blood glucose monitoring daily at teatime also if able to eat, or any time if not taking any nutrition [Level 4].
Monitoring in patients with steroid induced diabetes

• Prior to commencing steroids, baseline blood sugar should be checked.
• For those patients without known diabetes who are commenced on steroids, twice weekly monitoring is recommended as the frequency at which monitoring is not unduly burdensome but which is effective at detecting the onset of steroid induced diabetes\textsuperscript{11} [Level 2-].
• If patients have a random capillary blood glucose measurement of >8mmol/L, the diagnoses of steroid induced diabetes can be confirmed IF APPROPRIATE with a venous glucose measurement >11mmol/L\textsuperscript{1}.
• Patients with steroid induced diabetes who remain on steroids regardless of their treatment for the diabetes should receive regular monitoring. This should take the form of capillary blood glucose monitoring daily at teatime. [Level 4].
• If steroids are discontinued in patients in the last hours to days of life, any diabetes medications should be reviewed, reduced or possibly discontinued\textsuperscript{1}. Regular monitoring should continue for any patients still receiving treatment for their diabetes\textsuperscript{5} [Level 4].
# Symptoms/signs of hyper/hypoglycaemia

## Table 1. Symptoms and signs of hyperglycaemia

<table>
<thead>
<tr>
<th>Symptom/Sign</th>
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<tbody>
<tr>
<td>Polydipsia</td>
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<tr>
<td>Polyuria</td>
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<tr>
<td>Blurred vision</td>
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<tr>
<td>Fatigue</td>
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<tr>
<td>Headache</td>
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<tr>
<td>Nausea/vomiting</td>
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<tr>
<td>Shortness of breath</td>
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<tr>
<td>Smell of ketones on breath</td>
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<tr>
<td>Dry mouth</td>
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<tr>
<td>Weakness</td>
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<tr>
<td>Confusion/ agitation</td>
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<tr>
<td>Abdominal pain</td>
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<tr>
<td>Drowsiness</td>
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<tr>
<td>Coma</td>
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</tbody>
</table>

## Table 2. Symptoms and signs of hypoglycaemia

<table>
<thead>
<tr>
<th>Symptom/Sign</th>
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<tbody>
<tr>
<td>Sudden onset of hunger</td>
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<tr>
<td>Sweating</td>
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<tr>
<td>Palpitations/ anxiety</td>
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<tr>
<td>Dizziness</td>
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<tr>
<td>Poor concentration</td>
</tr>
<tr>
<td>Confusion</td>
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<tr>
<td>Drowsiness</td>
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<tr>
<td>Coma</td>
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Management: Withdrawing treatment

• The primary reason for glycaemic control in the last hours to days of life is symptom control and avoidance of osmotic symptoms from hyperglycaemia, or symptoms of hypoglycaemia. Therefore, withdrawal of diabetes medications should be balanced against the patient’s symptoms, and these should be assessed regularly as treatment is withdrawn\(^7\) [Level 2-]

• In a patient who is taking oral hypoglycaemia medications in the last hours to days of life, it is reasonable to stop these without the need to commence insulin replacement unless symptomatic\(^6\) [Level 4].

• For patients receiving insulin therapy, published professional opinion is in favour of stopping insulin in type 2 diabetics who are only receiving low dose insulin\(^1\) [Level 4]. For type 1 diabetics or type 2 diabetics on higher dose insulin or with a history of developing ketosis, the recommendation is to continue insulin at a low dose and a simplified regime i.e. once daily Lantus (glargine) in the morning\(^1\) [Level 4]
Management: Steroid Induced diabetes

- The risk of developing hyperglycaemia due to steroid therapy correlates with the dose of the steroid\textsuperscript{11} [Level 2-].
- Management of symptomatic hyperglycaemia in patients on steroids should not rely on a change in the steroid dose\textsuperscript{11} [Level 2-].
- For patients with steroid induced hyperglycaemia, insulin therapy is appropriate if patients become symptomatic or are found to have a capillary blood glucose of $>20\text{mmol/L}$; a low dose long acting insulin i.e. Lantus (glargine) once daily in the morning is advised\textsuperscript{1} [Level 4].
Management: Hyperglycaemia (>15mmol/L)

- If a patient is asymptomatic, consider whether there is a need to treat hyperglycaemia\(^{10}\) [Level 3].
- If patients are symptomatic of hyperglycaemia or are found to have a capillary blood glucose of >20mmol/L, then a one off dose of a short acting insulin 6 units should be administered\(^1\) [Level 4].
- If 2 or more doses of short acting insulin are required to keep blood glucose <20mmol/L in a 24-hour period, then consider commencing a long acting insulin in the morning\(^1\) [Level 4].
- If a patient is already taking a long acting insulin and requires 2 or more doses of short acting insulin in a 24-hour period an increase in the dose of long acting insulin of 10-20% should be made\(^1\) [Level 4].
- If uncertain, referral to your local diabetologist for advice is appropriate when planning the management of hyperglycaemia in patients in the last hours to days of life\(^{10}\) [Level 4].
Throughout this process consider the appropriateness of invasive investigations and treatment in light of the patient’s clinical condition. If the patient is felt to be imminently dying or if invasive investigation/treatment would cause undue distress, invasive efforts to correct blood sugars may not be in the patient’s best interests.

Discuss changing the approach to diabetes management with patient and/or family if not already explored. If the patient remains on insulin ensure the diabetes specialist nurses (DSNs) are involved and agree monitoring strategy.

**Type 2 diabetes Diet controlled or Metformin treated**

- Stop monitoring blood sugars

  - If insulin stopped:
    - Use capillary blood glucose for regular and prn monitoring
    - If blood glucose over 20 mmol/L give 6 units rapid acting insulin
    - Recheck capillary blood glucose after 2 hour

  - If patient requires rapid acting insulin more than twice consider daily Lantus (Glargine)

**Type 2 diabetes on other tablets (i.e. flozins and gliptins) and/or insulin / or GLP1 Agonists**

- Stop tablets, GLP1 injections and other antidiabetic medications. Consider stopping insulin depending on dose

  - If insulin to continue:
    - Prescribe once daily long acting insulin Lantus (glargine) based on 25% less than total previous daily insulin dose

**Type 1 diabetes always on insulin**

- Continue once daily morning dose of insulin Lantus (glargine) with reduction in dose

- Check blood glucose once a day at teatime:
  - If below 8 mmol/L reduce insulin by 10-20%
  - If above 20 mmol/L increase insulin by 10-20% to reduce risk of symptoms or ketosis
Management: Hypoglycaemia (<4mmol/L)

- The decision of whether to treat (including the potential for invasive treatment) should be made taking into account the overall condition of the patient, whether the hypoglycaemia is felt to be a result of the dying process or whether it has caused a rapid unexpected decline in the patient’s condition, their comfort, any advance wishes/directives of the patient and the views of those important to them (if known) [Level 4].

- A capillary blood glucose <6mmol/L should prompt a review of the patient’s current anti-diabetes medications. A capillary blood glucose <4mmol/L should prompt consideration of treatment [Level 4].

- It is appropriate to consider treating patients with hypoglycaemia in the last hours to days of life. Hypoglycaemia can be a reversible cause for a patient becoming acutely unwell and should be addressed as such [Level 4], even in patients approaching the end of life.
Management: Hypoglycaemia (<4mmol/L)

- If a patient receiving insulin therapy develops an episode of hypoglycaemia, there is a need to reduce the dose or stop the insulin (if already receiving low dose)\(^1\) [Level 4]. A typical reduction in daily insulin will be of 20%, but seek expert advice if unsure.

- If a patient is found to be hypoglycaemic (either on the basis of becoming symptomatic or through routine glucose monitoring if receiving insulin) a medical review should be sought.

- If uncertain, referral to your local hypoglycaemia guidelines or diabetologist for advice is appropriate when planning the management of hypoglycaemia in patients in the last hours to days of life\(^{10}\) [Level 4].
Throughout this process consider the appropriateness of invasive investigations and treatment in light of the patient’s clinical condition. If the patient is felt to be imminently dying or if invasive investigation/treatment would cause undue distress, invasive efforts to correct blood sugars may not be in the patient’s best interests.

Is patient conscious and able to swallow?

- Yes
  - Give one of the following:
    - 150 ml of non-diet cola (small can)
    - 200 ml of pure smooth orange juice (small carton)
    - 100 ml of Lucozade Original
    - 4 glucotabs
    - 5 to 6 dextrose tablets

  - If after 5 minutes, the blood glucose level is still less than 4 mmol/L, repeat the treatment. Once the blood glucose is above 4 mmol/L, give a starchy snack like a banana or glass of milk or 2 biscuits unless a meal will be eaten in the next 1 to 2 hours.

- No
  - Is patient conscious and not able to swallow?
    - Yes
      - Patients on PEG feeds: You should stop the feed and insert one of the following:
        - 30 ml undiluted Ribena
        - 150 ml non-diet cola
        - 100 ml Lucozade Original into the feeding tube.

    - If unconscious: Put the patient in the recovery position and maintain airway - do not put glucose in the mouth. Give 1mg glucagon intra-muscularly if available and carer trained. If glucagon is not available or is ineffective, and IV access is available, give 75-80 ml of 20% glucose (over 10-15 minutes). Note: glucagon may not be effective in people with liver disease.

    - Repeat this procedure every 5 minutes until the blood glucose is above 4 mmol/L.
    - Afterwards resume the feed

  - No

If consciousness not regained once blood glucose >6mmol/L
OR
If blood sugars are not responding to treatments
Consider the appropriateness of further invasive management in light of the patient’s condition. If the patient is imminently dying, further treatment may not be appropriate.

Once conscious (usually after about 10 minutes), give one of the following:
- 150ml non-diet cola
- 100ml Lucozade
Follow with a starchy snack such as a banana or 2 slices of bread.
Mental Capacity Act

Where a patient is shown to lack capacity to consent to treatment, the Mental Capacity Act, 2005 must be followed. Lasting Power of Attorney, Advanced Decisions, Independent Mental Capacity Advocates and Deprivation of Liberty Safeguards should be utilised where appropriate.
Advance Care Planning

• When a patient is in the last 12 months of life or in a deteriorating phase of their illness consider discussing advance care planning. Explore the wishes of the patient and their carers regarding the monitoring and management of diabetes at the end of life [Level 4].

• Any advance decisions about diabetes monitoring and management in the last hours to days of life should be recorded as part of the advance care plan. [Level 4].

• Patients and those important to them may regard a relaxation in blood glucose monitoring and management as a sign of ‘giving up.’ It is important that these processes are explained sensitively and in the context of symptom control, recognising that the emphasis is on avoiding unnecessary burdens for the patient in the last hours to days of life [Level 4].
1. When it is recognised that a patient is approaching the last hours to days of life, review intensity of monitoring and medications (Grade D)

2. All patients with diabetes in the last hours to days of life should be reviewed every 24 hours by a healthcare professional (Grade D)

3. Where regular insulin is required, a long acting insulin e.g. Lantus (Glargine) should be used (Grade D)

4. All patients receiving insulin should have regular capillary blood glucose monitoring daily (Grade D)
5. Variable rate insulin should be avoided in the management of diabetes in the last hours to days of life (Grade D)

6. Short acting insulin should be considered in patients with symptomatic hyperglycaemia with blood glucose >15, or asymptomatic hyperglycaemia with blood glucose >20 [Grade D].

7. Treatment of hypoglycaemia (symptomatic or not) should be undertaken unless an assessment that the patient is imminently dying or that further invasive treatment is not appropriate has been documented (Grade D)
Standards

8. Patients and those close to them should be involved in discussion regarding the monitoring/management of their diabetes at the end of life, and this should be clearly documented (Grade D)

9. Patients with diabetes in the last hours to days of life should have a documented care plan regarding the monitoring and management of their diabetes at the end of life (Grade D)

10. Patients and those important to them should have a documented offer of written information regarding diabetes monitoring/management at the end of life (Grade D)
References

Public Representative Comments

Mr Bob Giles
Questions/ Comments from the group

Suggested topics:

1. What is the potential to explore the role of continuous blood glucose monitoring using new transdermal monitors?

2. Should we include further guidance or a standard about criteria for discussion with a specialist, and if so, what should these be?

3. Should steroid induced diabetes monitoring and management form part of this guideline or “The use of corticosteroids in palliative care”? (You’re welcome, corticosteroid group)

4. Are we content to advocate CBG monitoring instead of urinary glucose monitoring despite the diabetes UK guideline recommending the opposite?