Diabetes at the End of Life

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“A good way to live longer is to move to the eastern part of the English county of Dorset and take up the game of golf”

“old age is not so bad when you consider the alternative”

Maurice Chevalier
“Surely this is a non subject? The only thing one can say is that if you are dying, the important thing is to be as comfortable as possible. In other words avoid diabetic symptoms and hypoglycaemia and keep finger pricking to a minimum. I don't know of any literature on the subject and very much doubt that there is any.”
“a good death”

- To know when death is coming and to understand what can be expected
- To be able to retain control of what happens
- To be afforded dignity and privacy
- To have control over pain relief and other symptoms
- To have choice and control over where death occurs
- To have access to spiritual and emotional support
- To have access to hospice care
- To have control over who is present and who shares the end
- To be able to issue advance directives
- To have time to say goodbye and control over other aspects of timing
- To be able to leave when it is time to go
- **To die with glucose levels that are not too high nor too low….**
End of life care for older people

- Dying patients frequently do not receive basic nursing care
- Staff may focus on physical needs at the expense of psychological and spiritual care
- Older people are less likely to receive appropriate pain control than their younger counterparts, especially for patients with dementia.
- Older people are less likely to receive hospice care
- In care homes end of life care may be impeded by inadequate staff training, poor symptom control and lack of psychological and emotional support
- Comorbidity and drug reactions make symptom control more difficult
- Diabetes is perceived to be “difficult”
Diabetes at the end of life

- Pre-existing diabetes
- Secondary diabetes
- Drug-induced diabetes
- Poor nutrition
- Defective counter-regulation
- Kidney/liver disease

Hyperglycaemia

Hypoglycaemia
Diabetes care at the end of life

- When is death expected?
- Glucose control problem?
- Non-glucose control problem?
- Patient problem?
- Health care professional problem?

J Pain Symptom Management 2006; 32:275
Hyperglycaemia

- **Agitation:**
  - tense, irritable, restless, poor concentration

- **Osmotic:**
  - thirst, dry mouth, polyuria

- **Neurological:**
  - dizziness, blurred vision, weakness

- **Malaise:**
  - headache, nausea

- **Threshold for symptoms:** 15 mmol/l

(Diab Metab Res Rev 2003; 19: 408-14)
Living and dying with Diabetes

- Hypoglycaemic symptoms
- Osmotic symptoms
- Malaise
- Lethargy
- Frustration

Sensor value (mmol/l)

Time (0:00 to 22:00)
Terminal Care (1)

- **Type 1 Diabetes**
  - Once daily basal insulin
  - Reduce by 50%
  - Test once daily
  - Watch for hypoglycaemia
  - Do not die of DKA

- **Type 2 Diabetes**
  - Stop oral agents
  - Stop monitoring
  - Watch for hypoglycaemia
  - Watch for hyperglycaemia*
  - Do not die of HONK

*Palliative Med 2006; 20: 197-203
Terminal Care (2)

- Give permission to run high glucose levels
- Give permission to miss meals
- Do not withhold $R_x$ for fear of upsetting diabetes
- Testing may be expected
- Steroids increase glucose levels and appetite
- Illness causes insulin resistance
- Glimepiride, Lantus and Actrapid
Steroids and Glucose tolerance

- 10 healthy volunteers
- Short insulin tolerance test
- Caudal epidural
- 80 mg Triamcinolone

- 28 COPD
- Non-diabetic
- Acute hospital admission
- 30-40 mg Prednisolone

Glucose Disappearance $k_{TTT}$ (% min)

Rheumatology 2002; 41: 68-71

Glucose (mmol/l)
Steroids - Practical Aspects

Type 2 diabetes
No history of diabetes

Starting steroids
Try once daily

Test BG at 1800 hours

>15 mmol/l

Glimperide
2 mg
at 1200 hours
Titrate dose

<15 mmol/l

No action

Glipizide
If severe renal impairment

>15 mmol/l
after 5 days

Start once daily
Lantus 10 units
In morning
No Carbohydrates
PEG feeding and diabetes control

Glucose (mmol/l)

• 22 hr continuous feeds with i.v. insulin + basal Glargine/Isophane
• Change after 48-72 hrs to:
  • 3 feeds each day with
  • Soluble/analogue insulin at start of feed

Diabetic Med 2002; 19: 1006-8
Admitted with hyperglycaemia

- 40 consecutive patients over 2 months with admission glucose between 11 and 17 mmol/l
- 10 patients **without** known diabetes
- 55% treated – glucose 13.4 mmol/l
- 45% untreated – glucose 13.7 mmol/l

<table>
<thead>
<tr>
<th>Rx</th>
<th>n</th>
<th>Admission glucose (mmol/l)</th>
<th>Day 1 glucose (mmol/l)</th>
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<tr>
<td>i.v. insulin</td>
<td>7</td>
<td>15.1</td>
<td>9.0</td>
</tr>
<tr>
<td>s.c. insulin</td>
<td>5</td>
<td>14.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Oral Rx</td>
<td>9</td>
<td>13.0</td>
<td>11.1</td>
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<tr>
<td>No Rx</td>
<td>18</td>
<td>14.0</td>
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</table>
Insulin and meals in hospital

Time of injections relative to meals

(Diabetic Med 2006; 23 (Suppl): P164)
Diabetes Treatment in Older People

- Requires understanding
- Requires training
- Requires knowledge
- Requires review

Falls (person/year)

Diabetes Care 2002; 25: 1749-54
Hypoglycaemia and the brain

- Characteristic symptoms
- Idiosyncratic symptoms
- Negativism and denial
- Automatism
- Seizures
- Coma
- Death
Hypoglycaemia Unawareness

Failure to:

• develop warning symptoms
• recognise warning symptoms
• take appropriate action despite warning symptoms
Glucose counter-regulation

- Release of hormones
- Warning symptoms
- Cognitive impairment
- Increased brain blood flow

↑Glucose Production
↓Muscle glucose uptake
Risk factors for hypoglycaemia at the end of life

- Insulin/SU - too much, wrong time
- ↓ Exogenous glucose - anorexia
- ↓ Endogenous glucose - glycogen depletion
- ↑ Insulin sensitivity - sleep,
- ↓ Insulin clearance - renal
- Hypoglycaemia
Insomnia and Diabetes

- Hypoglycaemia
- Fear of hypoglycaemia
- Painful neuropathy
- Restless leg syndrome
- Hyperglycaemia
- Sleep apnoea
- Cognitive impairment
- Sleep disorders
- Pain
- Medications
“Surely this is a non subject (it’s not!)? The only thing one can say is that if you are dying, the important thing is to be as comfortable as possible. In other words avoid diabetic symptoms (<15 mmol/l) and hypoglycaemia (>4 mmol/l) and keep finger pricking to a minimum. I don't know of any literature on the subject and very much doubt that there is any but if in doubt ask the diabetes team”
Diabetes at the End of Life

- There is no evidence
- Aim for > 4 and < 15 mmol/l
- Testing may be necessary/expected
- Once daily basal insulin/SU
- Avoid Metformin

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