Faculty of Forensic & Legal Medicine

Management of Diabetes Mellitus in custody

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Introduction

This guidance is to assist the management of diabetics for Forensic Physicians (FP) and other Health Care Professionals (HCPs) working in the custodial environment. It is concerned with the care of the detained person (DP) with Type 1 diabetes [formerly known as insulin-dependent diabetes mellitus (IDDM)] or Type 2 diabetes [formerly known as non-insulin-dependent diabetes mellitus (NIDDM)].

In recent years, there has been a significant increase in the number of Type 2 diabetics who require insulin. There has also been an increase in the number of Type 1 diabetics who are obese and insulin resistant, who now use oral medications, (similar to those given to Type 2 diabetics), in addition to insulin.

All FPs & HCPs should have the means to test blood glucose (BG) with a quantitative meter.

Some meters also indicate if ketones are present. Colour strip visual assessment of ketones on urinalysis can also inform clinical decision making. Ketone strips tend have a short life and it is essential to ensure they are 'in date' or are replaced. It is important to highlight the significance of ketones as a sign of acidosis and understand that this is a medical emergency.

Measurement of the BG to obtain a baseline estimation is recommended as soon as possible for all diabetic DPs. This may be done by the patient. Results should be shared with other relevant healthcare staff to assist the provision of ongoing care.

It is not unknown for a DP to claim to be diabetic; even bringing insulin that is not theirs. Insulin pens are usually carried without a pharmacy label, so a blood sugar level > 13 mmol/l is very helpful in identifying diabetes, unless corroboration is obtained from other sources: e.g. the electronic care summary, by detailed questioning of the DP on diabetes with appropriate responses, or the testimony of a close relative is obtained.

FPs/HCPs need to instruct custody staff that if a known diabetic DP's condition deteriorates, it is safer to assume this is hypoglycaemic and to administer glucose. This may prove lifesaving and would not significantly affect hyperglycaemia. Even if the DP's recovery is complete, the FP/HCP must be informed, as changes in medication may be indicated.

FPs/HCPs should reassure themselves that custody staff are aware of the clinical features of hypoglycaemia which may include:

- feeling weak and dizzy
- feeling hungry
- a higher heart rate than usual
- blurred vision
- pallor
- temporary loss of consciousness
- confusion
- convulsions

Hypoglycaemia may also occur as a complication of heavy alcohol use and stimulant ingestion.

Risks of complication are increased in those with poor disease control, a frequent situation for those detained in custody.

Co-morbidity with substance misuse, especially alcohol, is common, and mental illness, in particular depression, has a higher incidence in diabetic patients; these should be fully considered in advice for care during detention and interview.

A finger prick blood sample may be taken to clarify the diagnosis of hypoglycaemia. Levels below 4 mmol/l are diagnostic, but if this causes any difficulty, it is safer to treat immediately. This includes calling emergency assistance in the absence of the FP/HCP on site.

History

The following information should always be obtained as a baseline by the FP/HCP:

- determine history (Type 1 or Type 2);
- medications (relevant to diabetes and other conditions);
- doses of medication, time taken and when next due;
- level of diabetic control i.e. recent BG levels, including hospital admissions and episodes of hypoglycaemia;
- other medical conditions associated with diabetes e.g. hypertension, cardiovascular disease, visual impairment, renal, neurological, depression or dermatological complications;
- dietary requirements: when and what the DP last ate;
- note recent exercise;
- note any previous episodes of hypoglycaemia, documenting any behaviour changes, associated with this; such records might be relevant in a potential claim of automatism as a defence).

Examination

In addition to blood glucose measurement consideration should be given to recording:

- oxygen saturation
- pulse
- blood pressure
- temperature, if indicated
- condition of skin surfaces
- appropriate examination of body systems
- mental state if appropriate

Investigations

FPs/HCPs should perform an estimation of BG level with a blood glucose meter. The DP should wash their hands with soap and water and dry them carefully, or a non-alcohol swab can be used for cleaning the skin. If the DP has their own device, witnessed self-testing may be conducted. The baseline level will inform the need for and frequency of further testing.

Ideally, the insulin dependent diabetic should follow their usual pattern and doses of insulin administration and dietary intake. Consideration should be given to a higher or lower carbohydrate load in the meals provided in custody, compared with those to which the DP is accustomed. Therefore, for some DPs, their meal-related insulin doses may need to be reduced whilst in custody.

It may be advisable in insulin-dependent diabetics to check the blood glucose levels more frequently during detention than they would usually do. Urinalysis may assist in the diagnosis of ketoacidosis, in the absence of ketone blood testing strips and thereby aid decision making regarding fitness for detention.

Management plan

A careful management plan should be detailed and shared with the DP, the FPs/HCPs and custody staff, ensuring appropriate hand-over at shift change. Particular care should be taken in those with complications such as drug intoxication, alcohol dependence or acute intoxication, head injuries and concurrent infections or complications, e.g. vomiting.

Consideration should be given to the recommended frequency of BG testing and when the DP should be reviewed by the FP/HCP.

Hyperglycaemia

If blood glucose (BG) is > 25 mmol/l and there is evidence of impairment of the level of consciousness, or confusion or concurrent infection, the DP should be referred to hospital immediately. Safe practice would mean that the FP/HCP should consider immediate hospital transfer for those detainees with a BG > 30 mmol/l.

DPs with BG levels between 12-25 mmol/l would normally be Fit to be Detained (FTBD), but an individual global assessment (this may include urinalysis) must to be undertaken.

It may be safer practice to maintain BG levels higher than optimal community levels to reduce vulnerability to hypoglycaemia during detention.

Diabetic Ketoacidosis (DKA)

This may occur with hyperglycaemia, but it is also a risk at near normal levels of blood sugar in Type 2 diabetics treated with an SGLT -2 inhibitor e.g. empagliflozin.

Typical symptoms of diabetic ketoacidosis (DKA) include:

- thirst
- polyuria
- nausea
- vomiting
- abdominal pain
- dehydration
- deep laboured breathing;
- non-ketotic hyperosmolar states should also be considered;
- confusion and sometimes even coma.

Symptoms of DKA usually evolve over a 24 hour period, with the first sign often being hyperglycaemia.

These symptoms of DKA with urine ketones of greater than 2 are an indication to refer to & admit to hospital, as an emergency.

Hypoglycaemia

If the FP/HCP measures the BG between 2-4 mmol/l, they should administer 10g glucose as as drink/gel/tablet or carbohydrate foodstuff and review over the next 10 minutes when the BG level should be repeated.

The FP/HCP should remain with the DP during this time. 10g of glucose is available from 2 teaspoons sugar, 3 sugar lumps or 1 tube glucose gel. For those able to swallow, after this initial sugar 'boost', the DP should follow up with starchy carbohydrate -containing food, when they have recovered sufficiently.

First line treatment for those unable to swallow or unconscious is 500 micrograms of glucagon IM, with IV glucose 20% as a second line if glucagon is not available. (Note consideration of alcoholic or liver disease status. It should be remembered that glucagon requires the liver to have stores of glycogen and so in alcoholic, or other liver diseases, it may not work.) Glucagon also works poorly in children and teenagers. Glucagon often causes severe nausea and vomiting. In most situations where glucagon is used in management, the FP/HCP will also need to request referral to & ongoing treatment in hospital.

The FP/HCP/ should remain with the DP until he is conscious. The DP may need to be transferred to hospital especially if his management has included recent use of a long acting insulin, a long acting sulphonylurea, drugs or alcohol.

Medication and diet

The FP/HCP should recommend that all insulin injections or oral diabetic medications are brought in from home, if not with the DP already/when arrested. The FP/HCP may choose to supervise, or instruct an HCP colleague to supervise, the DP's self-administration of insulin. See Faculty Guidance on *Safe and Secure Administration of Medication in Police Custody*.

In the event that the usual insulin is not available, (not with the DP, or not available as stock medication in custody), the FP/HCP is recommended to obtain a suitable prescription via the local emergency department (ED), or the FP may prescribe a short-acting insulin. It is prudent to organise regular reviews and BG testing if there has been a change to the normal therapy regime.

Advice may be taken from the duty Medical Registrar at the local hospital.

It may be advisable, in DPs where the FP/HCP perceives a risk e.g. attempts to seek diversion, to encourage diabetics to first eat adequate quantities of carbohydrate and then to administer their insulin to prevent episodes of hypoglycaemia.

Hypoglycaemia may sometimes occur in patients treated who are taking oral hypoglycaemic medication, particularly the sulphonylureas, e.g. gliclazide. The FPs/HCPs covering the next shift with the responsibility for custody must be notified of the BG levels to facilitate ongoing care.

Custody staff should inform the FP/HCP of any refusal by the DP to take main meals and/or medication; the FP/HCP should then review the management plan, or re-assess the DP, as appropriate.

Use of insulin pump therapy in custody

'Insulin Pump Therapy' also known as Continuous Subcutaneous Insulin Infusion (CSII) is used in the treatment of Type 1 diabetes. Insulin is continuously infused into the subcutaneous tissue by a thin plastic tube usually connected to a soft plastic cannula inserted under the skin. Pumps are about the size of an average mobile phone and run on batteries, with safety features to warn the user if the power is running low or if the pump is running out of insulin.

If a person using insulin pump therapy has been arrested, the custody officer should call the FP/HCP to assess the DP. The level of supervision required, whilst awaiting the FP's/HCP's assessment, will be dependent on an overall risk assessment by the custody officer, but may well need to be constant supervision.

Insulin pumps are used by diabetics to help manage their diabetes particularly in those who require multiple daily insulin injections. Before each meal, a bolus dose is taken, based on the amount of carbohydrate to be eaten. In between these a basal rate is set. The FP/HCP should advise on the frequency of medical review and BG monitoring.

The FP/HCP should check whether there is any possibility that the device has been dislodged during arrest and also assess the risk of self-harm (either by overdose of insulin or use of the tubing as a potential ligature). With Bluetooth connection devices, it may be possible to keep the meter outside the cell.

If there is any suspicion that any substance, e.g. Illicit drugs, other than the required insulin dose has been injected via the device the DP should be transferred immediately to the ED. The same approach is required if there is a possibility of insulin overdose [see management of unconscious hypoglycaemia].

Liaisons with other community clinical staff

If during detention the FP/HCP becomes aware of complicating factors or emergency scenarios, e.g. hypoglycaemia, it would be best practice to share this information with the DP's GP, with their consent.

Summary flow chart

A summary flow chart follows on the next page to facilitate easy reference for the FP/HCP on management of diabetes in relation to the BG levels during detention in custody. This is particularly with reference to fitness to be detained in custody and fitness to be interviewed.

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The Diabetes Diet
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Management of Diabetes Mellitus in custody

History

- Type I or Type 2
- Medication relevant to DM and other conditions
- Medication known to precipitate diabetes e.g. antipsychotic drugs
- Control including hospital admissions and episodes of hypoglycaemia
- Associated medical conditions: hypertension; CHD; alcohol dependence; pancreatitis
- Vulnerabilities: visual; renal; neuropathies; depression
- Dietary requirements

Examination

- Pulse; BP; temperature if indicated
- Pulse oximetry
- Condition of skin surfaces
- Appropriate examination of body systems to reveal complications or infection
- Mental state and consideration of effects of hypo or hyperglycaemia on fitness for interview

Investigations

- Blood glucose (BG) level (DP's own or FP blood glucose meter)
- Urinalysis may be indicated for ketones, protein, blood and nitrites

Hypoglycaemia

BG 2-4mmol/L administer 10g glucose as as drink/gel/tablet or carbohydrate foodstuff and remain with DP and review in 20 minutes.

If unconscious, administer 500 micrograms of glucagon IM, with IV glucose 20% second line if glucagon not available.

If requires glucagon or IV glucose consider hospital admission for ongoing care.

Follow with starchy carbohydrate

Review in 4 hours

Caution: severe alcohol dependents and teenagers have a poor response to glucagon.

Not recovered or second episode of hypoglycaemia or complications → **Transfer to E.D.**

Fully recovered and no complications → **Remain in custody**

Hyperglycaemia

BG >25mmol/L and impaired consciousness, confusion or infection → **Transfer to E.D.**

BG 12-25mmol/L need global assessment (including mental state) and note whether ketones present

Other problems, e.g. infection, intoxication, DKA → **Transfer to E.D.**

No other problems → **Remain in custody**

Acceptable blood glucose

BG 6-12 mmol/L and no other problems usually fit to be detained and interviewed. → **Remain in custody**

Remain in custody

Locate medication:

- In personal property
- Collect from home;
- Prescribe

Advise staff verbally and in writing in respect of medication, diet and when next medical review is needed. Highlight needs for and risks of care for DP.

Send any feedback and comments to forensic.medicine@fflm.ac.uk