

Medico-legal aspects of diabetes and insulin



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Today's diabetes world is fast-moving and exciting; knowledge is accumulating at an astonishing rate. To help understand the present, however, it sometimes helps to examine the past.

In this installment of *Tattersall's Tales*, Robert Tattersall reflects on medico-legal aspects of diabetes, exploring the issues of hypoglycaemia as a defence for criminal charge, especially with regard to driving, attempted murder, and failure to diagnose diabetes.

When I retired 15 years ago, I gave up clinical practice but continued to do some medico-legal work. I hope readers will find my comments useful.

Murder

For many years there was a popular belief that insulin could be used for the undetectable murder. Certainly many cases have been and probably still are being missed. For example, three patients in an American hospital who developed hypoglycaemia after surgery were written up in 1946 as a new syndrome of postoperative hypoglycaemia. It was not until 14 years later that it was discovered that the cause was injections of insulin by a psychotic nurse!

The main reason why murders by insulin (or any other substance) go undetected is that, in general, doctors do not consider the possibility of deliberate poisoning among their differential diagnoses. I used to play a game while we were having tea after a ward round. It went like this. I would say to the senior house officers (SHOs), "That 87-year-old woman in bed 2 with diarrhoea and vomiting is being poisoned by arsenic." Their first question would be, "Why?", to which I would say, "Her son is doing it to get her money". After a silence, the SHOs would say, "How do you know?", to which I replied, "I don't, but neither do you since you never considered the possibility." I don't know if any of them ever diagnosed poisoning in their subsequent careers but I was reminded of my game when appearing at the trial of a nurse accused of murdering five elderly women with insulin. All were recovering after surgery for fractured hips and had prolonged spells of hypoglycaemia, which "came out of the blue" and required large amounts of glucose for between 7–32 hours to prevent recurrence. In the first four cases, the possibility that the women had been given insulin or sulphonyureas was not considered, while in the fifth, C-peptide and insulin were measured, which clearly showed that the cause was exogenous insulin. What is the moral? Normal people do not develop profound and prolonged hypoglycaemia for no reason. If they do, there are three likely possibilities: insulinoma, factitious hypoglycaemia or attempted murder.

If such events occur in hospital, a member of staff is likely to be responsible. Of 53 cases of murder by insulin collected by Vincent Marks (1999), two perpetrators were doctors and 26 were nurses, paramedics or carers. Many prosecutions have failed because doctors did not take blood for insulin and C-peptide when the patient was admitted.

Hypoglycaemia as a defence to a criminal charge

Under English law a crime involves two elements, the *actus reus*, or forbidden act, and *mens rea*, or intent to commit the forbidden act. Thus, the psychotic mother who puts her baby on the fire thinking it is a log has committed the *actus reus* (killing the baby) but will be acquitted because she did not have any criminal intent.

Hypoglycaemic automatism may be used to nullify *mens rea* although matters are complicated because the law distinguishes between insane and sane automatism. The judges have decreed that if the automatism is the result of disease of the mind, the only defence open is insane automatism, which would involve acquittal but indefinite confinement in Broadmoor or a similar special hospital. A defence of sane automatism means acquittal without conditions and, for this reason, judges have tried to limit its application.

English law is based on precedent and one case will show the sort of mess it has got itself into when dealing with hypoglycaemia. A diabetic hospital orderly assaulted a patient (R v Quick, 1973). He had taken his insulin but instead of lunch, he had had whisky and rum. In the past he had often been admitted with hypoglycaemia and had been violent during these episodes. The court was unsympathetic because of this "disgraceful offence" and his recklessness in having alcohol instead of lunch. At the first trial the judge said that hypoglycaemia gave rise to a defence of insanity not automatism, whereupon the accused wisely changed his plea to guilty. The Court of Appeal, while determined not to let him off, balked at equating hypoglycaemia and insanity and decided that "disease of the mind" did not extend to transient malfunction caused by an external factor, in this case the injection of insulin. They also said that hypoglycaemia could not be used as a defence if it had been caused by recklessness, as confirmed by a case in 1983 (R v Sullivan) in which a man with temporal lobe epilepsy (TLE) assaulted his neighbour. This means that an insulin-dependent person with diabetes can plead sane automatism while an individual with TLE has to plead either guilty or insane. It has never been put to the test, but someone with an insulinoma would presumably be treated as insane automatism since the cause is an internal factor.

In practice, in lower courts, you should be able to get your patient off if you can put up a reasonable case, which should include some or all of the following (Tattersall, 1986):

- 1) That the person took insulin and the offence occurred at a time when hypoglycaemia was likely in view of the known time

course of the insulin(s).

- 2) The person's diabetes was well-controlled or over-controlled.
- 3) A history of a contributory factor such as missing a meal, unusual exercise, or extra insulin, provided this could not be interpreted as recklessness.
- 4) That the actions during hypoglycaemia were in sharp contrast to his or her normal behaviour.
- 5) A history of mental changes during previous episodes.
- 6) Evidence that the person became normal shortly after eating, was surprised about, and had total amnesia for the event in question.

Hypoglycaemia and driving

In general the same principles apply to defending someone accused of driving without due care and attention because of hypoglycaemia.

Unfortunately, in only one of the published cases (on which the law of precedent depends) has evidence been given by a diabetologist who has done research on hypoglycaemia. This is the case of *Broome v Perkins* (1978). Mr Perkins, who has T1D, was driving his car on a familiar route home from work. He consciously negotiated some road junctions and traffic lights but could remember nothing when he got home. His car had been followed for 5 miles, during which his driving was erratic, he swerved many times, was on the wrong side of the road, narrowly missed the near-side kerb, veered away from a coach and missed a builder's van by inches. He collided with a car, was incoherent when spoken to, but got back into his car and drove home. He clearly had total amnesia but, when his wife saw that the car had been damaged, she insisted on driving back along the route where they came across the accident. In the Magistrates' Court he was acquitted on the grounds of automatism but the Court of Appeal decreed that "for parts of the journey the defendant's mind was controlling his limbs and that thus he was driving", and they should have convicted him. Legal commentators thought this was a very harsh decision. I agree, because it fails to recognise that hypoglycaemia is not an all-or-none condition but a matter of degree. Driving simulator experiments show that people can be completely unaware of and have amnesia for their poor driving performance, even with relatively mild hypoglycaemia (Cox et al, 1993). It is therefore legal casuistry to suggest that he must have been in control or "driving" for some part of the journey.

Failure to diagnose diabetes

Some of these cases are truly shocking and, although they are rarely perpetrated by diabetologists, you may be involved as an expert.

The worst I have come across was a 35-year-old man, not known to have diabetes, who was admitted in diabetic ketoacidosis (DKA) and died. He had visited his GP five times

over the previous 8 weeks and had been put on oxybutrin and trimethoprim for urinary frequency, amitriptylene for tiredness, artificial saliva for a dry mouth and, finally, betnesol eye drops for blurred vision and stemetil for nausea.

The most extraordinary was a 25-year-old man who worked for a health authority. He had a circumcision and over the next 18 months was seen in outpatients nine times in two different hospitals for the investigation of diarrhoea. He was also admitted twice. Eventually he went to occupational health complaining of tiredness and was found to have a blood glucose of 45 mmol/L with retinopathy and extensive autonomic neuropathy. Amazingly, in all his medical contacts over the previous 18 months, his urine had never been tested nor his blood glucose measured.

Diabetes being precipitated or exacerbated by shock or an accident

There are two scenarios:

In the first, someone has a car crash and is taken to hospital where they are found to have diabetes. The lawyers think this might have been precipitated by the stress of the accident. An analogous argument was used with people who had heart attacks and were found to have diabetes where it was believed that raised stress hormone levels were the cause. In fact, raised HbA_{1c} levels proved that the diabetes was pre-existing (Oswald and Yudkin, 1987).

The other scenario is that someone with T2D is injured in a road accident and several weeks or months later, is put on insulin. It is suggested that the shock of the accident caused the need for more drastic treatment and that the damages should therefore be increased. This can be refuted by pointing out the progressive nature of T2D.

Cox D, Gonder-Frederick L, Clarke W (1993) Driving decrements in type 1 diabetes during moderate hypoglycemia. *Diabetes* **42**: 239–43

Marks V (1999) Murder by insulin. *Medico-legal Jour* **67**: 147–163

Oswald GA, Yudkin JS (1987) Hyperglycaemia following acute myocardial infarction: the contribution of undiagnosed diabetes. *Diabet Med* **4**: 68–70

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