



Assessing fitness to drive in a young man with type 1 diabetes

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This section is about the immediate management and investigation of an acute or subacute presentation in general practice. It is inspired by, but is not based on, a real patient situation.



A young man, John, who has just completed an engineering degree and who you have only seen a few times before comes to see you because his private class C driver's licence is due for renewal. He is 24 years old, lives with his girlfriend and has had type 1 diabetes for 12 years. You have no pathology results available for him but he says he has been under the care annually of an endocrinologist. He has had no regular doctor as he 'doesn't get sick'. He has no other medical problems.

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What should you ask John to be able to fill out his driver's licence form?

Answer: You should not fill out John's form at this consultation. You need much more information about this patient and his diabetes control. What regimen of insulin is he taking and when did he last see his endocrinologist? How often does he test his own blood glucose level (BGL) and when were his last pathology blood tests carried out? You need to know what his blood glucose control has been like over the past few months. In particular, has he had any episodes of severe hypoglycaemia in which he needed help with treatment because he was unconscious or too unwell. If so, how recently and what were the circumstances leading to the severe event? Has he seen an eye doctor or optometrist in the past year? Does he have any complications from his diabetes, such as retinopathy or insensitivity of his feet?

John takes a basa-bolus insulin regimen: insulin detemir 14 units twice daily subcutaneously and rapid-acting insulin lispro subcutaneously at 2 units per 15 g of carbohydrate. He also does his best to count his carbohydrate intake.

John tells you he had 'really bad' control when he was younger but in the past year, since he left his old stressful job, he has looked after himself a lot better and this is related to his new job and stable relationship. He has increased the frequency of his BGL monitoring, thinks about his BGL many times daily and plans to control it by self-care. He tests his capillary BGL a few times a day, usually before meals and if he feels unwell or has eaten irregularly. He doesn't go 'very high' anymore, not into the 20 mmol/L range; but he has had several episodes of mild hypoglycaemia over the past few weeks in which he was able to treat his low BGL by himself. He also tells you that he had one 'bad hypo' at night, but it was weeks ago.

His last pathology blood tests were about four months ago and were 'fine' he says, and he saw his endocrinologist, diabetes educator and dietitian a couple of months before this.

He last saw an optometrist about two years ago and doesn't think he has any complications from his diabetes.

What would you want to know now?

Answer: You ask John to tell you more about this 'bad hypo'. Does he know what his BGL was when he was hypoglycaemic? Does he develop early warning symptoms of hypoglycaemia when his BGL falls and at what typical level of blood glucose? Has he had any raised BGLs with ketones? Does he know what precipitated these low BGLs? What have his average finger prick BGLs been like over the past two months? Does he have problems with dieting or food, or does he use recreational drugs or consume high levels of alcohol that could be contributing to the recent low BGLs? Has he changed his insulin doses or diet and lifestyle in the light of these episodes? Who is John's endocrinologist, and as you were not the referring doctor to his endocrinologist, would he mind if you contacted him/her or the specialist team for information about the last consultation?

John says he had the severe hypoglycaemia episode overnight four weeks ago at about 4 am after a 'big night out' associated with much dancing and an unusually high alcohol intake for him (at least 100 g of ethanol in four hours). He took his usual night-time insulin before bed but feels he did not consume adequate amounts of carbohydrates with his evening meal and afterwards. He was discovered by his partner unrousable, and she administered glucagon and called the ambulance. His BGL was 1.9 mmol/L before he recovered consciousness from the hypoglycaemia. He has since been checking his BGL before bed and ensuring it is regularly above 7 mmol/L to help avoid night-time hypoglycaemia. No further episodes of severe hypoglycaemia have occurred.

John says he doesn't drink alcohol often any more, has no diet problems and doesn't use recreational drugs. His average finger prick BGL are 'good', certainly under 10.0 mmol/L.

Advice to drivers who have diabetes*²

- The driver should be advised not to drive if a 'severe hypoglycaemic event' is experienced while driving or at any other time, until they have been cleared to drive by the appropriate medical practitioner
- The driver should also be advised to take appropriate precautionary steps to help avoid a 'severe hypoglycaemic event', for example, by:
 - complying with specified medical review requirements (GP or specialist)
 - not driving if his or her BGL is less than 5 mmol/L
 - not driving for more than two hours without considering having a snack
 - not delaying or missing a main meal
 - self-monitoring BGL before driving and every two hours during a journey, as reasonably practical
 - carrying adequate glucose in the vehicle for self-treatment
 - treating mild hypoglycaemia if symptoms occur while driving including:
 - safely steering the vehicle to the side of the road
 - turning off the engine and removing the keys from the ignition
 - self-treating the low blood glucose
 - checking the BGL 15 minutes or more after the hypoglycaemia has been treated and ensuring it is above 5 mmol/L
 - not recommencing driving until feeling well and until at least 30 minutes after the BGL is above 5 mmol/L

* See NDSS *Diabetes and driving* document², including the Driving Responsibilities Checklist on page 2.

The mild hypoglycaemic episodes are usually related to unaccustomed exercise but have also occurred when he hasn't eaten regularly. He has awareness of the episodes when his BGL is about 2.5 mmol/L – he gets light headed, weak and shaky. He usually takes jellybeans to fix the problem. He used to have blood glucose readings averaging 14 mmol/L, but he found he got headaches and lethargic if they got any higher. So he now keeps his BGL under 10.0 mmol/L (two hours after eating), by changing his diet and eating regularly. He says he doesn't mind if you contact his endocrinologist.

What is important to tell John about his blood glucose management in view of his driving licence renewal at this point?

Answer: Before you talk with John about his blood glucose management, remember how much time and effort is needed to keep diabetes under control, all day, every day (12 years now in John's case). Respect the fact that he may not have good control all the time and don't be condescending about his knowledge or management of diabetes. Given this, you need to (for reasons both legal and out of good medicine) inform him of some specific things relating to his driving licence renewal.

A severe hypoglycaemic episode can impair one's ability to recognise the symptoms of hypoglycaemia for many weeks. This is dangerous because it doesn't leave much time for John to identify and correct the problem before he becomes confused from hypoglycaemia and unable to treat himself, in addition to affecting his reaction time and co-ordination in the complex task of driving. If he senses symptoms of hypoglycaemia only at a BGL of 2.5 mmol/L this also indicates that he lacks detection of the early warning symptoms because most people develop symptoms of hypoglycaemia in the 3 mmol/L range. It is very important to help John reverse this lack of hypoglycaemic awareness before you or your endocrine specialist colleague sign his driving licence renewal form. The updated Austroads guidelines (2012) state:¹ **"Any driver who has a persistent lack of hypoglycaemia awareness is generally not fit to drive unless their ability to experience early warning symptoms returns. However, for private drivers, a conditional licence may be considered by the driver licensing authority, taking into account the opinion of an appropriate specialist, the nature and extent of the driving involved and the driver's self-care behaviours."**

You should remind John that with fewer hypoglycaemic episodes he can regain a better

ability to sense hypoglycaemia developing. The updated Austroads guidelines also state:

"A 'severe hypoglycaemic event' is defined as an event of hypoglycaemia of sufficient severity such that the person is unable to treat the hypoglycaemia themselves and thus requires an outside party to administer treatment. It includes hypoglycaemia causing loss of consciousness. It can occur during driving or at any other time of the day or night."

Unfortunately, because of John's severe hypoglycaemic event, he should not usually drive for six weeks afterwards unless, after formal consultation, his endocrinologist recommends otherwise. When he is able to recommence he should be encouraged to plan ahead, especially before driving. He needs to ensure he is 'above 5 mmol/L to drive', he carries rapid-acting carbohydrate on his person and in his car, and he avoids precipitating high or low BGLs. Be positive with him: it was very wise of him to take better care of himself and he will feel much better if he continues to do this, but he must avoid severe hypoglycaemia for his general health and especially related to driving. You give him a printout of the updated National Diabetes Service Scheme guidelines on diabetes and driving (see the box on this page).²

John says he has been told about hypoglycaemia awareness before this is a good reminder. He swears this 'hypo' was the worst he has had for years and was most unusual. The driving licence renewal is due in two weeks.

Do you now sign it for him?

Answer: Considering the recent severe hypoglycaemic event, it is probably best that John see his treating endocrinologist to discuss his driving licence renewal and fitness to drive. If this timely review cannot occur, then you need to speak with his endocrinologist, especially in light of the hypoglycaemic unawareness and the recent severe hypoglycaemic event. You want to get confirmation about whether John can be supported to recommence driving. You also want to document that he definitely has no end-organ complications known from his diabetes and that he has indeed been under the care of a specialist team. You should ask the specialist whether John is able to have his licence renewed on time and arrange an early appointment with the specialist.

The possibility he is not able to drive right now because of the recent hypoglycaemic episode will be an awful shock to John. He needs this clarified with the specialist as soon as possible.

You need to see some regular BGLs documented over the next few days, first thing in the morning, two hours after lunch, before dinner and just before bedtime. You should also test the soles of John's feet and toes for light touch sensation impairment (ideally with a standardised 10 g nylon monofilament). You need John to have a professional eye review before signing the renewal because he has had long-standing problems with blood glucose control until recently and is at risk of retinopathy. Tell John that the ophthalmologist or optometrist should sign off this section of the renewal. You also need to order: HbA_{1c} and fasting BGL measurements; an early morning mid-stream urinary albumin to creatinine ratio (for identification of early kidney disease), serum electrolytes, urea, creatinine levels and biochemical profile; a fasting cholesterol, lipid subsets and triglyceride level measurements; and, if he hasn't had the following in the past year, coeliac disease serology and measurement of thyroid-stimulating (TSH) hormone level.

All of this can be reviewed with you before the driving licence expiry date.

You manage to speak with the endocrinologist and make an appointment for John. The endocrinologist feels John has good knowledge of diabetes but needs to apply this more consistently – she is pleased that he has decided to tighten up his control and wants to see him next week to reinforce this. She thanks you for your detailed referral.

Is there anything else you could cover opportunistically in this consultation?

Answer: It would be a timely reminder to ask John when he comes back for his results to make a double appointment if he wants to have a GP chronic diseases management plan carried out. Suggest that he be reviewed regularly by his endocrinologist, diabetes educator and dietitian, and at least annually by his eye specialist. His lack of foot problems (including absence of peripheral neuropathy, mechanical foot problems, foot ulcer or history of peripheral arterial disease) places him at low risk of diabetic foot ulceration. The provision of general foot care advice is indicated,

without need for regular podiatry review. Overall, it is very important to be positive about John's decision to stabilise his BGL and this could be built on with allied health professional input.

After the consultation with his endocrinologist, some of John's early warning symptoms of hypoglycaemia, such as tremor and sweating, are improving. He is able to self-treat mild hypoglycaemic episodes, which can occur after exercise. John now has awareness of low BGL when his level is in the mid 3 mmol/L range. On careful review the causes of the severe nocturnal hypoglycaemic episode have been identified and John is now taking precautions to avoid such events. He has been reviewed by the specialist team dietitian to help with his carbohydrate counting.

John returns with his pathology test results and home blood glucose readings (range from 3.8 to 12.1 mmol/L). His HbA_{1c} level is 8.4% (not well controlled but about average for adults with type 1 diabetes in Australia), his fasting BGL is 4.5 mmol/L, total cholesterol 4.1 mmol/L, triglyceride level 1.7 mmol/L, HDL-cholesterol 1.6 mmol/L and calculated LDL-cholesterol 2.3 mmol/L. His urinary albumin to creatinine ratio, TSH level and coeliac disease serology are normal, his vitamin D level is normal at 75 mmol/L, and his serum electrolytes, urea, creatinine test and liver enzymes are also normal. He has had his optometrist sign off that section of the licence renewal. His eyes show some mild nonproliferative retinopathy with normal visual acuity.

Is there anything else you should do?

Answer: Interpret the test results for John and provide reassurance. The absence of albuminuria is a good prognostic sign. The presence of mild nonproliferative diabetic retinopathy on his eye screening is not surprising given the duration his diabetes. The changes are not vision threatening.

Regarding his diabetes and driving, according to the updated Austroads 2012 guidelines,¹ a conditional licence may be considered by the driver licensing authority subject to at least two-yearly review, taking into consideration the nature of the driving task and information provided by the treating doctor on whether each of the following criteria are met:

- the condition is satisfactorily controlled

- there is no recent history of a 'severe hypoglycaemic event'
- the person is following a treatment regimen that minimises the risk of hypoglycaemia
- the person experiences early warning symptoms (awareness) of hypoglycaemia
- there are no end-organ effects that may affect driving.

In regards to the first point 'satisfactory control of diabetes', the following applies: *"When assessing whether the criteria for a conditional licence are met, 'satisfactory control' of diabetes for a private licence in a person receiving insulin, will generally be defined as a glycated haemoglobin (HbA_{1c}) level of less than 9.0% measured within the preceding three months, as against a general goal of less than 7.0% in people with diabetes. A reading of at or higher than 9.0% could be one trigger for endocrinologist review. Severe hypoglycaemia and lack of hypoglycaemia awareness also need to be absent, as described above. In terms of documented BGL readings, for people on insulin treatment, blood glucose monitoring records and other related records should also be reviewed. In general for commercial vehicle drivers on insulin, at least the last three months of blood glucose monitoring records should be reviewed, whilst for private vehicle drivers on insulin, records of blood glucose monitoring across recent months should be reviewed."*

Do you (or the endocrinologist) sign off John's driving licence renewal?

Yes, you can sign the licence documenting the conditions the endocrinologist has suggested and that she will review him on the date of any follow-up appointment made. Ask John if he would like a reminder placed for a review of his diabetes in three month's time and explain the need for him to have a regular GP to prevent this happening again next year with his licence renewal. **ET**

References

1. Austroads. Assessing fitness to drive, updated 2012. Available online at: http://www.austroads.com.au/images/stories/AFTD_reduced_for_web.pdf (accessed March 2013).
2. National Diabetes Service Scheme (NDSS). Diabetes and driving. Diabetes Australia, August 2011. Available online at: <http://www.ndss.com.au/Documents/NDSS/Resources/DrivingDiabetes/DrivingandDiabetesBooklet.pdf> (accessed March 2013).