Diabetes and alcohol

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“We are for ever drinking on one excuse or another... We drink one another’s health and spoil our own.”

In 2010, people in the UK aged ≥15 years drank the equivalent of 11.6 litres of pure alcohol on average; 37% as beer, 34% as wine, and 22% as spirits. Average intake among drinkers was 13.8 litres. One unit of alcohol is 10ml or 8g of pure alcohol.

Alcohol intake is notoriously difficult to assess. People usually underestimate how much they drink. The effects of alcohol are modified by multiple factors, including the type of drink, recent or concurrent consumption of food (and which food), the regularity of drinking, binge drinking or not, genetic factors, medication, concurrent illness. Drinking alcohol is usually a lifestyle choice, like diet and exercise, so these variables interact.

The risk of cardiovascular disease, and of type 2 diabetes

Moderate alcohol intake confers future cardiovascular benefits in the general population. Does this apply to people with type 2 diabetes?

Alcohol consumption was reviewed in the ADVANCE study. After controlling for multiple confounders, heavy drinkers had dose-dependent higher risks of cardiovascular events and overall mortality than teetotallers. Patients who reported moderate alcohol intake (≤21 drinks weekly for men and ≤14 drinks for women) had fewer cardiovascular events (adjusted hazard ratio [aHR] 0.83; 95% CI 0.70–0.95), fewer microvascular complications (aHR 0.85; 95% CI 0.73–0.99), and lower all-cause mortality (aHR 0.87; 95% CI 0.75–1.00) than teetotallers. People who mainly drank wine did particularly well.

Moderate alcohol intake also appears to reduce the risk of developing type 2 diabetes. A meta-analysis found a U-shaped relationship in both men and women. When compared with lifetime teetotallers, drinking 22g/day alcohol (relative risk 0.87 [95% CI 0.76–1.00] in men, and 24g/day [0.60 [0.52–0.69]] in women reduced the risk of subsequent type 2 diabetes. The risk increased if men drank >60g/day (1.01 [0.71–1.44]) or women drank about 50g/day alcohol (1.02 [0.83–1.26]).

Alcohol and ketoacidosis

Most ketoacidotic patients have diabetes, but alcohol can also cause ketoacidosis. Patients with alcoholic ketoacidosis usually have a history of long-term alcohol abuse, a recent drinking binge, inadequate nutrition, vomiting, and previous similar episodes.

Intercurrent infection or pancreatitis may precipitate alcoholic ketoacidosis. Alcohol levels are often low or absent. Blood glucose is low or normal. (NB: undernourished people with type 1 diabetes occasionally develop diabetic ketoacidosis with a normal blood glucose.)

Alcoholic pancreatitis

Chronic pancreatitis causes exocrine and endocrine damage, with malabsorption as well as varying degrees of beta-cell malfunction, particularly insulin and glucagon insufficiency.

Chronic pancreatitis is an unusual cause of diabetes. Tropical fibrocalkulus pancreatitis is rare in the UK. Alcoholic pancreatitis is more common and is influenced by genetic susceptibility. It may take five to 15 years of heavy drinking to develop. Patients with alcoholic chronic pancreatitis may develop exocrine insufficiency six years after the onset of disease, whereas endocrine insufficiency occurs at a median time of eight years.

In one study, data on 500 patients with chronic pancreatitis (alcoholics, 85%) were collected between 1973 and 1996. The cumulative rate of diabetes mellitus was 85±4% 25 years after the clinical onset of chronic pancreatitis. On multivariate analysis the only independent risk factors for developing diabetes mellitus were distal pancreatectomy (risk ratio 2.4; 95% CI 1.6–3.8) and early onset of pancreatic calcifications (risk ratio 3.2; CI 2.2–4.7).

The effects of alcohol

Alcohol contributes to daily calorie intake. It slips down easily. Alcohol itself contains 7 kilocalories (kcal)/g. The myriad available drinks provide highly variable additional calories. Drinking five pints of lager a week adds up to 44 200kcal over a year, equivalent to eating 221 doughnuts.

Patients who need to lose weight are usually advised to limit alcohol, and include any ingested in their total calorie intake. However, those on insulin who use carbohydrate counting to help adjust insulin dose are usually advised not to include alcohol carbohydrates in this arithmetic.

Alcohol may cause hypoglycaemia – both in malnourished chronic alcoholics, and in people with diabetes on insulin. The signs of hypoglycaemia resemble those of alcohol intoxication. If someone smelling of alcohol appears drunk, most people would assume that the only problem is alcohol excess. Failure to recognise and treat hypoglycaemia may be fatal. This is one reason why people with insulin-treated diabetes should carry a diabetes card or wear a medical alert device.

In a 1982 study, alcohol was implicated in about a fifth of those attending accident and emergency with insulin-induced hypoglycaemia.

In a single blind randomised hyperinsulinaemic clamp study, people with type 1 diabetes and non-diabetics were given alcohol (0.75g/kg) raising their blood ethanol levels to 23.8±1.4mmol/L and 20.1±0.9mmol/L respectively (the legal limit for driving is 80mg/dl or 17.4mmol/L). At a glucose level of 4.5mmol/L alcohol slowed reaction times in both groups. When glucose was maintained at 2.5mmol/L reaction times slowed more. ‘Despite increases in symptoms during hypoglycaemia,
only 2 of 15 individuals “felt hypoglycaemic” after ethanol compared to 11 out of 15 after placebo. Counter-regulatory hormone response was not affected by alcohol although other studies have suggested this.10

‘I limited myself to a bottle of white wine… I had an evening meal prior to drinking and was running my blood sugar a little higher than I’d like, at 9mmol/l knowing that the alcohol was going to take effect later. What I should have done was to eat and not just drink… From 10pm through to 5am Anna (my CGM) says I had 4x hypos, each one she gracefully awoke me for to let me know.’11

Free-living type 1 adults who regularly drank <28 units alcohol a week were given vodka and orange or orange alone with a standardised evening meal and insulin dose while using continuous glucose monitoring. They had stable glucose control and normal hypoglycaemia awareness. The study was double blind. Patients’ blood glucose levels were lower during the alcohol day, and next day, and they reported twice as many hypoglycaemic episodes as on the non-alcohol day.12

So, in people with type 1 diabetes, alcohol may reduce awareness of hypoglycaemia, impair ability to cope with it, worsen hypoglycaemic cognitive impairment, increase the risk of hypoglycaemic episodes after drinking, and next day; and prevent on-lookers from recognising and treating the hypoglycaemia.

About a quarter to a third of young people with type 1 diabetes drink alcohol, although fewer than their non-diabetic peers. They are often more concerned with ‘fitting in’, including binge drinking, than with diabetes self-care. Alcohol mismanagement is often linked to poor diabetes self-care.13

‘I have a type 1 diabetic girlfriend who has just graduated [sic] her 30th birthday… She has had way too much to drink tonight, and is now asleep (passed out) in bed. What do I have to do to ensure that she will be alright in the morning… she has never been this drunk before, and I’m scared.’ A helpful reply was posted 24 minutes later.14

Young people use social networking sites for advice. Ten websites with 247 individual postings about alcohol and diabetes were reviewed. ‘Inaccurate information was common.’15 Diabetes UK provides useful advice.16

Type 2 diabetes

Glycaemic effects of regular moderate alcohol were studied in patients with type 2 diabetes who had previously abstained (raising questions about generalisability). They drank 150ml of wine or non-alcoholic diet beer daily for three months. Among participants who drank alcohol fasting plasma glucose decreased from 139.6±41 to 118.0±32.5mg/dl after three months compared with 136.7±15.4 to 138.6±27.8mg/dl in the control subjects.17

Current alcohol consumption was reported by 50.8% of 65 996 US adults with diabetes (92.2% type 2). There was ‘a gradient of increasing risk for poor adher-
ence to diabetes self-care behaviours with increasing alcohol consumption, starting with those who consume even one drink a day. Former drinkers had the greatest compliance with each self-care behaviour, except for current smoking.’18

Drugs

Alcohol flushing was common with chlorpropamide therapy. Check temperature rise after alcohol correlated with plasma chlorpropamide concentration.19 Alcohol flushing may occur with other sulphonylureas, e.g. glibenclamide; and other drugs including nitrates, nitrofurantoin and metronidazole for example.

Summary

Drinking alcohol in moderation may reduce the risk of developing type 2 diabetes, and, among those with type 2 diabetes, may reduce the risk of cardiovascular disease and improve fasting blood glucose levels.

Drinking alcohol increases the risk of hypoglycaemia in people on insulin, and worsens the cognitive impairment of hypoglycaemia, reducing warning, and impeding appropriate treatment by the patient and bystanders. Increasing alcohol intake increasingly worsens diabetes self-care.

People with diabetes of all ages need better, targeted advice about alcohol. Those who are at current or future risk of harm from alcohol need better help to reduce or stop drinking.20

Dr Rowan Hillson, MBE, National Clinical Director for Diabetes, England 2008–2013

References