

Management of type 1 diabetes



Subarachnoid haemorrhage: A new complication of type 1 diabetes?

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Cardiovascular disease is a frequent cause of death in individuals with type 1 diabetes. The relationship between type 1 diabetes and cardiac disease is reasonably well defined; whereas the relationship with cerebrovascular disease and type 1 diabetes is less well studied. Korja et al, the authors of the article summarised alongside, aimed to investigate this relationship using the FinnDiane (Finnish Diabetic Nephropathy) Study cohort. The cohort comprises of just over 4000 people with type 1 diabetes who have been followed since 1998. In this particular sub-study, the authors examined the incidence of subarachnoid haemorrhage (SAH) as a measure of cerebrovascular disease in people with type 1 diabetes.

SAH is a relatively rare cerebrovascular event. Most are caused by the rupture of arterial aneurysms that have a relatively central location within the brain. These aneurysms are usually found in larger arteries and can be regarded as a form of macrovascular disease. In addition, there is a small sub-group of SAH (5–15%) that does not occur at the site of aneurysms. These non-aneurysmal SAHs occur in smaller arteries in more peripheral sites within the brain. Because the site of damage is different the clinical presentation also differs from SAHs that occur at

the site of an aneurysm. The severity of damage at initial presentation is usually less for non-aneurysmal SAH, and there is a specific pattern of bleeding on CT imaging. Not surprisingly there is no evidence of aneurysm on subsequent angiogram. With this sub-type of SAH, the patient usually makes a better recovery with less long-term disability.

The authors' hypothesis was that non-aneurysmal SAH may represent a form of microvascular disease in a similar way to diabetic retinal disease. SAH is a rare condition so, even though the number of people followed is large, there were few events – only 15 in the study population. This gives an incidence of SAH for people with type 1 diabetes that is approximately four times higher than the expected incidence rate for the population of Finland. In the study by Korja et al, 10 of the 15 were non-aneurysmal SAH; a much higher proportion than would be expected.

With the small number of people in the study, the authors were not able to show an association between SAH and other established risk factors or the presence of diabetic retinopathy. However, the authors may have described a new complication of type 1 diabetes, although it would appear that this will have little impact on diabetes care as the prevention of SAH involves modifying established risk factors, such as hypertension and smoking. ■

Diabetes Care

Incidence of subarachnoid haemorrhage

Readability ////

Applicability to practice ///

WOW! Factor ////

1 The authors investigate the incidence of subarachnoid haemorrhage (SAH) as an adverse event in people with T1D using a cohort from the FinnDiane (Finnish Diabetic Nephropathy) study ($n=4080$).

2 Participants had a mean age of 37.4 ± 11.8 years, and 52% were male. The follow-up for the entire cohort was 36 680 person-years. The median follow-up time for each participant was 9.4 years.

3 Fifteen patients were confirmed to have had an SAH; the crude incidence of SAH was 40.9 per 100 000 person-years. Ten individuals were confirmed to have had a non-aneurysmal SAH and there was one confirmed incidence of an aneurysmal SAH.

4 The remaining four cases were fatal SAHs; two patients died within 24 hours of the SAH in hospital, and two died out of the hospital.

5 As there was only one confirmed case of aneurysmal SAH, no characteristics for people with T1D could be identified. However, compared to those that had no SAH, non-aneurysmal SAH patients were slightly older and more frequently used anti-hypertensive treatment at baseline.

6 No significant difference was measured in characteristics such as the age of diabetes onset, BMI and blood pressure values. However, there was a slightly higher prevalence of diabetic retinopathy and smoking among the participants who had had a non-aneurysmal SAH.

Korja M, Thorn LM, Hägg S et al (2013) Subarachnoid hemorrhage in type 1 diabetes: a prospective cohort study of 4,083 patients with diabetes. *Diabetes Care* **36**: 3754–8

“**Jet injection may be a good needle-free alternative to conventional pens, for administering insulin aspart, for people who have difficulty limiting postprandial glucose excursion.**”

Diabetic Medicine

RCT: Insulin degludec vs insulin glargine plus bolus aspart

Readability ✓✓✓✓
Applicability to practice ✓✓✓✓
WOW! Factor ✓✓✓✓

1 In this article, the authors extended the BEGIN® Basal-Bolus Type 1 trial by 1 year to compare the long-term safety and efficacy of insulin degludec with insulin glargine, both basal insulins and both administered with insulin aspart in this study.

2 In the main trial, 472 participants were randomly assigned to receive insulin degludec and 172 were randomly assigned to receive insulin glargine in a 3:1 ratio. Basal insulin was titrated to pre-breakfast plasma glucose values of 3.9–4.9 mmol/L. In total, 75% of participants from each group continued into the extension trial.

3 From the extension study, in terms of safety, a similar proportion of participants from both groups reported adverse events, which were mostly reported as mild.

4 There was no significant difference in the observed mean HbA_{1c} or fasting plasma glucose between the two groups after the 2-year period.

5 The rates of confirmed hypoglycaemia were similar for both groups. However, the authors found that the rate of confirmed nocturnal hypoglycaemia was significantly lower in the insulin degludec group ($P=0.02$). This translated to a 25% lower risk of nocturnal hypoglycaemia in the insulin degludec group.

6 After 2 years, the daily dose of basal insulin was significantly lower in the insulin degludec group compared to the insulin glargine group (they used 12% less basal insulin and 9% less total daily insulin [$P<0.01$]).

Bode BW, Buse JB, Fisher M et al (2013) Insulin degludec improves glycaemic control with lower nocturnal hypoglycaemia risk than insulin glargine in basal-bolus treatment with mealtime insulin aspart in Type 1 diabetes (BEGIN®) Basal-Bolus Type 1. *Diabet Med* **30**: 1293–7

Diabetes Care

CGM reduces severe hypoglycaemia

Readability ✓✓✓✓
Applicability to practice ✓✓✓
WOW! Factor ✓✓✓

1 In a specialist diabetes centre in the UK, a retrospective audit of 35 individuals with T1D and problematic hypoglycaemia unawareness was carried out.

2 The participants had a mean age of 43.2 ± 12.4 years and

24 were female. They received a continuous glucose monitor for the monitored 12-month period in addition to their already established continuous subcutaneous insulin infusion (CSII) device.

3 The median rate of severe hypoglycaemic events fell from 4.0 to 0.0 episodes/patient-year ($P<0.001$). Nineteen participants reported subjective improvement in awareness; however, there was no significant improvement in the awareness of participants over the year using a Gold score measure.

Choudhary P, Ramasamy S, Green L et al (2013) Real-time continuous glucose monitoring significantly reduces severe hypoglycemia in hypoglycemia-unaware patients with type 1 diabetes. *Diabetes Care* **36**: 4160–2

Diabetes Care

Insulin aspart therapy: Jet injection versus conventional pen

Readability ✓✓✓
Applicability to practice ✓✓✓
WOW! Factor ✓✓

1 A randomised, double-blind, double-dummy crossover study was carried out to compare jet injection or conventional pen administration of insulin aspart in 12 people with T1D and 12 people with T2D.

2 The insulin aspart was administered prior to a standardised carbohydrate-rich meal on two separate days.

3 Jet injection administration resulted in a shorter time to peak plasma insulin level than the conventional pen ($P=0.003$), and a reduced hypoglycaemic burden during the first hour postprandial, but this was not significant.

4 Jet injection may, therefore, be a good needle-free alternative to conventional pens for people who have difficulty limiting postprandial glucose excursion.

Engwerda EE, Tack CJ, de Galan BE (2013) Needle-free jet injection of rapid-acting insulin improves early postprandial glucose control in patients with diabetes. *Diabetes Care* **36**: 3436–41

Diabetes Obes Metab

Systematic review: Insulin detemir and NPH insulin

Readability ✓✓✓✓
Applicability to practice ✓✓✓✓
WOW! Factor ✓✓

1 This systematic review considered the clinical differences in patients with T1D or T2D who had been treated with two basal insulins: neutral protamine Hagedorn (NPH) insulin and insulin detemir.

2 After a search of PubMed, 14 studies met the inclusion criteria (randomised controlled trials with a duration of ≥ 12 weeks; including non-hospitalised adults with either T1D or T2D).

3 From the 14 studies considered, insulin detemir treatment provided similar or better glycaemic control, lower within-subject variability, similar or lower frequency of hypoglycaemia and less weight gain when compared to treatment with NPH insulin.

Frier BM, Russell-Jones D, Heise T (2013) A comparison of insulin detemir and neutral protamine Hagedorn (isophane) insulin in the treatment of diabetes: a systematic review. *Diabetes Obes Metab* **15**: 978–86