GAVE a little, gain a lot

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Introduction

- Effective diabetes management often presents enormous challenges and is also influenced by comorbid chronic conditions.
- Conventional monitoring of long-term glycaemic control involves glycosylated haemoglobin. In certain comorbidities, alternative monitoring options are available.
- We present the unusual case of a poorly controlled patient with diabetes, who optimised his glycaemic control via a fortunate and unintended byproduct of surgery.

Case description

- 60-year-old man with type 2 diabetes mellitus for 12 years.
- Extreme insulin resistance led to him requiring 130 international units of insulin daily by 2 years after diagnosis. Glycaemic control was poor with HbA1c ranging from 70 to 90 mmol/mol.
- Other metabolic parameters were suboptimal despite maximal medical treatment with hypertension, dyslipidemia and obesity. Poor cardiovascular profile was compounded by a sedentary lifestyle.
- Anti-GAD and anti-islet antibodies were negative, excluding type 1 diabetes.

Clinical course

- Gastric antral vascular ectasia (GAVE) was diagnosed 4 years ago. He required frequent endoscopic interventions to control his disease, requiring almost 60 procedures in 4 years.
- However, endoscopic treatment proved ineffective and he became transfusion dependent two years ago, requiring transfusions every 3 weeks.
- Fructosamine was used to measure glycaemic control. This remained poor.
- Surgery was performed as definitive treatment of GAVE and consisted of a partial gastrectomy.

Figure 1: Biochemistry pre- and post-operatively

	Diabetes Clinic at referral: 2005	Diabetes Clinic Preoperative: 2014	Diabetic Clinic Postoperative: 2016
IFCC HbA1c (mmol/mol)	89	86 (based on fructosamine)	46
Creatinine (umol/L)	83	79	82
Cholesterol (mmol/L)	5.6	2.9	3.6
HDL (mmol/L)	1.02	0.8	1.1
TC/HDL	5.49	3.63	3.27
Urinary Albumin to creatinine	1.4	2.3	2.1

Case outcome

- Postoperatively, he made excellent progress and required no further blood transfusions or endoscopies.
- Furthermore, insulin requirement significantly reduced such that it was discontinued a year after surgery. Taking metformin and sitaglipin, HbA1c fell to 46 mmol/mol *(See Figure 1)*
- Post-operative BMI was 32.8 compared with 39.4 kg/m2 prior to surgery. His blood pressure and lipid profile became maintained within the diabetic target ranges *(See Figures 1 and 2)*

Discussion

- GAVE are vascular lesions of the gastric antrum, which are characterised by tortuous dilated blood vessels radiating proximally from pylorus. They are most commonly seen in middle-aged to elderly women, with autoimmune disease (e.g. atrophic gastritis). Diagnosis is made on endoscopic appearance and typically present as acute upper GI bleeds or chronic iron deficiency anaemia.
- Treatment of GAVE relies on iron therapy and transfusions. Endoscopic therapy with laser photocoagulation, argon plasma coagulation and heater-probe therapy are used for symptomatic cases. In severe cases, surgery is required.
- However, our gentleman became transfusion dependent meaning HbA1c was not reliable because it measures mean blood glucose concentration over the preceding 60 days - i.e. red cell half-life. If HbA1c monitoring is invalid because of disturbed erythrocyte turnover or abnormal haemoglobin type, estimate trends in blood glucose control involve fructosamine estimation, quality-controlled blood glucose profiles and total glycated haemoglobin estimation (if abnormal haemoglobins). The fructosamine assay is a measure of glycaemic control over a period of 2 to 3 weeks in diabetic patients. It is cheap and rapid. It measures the levels of glycosylated - with fructose groups - serum proteins.
- Partial gastrectomy involves surgical resection of the gastric antrum; lower third of the stomach that lies between the body of the stomach and pyloric canal. It is used to treat peptic ulcer disease, arteriovenous malformations such as GAVE, gastric neoplasms and gastric outlet obstruction. Post-operatively, it is associated with weight loss. However, unlike sleeve gastrectomy, it is not considered a bariatric procedure. Therefore the improvement in this patient's weight and glycaemia was a fortunate but unintended benefit of surgery.

Figure 2: Clinical observations pre- and post-operatively

	Diabetes Clinic at referral: 2005	Diabetes Clinic Preoperative: 2014	Diabetic Clinic Postoperative: 2016
Weight (kg)	121	129.2	107.2
BMI	36.9	39.4	32.8
Blood pressure (mmHg)	160/86	151/62	119/62