A 30-year-old woman with longstanding type 1 (insulin-dependent) diabetes mellitus presents with severe hypoglycaemia. She is known to have autonomic neuropathy resulting in gastroparesis. She is on a gluten-free diet for celiac disease and thyroxine for hypothyroidism. Clinical examination is unremarkable apart from the presence of lipohypertrophy.

Which one of the following features of her history or examination most significantly increases the risk of a further severe hypoglycaemic episode in the next 24 hours?

A. Thyroxine therapy
B. Gastroparesis
C. Lipohypertrophy
D. Coeliac disease

**E. The current hypoglycaemic episode**

Answer A hypothyroidism can increase risk of hypoglycaemia in TIDM therefore its treatment would be the opposite – the answer is not A.

Answer B Diabetic gastroparesis results in delayed stomach emptying, leading to retention of stomach contents. Other abnormalities include gastric dysrhythmia, abnormality of fundic relaxation, and antral hypomotility. Symptoms include bloating, early satiety, abdominal pain, nausea, or vomiting. Delayed stomach emptying may lead to gastroesophageal reflux, with symptoms of heartburn and vomiting of undigested food. Because gastroparesis makes stomach emptying unpredictable, blood glucose levels may be erratic and difficult to control – hyper and hypos can occur. Not the most significant increase to risk of further severe hypoglycaemic episodes.

Answer C Lipohypertrophy is characterised by a benign “tumour-like” swelling of fatty tissue secondary to subcutaneous insulin injections. Diabetic lipodystrophies, particularly lipoatrophy, were common local complications of insulin treatment in patients treated with bovine or porcine insulins. With the introduction of human recombinant insulins, lipoatrophy has become uncommon, but lipohypertrophy remains a major problem. It is estimated that the prevalence of clinically significant lipohypertrophy is around 20% to 30% in patients with type 1 diabetes and around 4% in patients with type 2 diabetes. Injection into lipohypertrophied injection sites can lead to problems with glycaemic control. Evidence indicates that insulin absorption can be significantly delayed, leading to erratic glycaemic control and unpredictable hypoglycaemia. The lipohypertrophied areas can be unsightly, and the only available treatment for the condition is liposuction, although not injecting into the sites may reduce their size over time. Not the most significant increase to risk of further severe hypoglycaemic episodes.

Answer D celiac disease

In patients with celiac disease (gluten-sensitive enteropathy, or GSE), ingestion of the gliadin fraction of wheat gluten and similar molecules (prolamins) from barley, rye, and possibly oats causes damage to the intestinal epithelium. The injury results from an abnormal T-cell response against gliadin. Thus, GSE is a disease in which host susceptibility must be combined with a specific environmental trigger to affect injury. Typically, patients with GSE have chronic diarrhea and failure to thrive. However, some patients present with short stature, flatulence, or recurrent abdominal pain. Dermatitis herpetiformis, a pruritic papular rash, is directly related to GSE. Other atypical presentations are increasingly recognized, among them iron-deficiency anaemia, osteopenia/osteoporosis, short stature, dental enamel hypoplasia, arthritis and arthralgia, chronic hepatitis/hypertransaminasemia, and neurological problems. GSE has also been found in asymptomatic individuals who nonetheless have evidence of intestinal mucosal injury on biopsy.
Due to malabsorption underlying celiac disease is associated with an increased risk of symptomatic hypoglycemia and that the introduction of a gluten-free diet with normalization of the intestinal mucosa may reduce its frequency. Similar to gastroparesis this may make glycaemic control difficult but not the most likely answer here

**Answer E the current hypoglycaemic episode**

Recurrent hypoglycemia itself also may contribute to the impaired counterregulatory response, potentially leading to a vicious cycle (hypoglycemia-associated autonomic failure). Careful metabolic studies have demonstrated that a single episode of hypoglycemia impairs the release of counterregulatory hormones and the development of early symptoms in response to a second episode within the next 12 to 24 hours. On the other hand, meticulous glycemic control, avoiding hypoglycemia, can improve or normalize the neuroendocrine response in patients with type 1 diabetes of relatively short duration. This improvement, which includes enhanced perception of symptoms, can occur within as little as two days of strict avoidance of hypoglycemia. This is the most appropriate answer