**Dear Editor,**

We would like to raise awareness amongst your readers of the potential harm associated with the use of sodium-glucose co-transporter-2 inhibitors (SGLT-2i) in patients undergoing bariatric and metabolic surgery (BMS). Cases have come to the attention of the Patient Safety Committee at British Obesity and Metabolic Surgery Society (BOMSS) of ketoacidosis in BMS patients in the United Kingdom where SGLT-2i were implicated.

Sodium-glucose co-transporter-2 inhibitors (SGLT-2i) (gliflozins) have recently gained popularity due to their cardio-renal protective benefits in patients with and without type 2 diabetes mellitus (T2DM) [1]. These drugs have also been shown to help patients with T2DM lose weight and lead to a reduction of fat mass [2] making them very useful in patients with T2DM and obesity.

These drugs inhibit renal sodium-glucose co-transporters, thereby reducing the reabsorption of glucose in the kidney and serum glucose levels [1]. Because of their mechanism of action and their impact on reducing insulin (due to decreasing glucose) and increasing glucagon levels, patients, especially those with severely reduced oral intake (such as those pre and post-bariatric surgery) are predisposed to dehydration and ketosis. These drugs have been found to be associated with a higher risk of euglycaemic (and hyperglycaemic) diabetic ketoacidosis (DKA) [3]. The diagnosis of euglycaemic DKA is usually confirmed by the presence of metabolic acidosis, ketosis, bicarbonate less than 15 mmol/L, and a glucose level that is usually less than 11 mmol/L [1]. In contrast, in hyperglycaemic DKA, the blood glucose is abnormally elevated and is usually > 15 mmol/L.

The Food and Drug Administration of the United States of America issued a warning on this in 2015 [4]. In the United Kingdom, National Institute of Health and Care Excellence (NICE) recommends checking whether the person may be at increased risk of DKA, for example on a very low carbohydrate or ketogenic diet, before starting an SGLT-2i [5]. Despite these high level warnings, cases of DKA have been published in BMS patients with the use of these drugs [6,7,8].

Patients undergoing bariatric surgery are usually advised to go on a liver-reducing low (<1200kcals per day) or very low-energy diet (<800kcals per day) immediately prior to the surgery. For many patients, this will be a sudden and significant reduction in their usual carbohydrate intake. Moreover, in the first few weeks after bariatric surgery, most patients will be consuming only around 600kcals per day and some struggle to meet their fluid requirements. All these factors place them at a higher risk of developing ketosis.

Amongst BMS, cases of euglycaemic DKA have been reported after sleeve gastrectomy [7], gastric band [7] and Roux-en-Y gastric bypass [7,8]. Cases have been reported from as early as 6 hours up to 6 weeks after bariatric surgery [9]. BOMSS has recommended a set of precautions (Table 1) which every unit that performs BMS should consider implementing.

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**Statement on Human and Animal rights:** This article does not involve any trials being carried out on humans and animals

**Informed consent:** Not applicable

**Ethical approval:** Not applicable

**Table 1: Recommendations**

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| 1 | Stop any SGLT-2i 48 hours before starting any low energy or very low energy diet |
| 2 | Stop any SGLT-2i 48 hours before bariatric surgery even if no preoperative diet is recommended |
| 3 | Do not re-start SGLT-2i post bariatric and metabolic without a full discussion of the pros and cons and other treatment options with the patient |
| 4 | Consider withholding SGLT-2i in any patient hospitalised for major surgery or acute serious illness |
| 5 | Ketone levels should be monitored daily in all patients on SGLT-2i hospitalised with an acute serious illness |
| 6 | SGLT-2i should only be restarted once the clinical condition has stabilised and normal oral intake established. If a decision is taken to recommence them at a later stage or permanently omit them, this should be communicated to the GP. |

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