



LETTER TO THE EDITOR

## The Importance of Glycaemic Control Before Bariatric Surgery: Preventing Microvascular and Metabolic Complications

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Dear Editor,

We read with interest the study by Wilmington et al. [1], where they undertook a retrospective study of patients with type 2 diabetes (T2D) who underwent bariatric surgery. It was reassuring to see that for the 269 patients analysed, preoperative glycaemic control (categorised by HbA1c < 69 mmol/mol vs. HbA1c ≥ 69 mmol/mol) did not influence perioperative and 30-day postoperative outcomes (surgical complications, mortality, readmission, ICU admission and hospital length of stay) [1].

For modern laparoscopic bariatric surgery performed in specialist centres, immediate postoperative surgical outcomes have been shown to be largely unaffected by preoperative glycaemic control [2–4]. Whilst this has been confirmed by Wilmington et al., they provide no postoperative glycaemic and metabolic outcomes. Their assertion that preoperative HbA1c has limited utility in decisions around proceeding to bariatric surgery or subsequent operative outcomes crucially fails to acknowledge the potential for perioperative and postoperative metabolic complications, including the long-recognised risks of acute electrolyte disturbances and importantly diabetic emergencies including diabetic ketoacidosis and hyperosmolar hyperglycaemic state [5, 6]. These additional risks can be mitigated through preoperative optimisation of glycaemia, alongside safe perioperative management of diabetes [6].

Our group has previously highlighted additional dangers of rapid improvement in glycaemic control following

bariatric surgery, which can be thought of as a deceleration injury and can result in new onset or progression of pre-existing diabetic retinopathy (DR) [7, 8]. Deterioration of DR following a stringent glycaemic intervention is often referred to as ‘early worsening’ and has been reported to occur between 3 months and 3 years following intervention [9, 10].

Landmark trials such as the Diabetes Control and Complications Trial (DCCT) and the UK Prospective Diabetes Study (UKPDS) have shown that intensive treatment was associated with an increased risk of early worsening of DR [11]. Whilst enhanced glycaemic control prevented longer-term DR progression, the risk of early worsening needs to be borne in mind. Similar observations of early worsening of DR with intensive treatment have been shown in patients undergoing other intensive diabetes therapies and in pregnant women [9].

More recently, the SUSTAIN-6 trial which investigated cardiovascular outcomes in patients with T2D treated with the glucagon-like peptide 1 (GLP-1) receptor agonist semaglutide identified a 76% increase in DR in the semaglutide group [12]. Further analysis has also found that the presence of DR after treatment with semaglutide was related to baseline control, pre-existing DR, and rapid HbA1c reduction, rather than a direct drug effect [13]. A similar trend was found with liraglutide treatment in the LEADER study, emphasising that rapid HbA1c reduction is the primary driver of this effect [14]. It is worth noting that many studies which examine the early worsening of DR with treatment intensification were not designed with this question in mind, and there is a lack of standardisation in reporting retinopathy and visual outcomes.

Though the bariatric surgical literature on early DR has produced variable results, there is again consensus over factors which increase risk [15], namely, preoperative HbA1c, severity of DR and magnitude of postoperative HbA1c reduction [16, 17]. Although the underlying pathophysiology remains a subject of debate, several theories have been proposed. These include mechanisms involving concentration

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changes in osmotically active molecules, altered actions of insulin and vascular endothelial growth factor, and blood-retinal barrier dysfunction [9].

Thus, a clear signal exists that patients with significantly elevated HbA1c levels and more severe DR before undergoing surgery face a heightened risk of worsening DR postoperatively. Whilst observed rates of new or progressive DR following bariatric surgery are generally low, we contend that the occurrence of preventable progression to sight-threatening DR or blindness in even a single patient, similar to mitigating surgical mortality, is to be avoided.

Whilst bariatric surgery remains a highly effective treatment for patients with diabetes and obesity, given that caution and monitoring for worsening DR is advised even with medical therapies such as semaglutide, it should be approached with meticulous evaluation and management of risks including glycaemic control and microvascular complications both before and after surgery.

With bariatric surgery, the trajectory of improved glycaemia following weight loss cannot be controlled and is often unpredictable. This differs from conventional diabetes treatment intensification with pharmacotherapy, which can be controlled and adjusted, mitigating potential adverse effects. Considering the waiting times for bariatric surgery and the availability of effective medical therapies, we argue that there is rarely any justification for not carefully optimising glycaemic control preoperatively to mitigate potential harm to patients.

At our centre, we pragmatically recommend an HbA1c < 75 mmol/mol (9.0%) which is a realistic target in our experience. In rare instances where efforts to optimise glycaemic control reach a plateau, we propose that bariatric surgery be conducted with consideration of preoperative DR status and careful postoperative monitoring. Following bariatric surgery, all patients with diabetes should remain on the primary care diabetes register to ensure regular retinal surveillance even if their diabetes undergoes remission. Further research is required to elucidate precise mechanisms and to help stratify the risk of DR progression in patients with diabetes who require bariatric surgery.

## Declarations

**Conflict of Interest** Akheel A. Syed was a former honorary selection panel member of the Leadership and Development Awards committee of the Society for Endocrinology UK. All authors declare that they have no other potential conflict of interest.

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