

Is there an optimum level of intraoperative glucose control?

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Trauma, surgery and anaesthesia are known triggers of the stress response and this has been shown in many studies to present as a hyperglycaemic response. These elevated blood glucose levels have, in turn, been linked in many studies to increased mortality and morbidity in hospitalised patients and most certainly in patients undergoing surgical procedures of one type or another. Poor perioperative clinical outcomes are true of both diabetic and non-diabetic patients, except that they occur to varying extents.

The first Leuven study by Van den Berghe reported that intensive insulin therapy reduced mortality in selected critically ill surgical patients. As a result, lowering blood glucose levels was recommended as a means of improving patient outcomes. However, in contrast to these findings, subsequent research provided compelling evidence of increased mortality associated with intensive insulin therapy, not least because of the increased incidence of severe hypoglycaemia that resulted.

The majority of recent data guiding perioperative glycaemia management were informed by research on patients in critical care and it's from this research that extrapolations have been made to guide intraoperative blood glucose control. As can be expected, this approach is fallacious because of the differences in metabolic perturbations associated with either environment. On the other hand, most of the research addressing intraoperative blood glucose management was conducted in patients

undergoing cardiac surgery and until recently, this was the only information available. Specific though these data may be to this select group of patients, they have helped define the parameters within which surgical general patients should ideally be managed.

A number of recent publications have reported on research into different strategies for blood glucose management in non-cardiac surgery. Two very important messages emanate from these studies. First, a reduction in glucose variability is a key component of any strategy to control blood glucose. This recognition stems from the observation that increased variability is associated with increased postoperative mortality. Secondly, target blood glucose levels associated with clinical benefit are not the same for the intraoperative versus postoperative periods (higher in the former). Lastly, intraoperative blood glucose control should not target near-normal levels, but should rather aim for the upper limit of the normal range. This is illustrated in the results of a cardiac study where postoperative mortality is shown to increase when blood glucose levels are titrated to near normal levels, as opposed to patients with relative intraoperative hyperglycaemia.