Editorial

Cardiac Surgery and the Low Hanging Fruit of Perioperative Nutritional Interventions

DESPITE THE increasing prevalence of comorbidities amongst patients undergoing coronary artery bypass grafting (CABG) surgery, outcomes continue to improve. Although major complications following routine surgery are uncommon, the perioperative management of patients with potentially modifiable major risk factors remains challenging.

Future gains are likely to require a focus on high-risk patients and the comprehensive evaluation of all aspects of their care. This includes assessing novel approaches that challenge the status quo and recognize the changing characteristics of patients undergoing CABG surgery. It is an approach for which perioperative nutritional interventions would seem ideally suited. Preoperative fasting can induce metabolic stress, promoting insulin resistance and protein catabolism. These effects may be heightened in obese patients, a cohort that are over-represented amongst patients undergoing CABG surgery and are at increased risk of adverse outcomes.

In this issue of the Journal of Cardiac and Vascular Anesthesia, Hosny et al present the results of a single-center trial that included 63 nondiabetic patients with a body mass index (BMI) of 30 to 40, undergoing elective, on-pump CABG surgery, randomly allocated to 1 of 3 preoperative nutritional regimes including overnight fasting, an infusion of 50 g of intravenous glucose solution or mixed (soybean, medium chain triglyceride, olive oil, and fish oil) lipid infusion of equal caloric content (200 kcal). Patients receiving preoperative lipid therapy had significantly lower levels of insulin and glucose concentrations up to 24 hours after intensive care unit (ICU) admission, compared with both the glucose infusion and conventional fasting groups. Similar differences also were observed between groups for free fatty acid and triglyceride levels. ICU and hospital stay were similar between groups, although a significantly lower proportion of participants in the lipid therapy group received perioperative inotropic support.

A degree of caution is required in interpreting these findings. The number of comparisons is large, increasing the risk of a type I error. Insulin resistance is more typically quantified using the hyperinsulinemic euglycemic clamp or homeostatic model assessment. Furthermore, there is the potential for confounding by co-intervention, including a lack of data on the doses of vasoactive medication, propofol, and exogenous insulin. The lack of blinding of the conventional fasting group is another source of potential bias. Future studies investigating whether or not these findings can be replicated at other sites and in other groups of patients also would benefit from reporting all CONSORT elements, including trail registration, protocol availability, and estimates of effect size and precision for each primary and secondary outcome reported, elements not included by Hosny et al.

Despite these limitations, there is a scientific and ethical imperative to publish these preliminary results. The findings also are intriguing. Studies that challenge the conventional wisdom of fasting practices for patients undergoing cardiac surgery remain scant. Also, although enhanced recovery after surgery programs in other surgical specialties often include an emphasis on fasting minimization and specialized preoperative nutrition, these have tended to involve carbohydrate rather than lipid therapy. The pleotropic effects of lipids are both a strength and a weakness of research into this therapy. Potential benefits of specific lipids include the direct availability of medium chain triglycerides to mitochondria, the relative preference of myocytes for free fatty acids, and the anti-inflammatory and immunomodulatory effects of omega-3 fatty acids. However, these differences add an additional source of heterogeneity in the available evidence to date.

In more general terms, obesity is an independent risk factor for nosocomial infection and prolonged hospital stay in patients undergoing cardiac surgery. This may be due in part to the effects of underlying insulin resistance. It is plausible that the exacerbation of pre-existing metabolic derangement caused by conventional fasting could be mitigated by a nutritional intervention that decreases the stress response and minimizes the perioperative catabolic period. Hosny et al have shown us the tree and the fruit that may hang from it. It is now time to ascend the ladder by continuing to build the evidence for nutritional interventions in selected high-risk patients undergoing cardiac surgery.
References


