

from the patient's own bacteria, looks at whether hair covering of surgeons is relevant, and attributes more bacterial shedding to men than women. Surely, a very crucial issue not considered in the analysis are other major co-factors, the principal of which (rarely considered) being the propensity of surgeons to exit the OR and wander about the hospital in OR attire. Few actually re-clothe themselves in new clean surgical attire, which rather suggests that there might not be much difference between this and ordinary washed clothes from home! As the latter suggestion, like the rather amusing possibility mentioned by Kothari and colleagues<sup>1</sup> that surgeons operate naked, will hardly acquire universal acceptability, it might be better to study whether the current surgical trend of quitting and re-entering the OR ad lib has indeed any deleterious effect.

In addition, the published reply of Fujita<sup>2</sup> might, at cursory reading, imply that hair was clipped at the surgical site, that is, around the proposed incision, rather than generally in the OR. Also, there seemed to be a suggestion that surgical site infections are related to the debility of duly affiliated American anesthesiologists!

#### REFERENCES

1. Kothari SN, Anderson MJ, Borgert AJ, et al. Bouffant vs skull cap and impact on surgical site infection: does operating room headgear really matter? *J Am Coll Surg* 2018;227:198–202.
2. Fujita T. Evidence-based surgical attire. *J Am Coll Surg* 2018; 227:475.

Disclosure Information: Nothing to disclose.

## What Constitutes Ideal Perioperative Glycemic Control for Preventing Acute Postoperative Hyperglycemia in Surgical Patients with Nonalcoholic Fatty Liver Disease?



Kazuhiro Hanazaki, MD, PhD,  
Hiroyuki Kitagawa, MD, PhD,  
Tsutomu Namikawa, MD, PhD  
Kochi, Japan

We commend Ssentongo and colleagues on their interesting article about the relationship between nonalcoholic fatty liver disease (NAFLD) as a high-value predictor of

postoperative hyperglycemia and complications of major abdominal surgery.<sup>1</sup>

Serious problems relating to perioperative glycemic control include hyperglycemia, hypoglycemia, and variability of blood glucose concentration caused by surgical stress.<sup>2,3</sup> To avoid these problems, we established a method of perioperative glycemic control using an artificial pancreas.<sup>2,3</sup> Although hyperglycemia induced by surgical stress is one of the main causes of postoperative infection, optimal blood glucose levels during the perioperative period to prevent postoperative infection, remain unclear. As noted by Ssentongo and colleagues,<sup>1</sup> many investigators have recently suggested that aiming for a blood glucose range of 80 to 140 mg/dL (4.4 to 7.8 mmol/L) to obtain good surgical outcomes is valid in surgical patients.<sup>3</sup> However, the optimal blood glucose range for achieving the most favorable surgical outcomes is unclear. One likely reason for this is that glycemic status varies significantly between patients with and without diabetes. Also, the optimal blood glucose range may depend on differences in surgical, oxidative, and inflammatory stress response in each patient. Our research supports the idea that tight glycemic control during the perioperative period—using an artificial pancreas and aiming for a blood glucose range of 80 to 110 mg/dL (4.4 to 6.1 mmol/L)—is superior to conventional glycemic control in several ways. We found that it not only reduces the risk of surgical site infection, but also leads to shorter hospital stays after surgery (compared with conventional glycemic control using a sliding scale) in patients undergoing hepatectomy, pancreatectomy, and esophagectomy.<sup>3</sup>

Nonalcoholic fatty liver disease is a hepatic manifestation of metabolic syndrome that involves insulin resistance and abnormal glucose metabolism.<sup>4</sup> Oki and colleagues<sup>4</sup> reported that patients with NAFLD had more variability in blood glucose concentration using continuous glucose monitoring than patients who did not have NAFLD. They noted that hyperinsulinemia, hyperglycemia, and glycemic variability are important predictive factors for progression of hepatic fibrosis in patients with NAFLD. Adverse outcomes associated with postoperative hyperglycemia in patients with NAFLD may be more serious. Therefore, in surgical settings, patients with severe NAFLD require more careful glycemic management than patients who do not have NAFLD and those with milder NAFLD.

Ssentongo and colleagues<sup>1</sup> concluded that patients with NAFLD who undergo major abdominal surgery are at risk of postoperative hyperglycemia and would benefit from preoperative metabolic optimization. We believe perioperative glycemic control using an artificial pancreas is a novel method of preoperative metabolic optimization

that has several benefits. It helps prevent hyperglycemia and helps prevent glycemic variability associated with adiposity in patients with NAFLD.<sup>2</sup> Furthermore, and most importantly, tight glycemic control using an artificial pancreas provides the ability to prevent blood glucose levels from falling below 70 mg/dL (3.9 mmol/L), by aiming for 80 to 110 mg/dL.<sup>2</sup>

As numbers of surgical patients with NAFLD, diabetes, and/or glucose intolerance increase, perioperative glycemic control will become more important. It will play an increasingly significant role in improving surgical outcomes, by preventing complications of perioperative hyperglycemia and glycemic variability such as infections.

## REFERENCES

1. Ssentongo P, Ssentongo AE, Dykes T, et al. Nonalcoholic fatty liver disease as a high-value predictor of postoperative hyperglycemia and its associated complications in major abdominal surgery. *J Am Coll Surg* 2018;227:419–429.e6.
2. Hanazaki K, Kitagawa H, Yatabe T, et al. Perioperative intensive insulin therapy using an artificial endocrine pancreas with closed-loop glycemic control system: the effects of no hypoglycemia. *Am J Surg* 2014;207:935–941.
3. Hanazaki K, Munekage M, Kitagawa H, et al. Current topics in glycemic control by wearable artificial pancreas or bedside artificial pancreas with closed-loop system. *J Artif Organs* 2016;19:209–218.
4. Oki Y, Ono M, Hyogo H, et al. Evaluation of postprandial hypoglycemia in patients with nonalcoholic fatty liver disease by oral glucose tolerance testing and continuous glucose monitoring. *Eur J Gastroenterol Hepatol* 2018;30:797–805.

Disclosure Information: Nothing to disclose.

## What Is the Value of Preoperative Esophageal Manometry in Patients with Giant Paraesophageal Hernia?



Stefano Siboni, MD,  
Marco Sozzi, MD,  
Luigi Bonavina, MD, FACS  
Milan, Italy

The actual prevalence of esophageal manometric abnormalities in patients with giant paraesophageal hiatus hernia is largely unknown because physiologic assessment in these individuals has often been considered irrelevant and difficult to perform due to the distorted anatomy secondary to volvulus of the intrathoracic stomach and

consequent inability to reach the gastric lumen with the manometric probe. Instead, previous studies have widely addressed the role of manometry in patients with sliding hiatus hernia and gastroesophageal reflux disease. Stationary or high-resolution (HR) manometry has been found useful to exclude achalasia in these patients, but the debate on whether the motility findings should guide the choice of a partial vs a total fundoplication still continues. Conversely, for patients with giant paraesophageal hernias, neither stationary nor HR manometry is part of routine evaluation in most centers, including ours. We congratulate Wirsching and colleagues<sup>1</sup> for embarking on such a study and for demonstrating abnormal preoperative motility disturbances at HR manometry in 53% of their patients. A major study finding is that type 1–2 achalasia was never diagnosed preoperatively, and therefore, there was no need to modify the planned surgical strategy and reoperations were not required. We certainly agree with the authors' conclusions that abnormal HR manometric findings in patients with giant paraesophageal hernia do not preclude elective surgical repair and that concomitant achalasia is a very rare entity.<sup>2</sup>

However, we question the reliability of HR manometry to provide a realistic picture of esophageal motility in a context in which distorted anatomy, decreased esophageal length, and loss of anchoring of the esophagus may alter the relaxation pattern of the lower esophageal sphincter.<sup>3</sup> Interestingly, in the study by Wirsching and colleagues,<sup>1</sup> preoperative symptoms were present in the majority of patients irrespective of the baseline manometric findings, and the incidence of postoperative dysphagia was very low considering that 18.5% of patients had either an esophago-gastric junction outflow obstruction or type III achalasia and 44.5% of patients received a total fundoplication. Furthermore, minor esophageal motor function abnormalities, including ineffective motility and fragmented peristalsis as detected by HR manometry, are known to be associated with minimal consequences over the long-term follow-up.<sup>4</sup>

We are convinced that preoperative HR esophageal manometry is unnecessary in patients with giant paraesophageal hernia who are candidates for elective surgical repair. We routinely perform a Toupet rather than a complete fundoplication in these patients to minimize the incidence of postoperative dysphagia, irrespective of the baseline motility pattern.<sup>5</sup> In our opinion, indications for elective surgical repair should be based solely on typical barium swallow and endoscopic findings. A CT scan can be selectively added based on previous medical history or the suspicion of concurrent cancer, which may alter the therapeutic algorithm. High-resolution manometry has a definite role in patients with persistent