Surgical site infections after coronary artery bypass grafting—Does “never” really mean “never”?

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In this edition of the *Journal*, Gulack and co-workers¹ use data from the Cardiothoracic Surgical Trials Network (CTSN) to define the incidence of surgical site infections (SSIs) in the leg and groin in patients undergoing saphenous vein graft (SVG) harvesting for coronary artery bypass grafting (CABG) and to determine the risk factors for these infections.¹ They found that 3.0% of patients undergoing CABG developed SSI in the leg or groin within 65 days of surgery. Factors associated with increased SSI were an open SVG harvest technique versus an endoscopic approach, an increased body mass index, and an increased transfusion of packed red blood cells. The majority of SSIs were superficial (88%), diagnosed after discharge within 30 days of the CABG, and associated with a higher rate of hospital readmissions. Unfortunately, limitations in the CTSN database and the retrospective design of the study limit important conclusions that can be reached regarding SSI and SVG harvesting during CABG.

The study was based on data collected 6 to 7 years ago. Since that time, there have been significant changes in glycemic control, antibiotic prophylaxis, and SVG harvesting techniques that have affected SSI. Only 75% of SVGs were harvested using an endovascular technique. The reasons for and the number of patients who underwent conversion from an endoscopic to an open technique are not reported. The study reported on both groin and leg infections; however, we are not told how many groin infections were associated with cannulation procedures and not SVG harvesting. The study indicates that postoperative hyperglycemia was not a factor for SSI. However, the definition of hyperglycemia was a single occurrence of a blood glucose value greater than 180 mg/dL during the initial 48 hours after surgery. Previous studies have shown that this is an inaccurate measure of the adequacy of glycemic control compared with a mean glucose value, which incorporates multiple glucose measurements over an extended period of time.² This was the basis for discontinuing the Surgical Care Improvement Project as a measure of glycemic control in cardiac surgical patients.² It is distressing that the

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Central Message

SSIs are considered “never” events. However, some patients may develop SSI even after adhering to guidelines for preventing SSI.

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majority of SSIs were diagnosed after discharge but within 30 days of the CABG. This questions the adequacy of the examination of the SVG harvest site at the time of discharge. No mention is made as to whether any erythema was noted at the SVG harvest site at that time. Many of these superficial SSIs may have been avoided and readmissions prevented had some of these erythematous changes been treated with oral antibiotics and more frequent clinic visits scheduled to reassess these wounds. Finally, it appears there was considerable variation among the participating institutions in their adherence to best practice guidelines. *Staphylococcus aureus* was the most common organism associated with SSI, but no mention is made if preoperative nasal decontamination was performed and whether antibiotic soaps were also used to cleanse the legs and groins in those in-house patients who could not shower. We are told that only 71% of patients received *S. aureus* “prophylaxis.”

Despite these limitations, this CTSN study calls our attention to the important issue as to whether SSI in patients undergoing CABG should ever be a “never” event. To answer this important question, which has both clinical and economic ramifications, I would encourage the CTSN to conduct another trial to determine the incidence of all

SSIs in patients undergoing CABG between 2015 and 2016. This study would answer 3 important questions:

1. What is the current incidence of SSI in patients undergoing CABG?

Since 2010, there have been several advances in the perioperative management of the patients undergoing CABG, including tighter glycemic control,² topical antibiotics applied to the sternal edges and the avoidance of bone wax,³ preoperative *Staphylococcus* prophylaxis, guidelines for perioperative antibiotic prophylaxis, and increased use of endovascular SVG harvesting,^{4,5} that have resulted in a decreased incidence of all SSI in patients undergoing CABG. Institution of these “best practice guidelines” have contributed to overall SSI rates as low as 0.7% and even 0% for sternal infections.^{4,6} These best practice guidelines are reviewed by Goh⁵ and in the recent American Association for Thoracic Surgery consensus guidelines for the prevention of sternal infections,⁴ and apply to all SSIs during cardiac surgery. The data generated by this study would determine the current benchmarks for SSI in patients undergoing CABG.

2. Does adherence to best practice guidelines reduce the incidence of SSI in CABG surgery?

Best practice guidelines to reduce SSI in CABG would include preoperative *Staphylococcus* decolonization using mupirocin and appropriate body soaps, prophylactic antibiotic coverage per Society of Thoracic Surgeons guidelines, maintaining serum glucose in the operating room and for 24 to 48 hours postoperatively between 120 and 180 mg/dL, treatment of all extra-thoracic site infections before CABG, topical antibiotics to the sternal edges and avoidance of bone wax, and endovascular SVG harvesting. The incidence of

SSI in patients with and without adherence to best practice guidelines would be determined.

3. What is the incidence of SSI in those patients who have adhered to best practice guidelines?

This is critical to determine whether the “never” principle should apply to SSI in patients undergoing CABG. It would be important to determine the profile of those patients who have adhered to best practice guidelines but still develop SSI. These patients may include those with low cardiac output syndrome, those who develop multisystem organ failure, patients aged more than 85 years who are frail and cannot ambulate independently, or those with an elevated hemoglobin A1c and uncontrolled diabetes mellitus.

Such a CTSN trial will help determine new benchmarks for SSI during CABG and identify the profiles of those patients who develop SSI despite adherence to best practice guidelines. Ultimately, this will help to determine who should or should not be a “never” patient in what is considered a “never” event.

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