Who determines the timing of delayed sternal closure, the surgeon or the patient?

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In this issue of *The Journal of Thoracic and Cardiovascular Surgery*, Wong and coauthors¹ retrospectively review the 6-year experience with all cardiac surgical patients at their institution, focusing on the roughly 5% of patients who were subjected to postcardiotomy open chest management (OCM) with subsequent delayed sternal closure. Wong and coauthors¹ make some important observations, most notably that longer durations of OCM are associated with increased mortality. Although this study is important from a prognostic standpoint, there are several features that limit our ability to risk stratify patients considered for OCM with greater accuracy.

First, although no attempt was made to assess preoperative predicted mortality of the population undergoing OCM, the decision to use OCM defines a very sick population, which in this case had mortalities of 16% at 30 days and 50% at long-term follow-up. Furthermore, historical concerns that OCM poses a significant risk of deep sternal wound infection are belied by the data, with only 4 of 201 patients having this complication occur, even with a median duration of OCM of 3 days.

The overall infection rate of 19% after aggregation of deep sternal wound infection, pneumonia, bacteremia, and sepsis merits further scrutiny, however, and perhaps this aggregate should be considered in the multivariable models as a “composite infectious complication.” Given the low incidences of these individual complications, it is not surprising that Wong and coauthors¹ were unable to demonstrate an independent association between any single infectious complication and 30-day mortality. Still, we know that in aggregation, the impact of infectious burden may be profound.

Most importantly, the conclusion of Wong and coauthors¹ that each additional day of OCM independently imparts a 9% increase in mortality needs to be interpreted with caution. At face value, the results of this study may suggest to the readership that earlier delayed

Todd C. Crawford, MD (left), and Glenn J. R. Whitman, MD (right)

Central Message

Wong and coauthors have improved our ability to understand the trajectory of patients with open chest management. As with all good studies, they have generated more questions than they have answered.

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sternal closure improves survival. Hastening closure in patients for the sake of hastening closure would be misguided, however, and it might actually put our patients at unnecessary risk. Timing of delayed sternal closure is patient driven, not surgeon driven. Patients are self-selected for survival on the basis of (1) the reversibility of the OCM indication (eg, coagulopathy or hemodynamic compromise) and (2) the time it takes for this reversal to occur.

Finally, coagulopathy and hemodynamic compromise are two pathophysiologically different processes. The benefit of OCM in cases of coagulopathy (70% of the patients in this study) is that packing of the mediastinum improves hemostasis and affords more controlled reversal of the coagulopathy in the intensive care unit, resulting in reduced mediastinal explorations and earlier cessation of bleeding. On the other hand, hemodynamic instability or the need for central extracorporeal membrane oxygenation (25% of the cases) looms as a more ominous process with unpredictable outcomes. These reviewers (T.C. and G.J.R.W.) were hoping that the indications for OCM would be differentiated in the risk models, with the hypothesis being that coagulopathy with OCM is a relatively benign indication with better outcomes and earlier closure than cardiogenic shock with an inability to tolerate sternal closure.

Wong and coauthors¹ have improved our ability to understand the trajectory of patients OCM. As with all good studies, however, they have generated more questions than they have answered.

Reference

1. Wong JK, Joshi DJ, Melvin AL, Aquina CT, Archibald WJ, Lidder AK, et al. Early and late outcomes with prolonged open chest management after cardiac surgery. *J Thorac Cardiovasc Surg*. 2017;154:915-24.