Sternal plate closure post coronary artery bypass surgery appears to increase the risk of surgical site infection

M. K. Charles1, L. Saxinger2, S. Smith2-3

University of Alberta, Edmonton, AB; Department of Medical microbiology1, Division of Infectious Diseases2 and Department of Infection Control3

Sternal wound infections are an important cause of morbidity and mortality in patients undergoing cardiac surgery. Wire cerclage is currently the standard of care for sternotomy closure. However, for the last decade, studies have suggested that sternal wound infection following rigid titanium plates is associated with greater sternal stability, shorter length of stay, and decreased post-operative complications.

In our facility, the use of sternal fixation was initiated in 2010. This method is generally reserved for patients deemed to be at high risk of sternal wound complication, as defined by the presence of 3 or more risk factors for sternal wound complications.

We report on our preliminary experience with this technique in high risk-patients for primary closure and compare it to a historical cohort of matched controls.

This is a case-control study. From August 2010 to August 2012, 1476 CABG were performed at the University Of Alberta Hospital, Edmonton, Canada. Titanium plate fixation was used in 32 patients for primary sternotomy closure compared with 58 controls. The overall infection rate (deep and superficial) during the study period was 3.23% for all cardiac surgery involving sternotomy (valve replacements, and CABG). The infection rate for CABG alone was 4.40%.

The rate of sternal wound infection in the sternal plate group compared with the historical control group (using wire cerclage) was 25% and 7% respectively (OR: 3.62, p=0.02). The majority of the patients in both groups were high-risk. The mean length of stay was 16.97 days for the cases and 13.93 days for the controls. The total mortality rate (6.3% vs. 13.8%) was higher in the control group. (Table 1, 2)

The surgical literature suggests this technique is superior to wire cerclage, with greater stability decreasing post operative pain and the length of stay.

To our knowledge, no one has reported high infection rates with the use of sternal plates. At our institution we did not observe the benefits expected for the titanium plate fixation of stenotomies, seeing instead an OR of 3.62 for infection with plate fixation. The concept of improved stability and outcomes is appealing, however the high infection rate observed outweighed a possible stability benefit. From a microbiologic perspective, the addition of large surface area of hardware could predispose to difficult to eradicate bacterial infection.

We hypothesize the rate of infection observed in our study may partially reflect the novelty of this approach in our hospital, and perhaps the physical surface area and characteristics of the plates. Long-term follow up and large scale studies will be needed to assess the benefits, complications and indication for primary closure with titanium plate fixation.

Sternal wound infection causing post operative mediastinitis is a complication that is associated with high mortality.

Rigid fixation is commonly used in bone fractures and titanium plate sternotomy closure was developed to allow rigid fixation post sternotomy, in an attempt to decrease pain and infection post operatively.

We would like to thank Rhoda from the Department of Infection control for her contribution to this study.


