

Implantable antibiotic-laced sponges reduce sternal infections in cardiac surgery

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Cardiac surgeons often "crack open" the flat bone that forms the middle front section of the chest, known as the sternum, in order to reach important structures. When a sternal wound infection (SWI) occurs, serious complications and even death may result. Implanting antibiotic-laden sponges between the sternal halves before closure has been adapted to prevent infections. While a recent report questioned this practice, a meta-analysis in *The Journal of Thoracic and Cardiovascular Surgery*, the official publication of the American Association for Thoracic Surgery, clearly established that the sponges do work.

"The results of the meta-analysis of Kowalewski and co-workers reinforce the concept that the application of topical antibiotics to the sternum during cardiac surgery significantly reduces the incidence of sternal wound infections," commented Harold L. Lazar, MD, a [cardiac surgeon](#) at the Boston Medical Center and the Boston University School of Medicine, in an editorial accompanying the report. "Strong consideration should be given to using some form of topical antibiotics in all cardiac surgical patients undergoing median sternotomy."

In a comprehensive search of the medical literature, which followed the PRISMA guidelines to ensure the analysis was done to meet the highest standards, investigators identified 14 medium- to high-quality studies that addressed the question of implantable gentamicin-collagen sponges (ICGSs) and sternal wound infections. Of 642 potentially relevant reports, 14 met the selection criteria. These 14 studies included 22,135 patients.

The evidence was conclusive. Including both randomized and observational studies, gentamicin-collagen sponges were associated with a significant 38% reduced risk of sternal wound infections. For deep sternal wound infections, there was a 38% risk reduction compared with controls and for superficial sternal wound infections there was a 40% risk reduction. The antibiotic sponges also reduced the risk of life threatening inflammation of the mid-chest tissues (mediastinitis). The investigators noted that the use of sponges had no significant impact on mortality rate.

The authors also examined the use of the ICGS in patients undergoing bilateral internal thoracic artery (BITA) harvesting. BITA harvesting is one option to obtain grafts for patients who are undergoing coronary artery bypass grafting (CABG). This strategy provides the advantages of arterial revascularization instead of or in addition to great saphenous veins and is associated with improved survival. It is recognized though, that using both internal thoracic arteries carries a higher risk of sternal infection than harvesting a single internal thoracic artery. "We found the benefit provided by the gentamicin sponge was attenuated when BITA was harvested," said lead investigator Mariusz Kowalewski, MD, of the Department of Cardiac Surgery, Dr. Antoni Jurasz Memorial University Hospital, Bydgoszcz, and Systematic Investigation and Research on Interventions and Outcomes, Medicine Research Network (Poland). "These results suggest that another potentially preventive measure must be taken in such patients."

An impetus for this literature analysis was the publication of results from the Implantable Gentamicin Collagen Sponge on Sternal Wound Infections Following Cardiac Surgery Trial (SWIPE-1) (Bennett-Guerrero E et al, JAMA 2010;304:755-62). SWIPE-1 found no difference between IGCS and control groups for superficial SWI, deep SWI, and rehospitalization for wound [infection](#) at 90-day follow-up. The analysis by Dr. Kowalewski clearly counters the claims of the SWIPE-1

trial. "We have found that the majority of studies published so far show that the use of IGCS may significantly reduce the incidence of infectious complications after [cardiac surgery](#)," explained Dr. Kowalewski, who further noted that the SWIPE-1 results may have been due to a methodologic flaw. As Dr. Lazar added, "The results of SWIPE-1 may have been due to a failure in that trial to follow the manufacturer's sponge implantation protocol, which resulted in longer exposure of the gentamicin sponge in a saline solution before application, thus lowering the concentration of gentamicin in the sponge."

Dr. Kowalewski added that gentamicin-collagen implants are used to decrease [wound infections](#) in many other groups of surgery patients. Dr. Lazar commented that he has also found good protection against SWI with other topical antibiotics, such as vancomycin, without the emergence of drug-resistant infections or kidney problems.

More information: "Gentamicin-collagen sponge reduces the risk of sternal wound infections after heart surgery: Meta-analysis," by Mariusz Kowalewski, MD, Wojciech Pawliszak, MD, Katarzyna Zaborowska, RN, Eliano Pio Navarese, MD, PhD, Krzysztof Aleksander Szwed, MD, Magdalena Ewa Kowalkowska, MD, Janusz Kowalewski, MD, PhD, Alina Borkowska, MD, PhD, and Lech Anisimowicz, MD, PhD: [dx.doi.org/10.1016/j.jtcvs.2015.01.034](https://doi.org/10.1016/j.jtcvs.2015.01.034)

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