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Evolving Concepts in Areas of Post-Operative Sternal Wound Infection Prevention

Shagufta Ahsan*

*Internal Medicine, Riverside Medical Group, 38 Meadowlands Pkwy, Secaucus, NJ 07094, USA.

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INTRODUCTION

Deep sternal wound infection (DSWI) is a rare but serious complication of cardiac procedures that require sternotomy, with an incidence of 1.5% [1]. Despite medical and surgical therapeutic interventions, DSWI can recur, needing re operations. This complication is associated with a significant mortality, usually reported to vary between 10 and 25% [2]. The exact mechanism by which mediastinitis develops is unknown and multifactorial.

Staphylococcus aureus is the most common cause of surgical wound infection. Staph infection after cardiac surgery results in significant morbidity and mortality. However, the morbidity and mortality rates are notably highest in cases of DSWI caused by methicillin resistant *Staphylococcus aureus*. Predicting their occurrence is essential for (MRSA) future prevention [3]. A well-known fact is that pre-operative prophylaxis measures significantly designed to prevent *S. aureus* infections should target the entire patient population not only to patients at elevated risk for these infections to efficiently decrease the risk of infection.

Proven and well accepted strategies to prevent DSWI include maintaining serum glucose <180 mg/dl with continuous insulin infusions in patients with or without diabetes mellitus in ICU [4], clinical process improvements, weight loss, smoking cessation efforts, and interventions targeting *Staphylococcus aureus* (nasal decolonization and vaccine) [3]. The current recommendations and interventions targeting *Staphylococcus aureus* are designed to reduce the duration of perioperative intravenous antibiotics for 24-48 h to avoid the emerging antibiotic resistance, another major health care problem and burden [5,6].

Thus, if absent serum levels and presumably low or absent tissue levels of antibiotics lead to a high incidence of wound infection, would augmenting the local antibiotic concentration with topical antibiotic concentration with topical antibiotics be beneficial [1] and we do believe it would add benefit in cardiac operations too by increasing local antibiotic concentration specially where at the end of operations, antibiotic levels are low [5]. Furthermore, this would reduce the toxicity of high doses of antibiotic administration. In summary, using topical vancomycin can reduce the dose and duration of systemically administered antibiotics, achieve much higher local wound concentration than do systemic antibiotics and this high concentration persists for several hours after closure of the incision.

Importantly, the benefit of the use of topical vancomycin applied to the sternotomy incision does not result in persistently elevated levels of serum vancomycin following cardiac surgical procedures [7]. Furthermore, topical vancomycin does not potentiate the emergence of drug-resistant infections or contribute to post-operative renal toxicity [7,8]. Whether to add topical vancomycin in the recommendation for preventing post-operative sternal wound infection since *Staphylococcus aureus*/non-aureus is usually sensitive to vancomycin is still not established.

A recent study confirmed topical vancomycin applied to the cut sternal edges, in conjunction with perioperative antibiotics and tight glycemic control, helps to eliminate wound infections in cardiac surgical patients [5]. It also can reduce the higher infection rates with longer operative times; where topical vancomycin should always be used.

Corresponding author: Shagufta Ahsan, Internal Medicine, Riverside Medical Group, 38 Meadowlands Pkwy, Secaucus, NJ 07094, USA, E-mail: shaguftaahsan@yahoo.com

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Furthermore, the use of topical vancomycin would be a very important addition in the treatment of infected re-operations.

However, based on available data the efficacy of local antibiotic administration for the prophylaxis of complicated and uncomplicated surgeries, and recommendations supporting this practice for surgical site prophylaxis have not been made yet. Despite that, the use of topical vancomycin should be encouraged or added in the recommendation for prevention of sternal wound infection, as it is easy to prepare and handle and is relatively in expensive. It provides effective hemostasis for bleeding from the sternum because it readily adheres to cut bone surfaces or open bone fractures. Additionally, it also provides bacteriostatic and bactericidal protection against gram-positive organisms that normally cause infections such as Staphylococcus and Streptococcus [5].

Never the less, many institutions have started utilizing minimally invasive cardiac surgeries, which minimize the risks following open-heart surgery, including bleeding/hematoma and superficial and deep sternal wound infections. The results of the largest study with 500 patients of robotically assisted thoracoscopic coronary operations have significant implications in adopting and establishing minimally invasive techniques in cardiac operations. Totally, Endoscopic Coronary Artery Bypass (TECAB) grafting has an encouraging peri operative result of high success rates reaching 80% of the procedures regardless of procedure complexity [9]. In another study on minimally invasive mitral valve surgery (MVS), there is no significant difference in 30 days or 1 year mortality , but the rate of sternal wound infection was significantly lower (0.04% vs. 0.27%, mini – MVS versus Conv-MVS) [10,11]. The potential and ultimate benefits of minimally invasive technique are still not adequately proven yet, in regard of freedom from any adverse effects and as they often involve intra operative conversion requiring larger thoracic incisions [9].

REFERENCES

1. Alasmari FA, Tleyjeh IM, Riaz M, Greason KL, Berbari EF, et al. (2010) Temporal trends in the incidence of surgical site infections in patients undergoing coronary artery bypass graft surgery: A population-based cohort study, 1993 to 2008. Mayo Clinic Proc 87: 1054-1061
2. Sjogren J, Malmsjo M, Gustafsson R, Ingemansson R (2006) Poststernotomy mediastinitis: A review of conventional surgical treatments. Vacuum-assisted closure therapy and presentation of Lund University Hospital mediastinitis algorithm. Eur J Cardiothorac Surg 30: 898-905.
3. Fowler VG Jr, O'Brien SM, Muhlbaier LH, Corey GR, Ferguson TB, et al. (2005) Clinical predictors of major infections after cardiac surgery. Circulation 112: 1358-1365.
4. Lazar HL, McDonnell M, Chipkin SR, Furnary AP, Engelman RM, et al. (2009) The Society of Thoracic Surgeons practice guideline series: Blood glucose management during adult cardiac surgery. Ann Thorac Surg 87: 663-669.
5. Lazar HL, Ketchedjian A, Haime M, Karlson K, Cabral H (2014) Topical vancomycin in combination with perioperative antibiotics and tight glycemic control helps to eliminate sternal wound infections. J Thorac Cardiovasc Surg 148: 1035-1040.
6. Bratzler DW, Dellinger EP, Olsen KM, Perl TM, Auwaerter PG, et al. (2013) Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health Syst Pharm 70: 195-283.
7. Lazar HL, Barlam T, Cabral H (2011).The effect of topical vancomycin applied to sternotomy incisions on post-operative serum vancomycin levels. J Cardiac Surg 26: 461-465.
8. Huiras P, Logan JK, Papadopoulos S, Whitney D (2012) Local antimicrobial administration for prophylaxis of surgical site infections. Pharmacotherapy 32: 1006-1019.
9. Bonaros N, Schachner T, Lehr E, Kofler M, Wiedemann D, et al. (2013) Five hundred cases of robotic totally endoscopic coronary artery bypass grafting: Predictors of success and safety. Ann Thorac Surg 95: 803-812.
10. Cheng DC, Martin J, Lal A, Diegeler A, Folliguet TA, et al. (2011) Minimally invasive versus conventional open mitral valve surgery: A meta-analysis and systemic review. Innovations (Phila) 6: 84-103.
11. McClure RS, Athanasopoulos LV, McGurk S, Davidson MJ, Couper GS, et al. (2013) One thousand minimally invasive mitral valve operations: Early outcomes, late outcomes and echocardiographic follow-up. J Thorac Cardiovasc Surg 145: 1199-1206.