



Clinical Update

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Mediastinitis After CABG: Medicare Won't Pay More

On October 1, 2008, the Centers for Medicare and Medicaid Services (CMS) stopped paying hospitals more for treating hospital-acquired conditions (HAC) that are considered to be reasonably preventable and classified as a complicating condition that would otherwise result in higher payment to the hospital. Mediastinitis after coronary artery bypass surgery is a targeted surgical site infection (SSI). CMS will pay for the original surgery, but will not reimburse hospitals at a higher rate for treating the infection.

And those costs are significant. Persons with mediastinitis can spend an extra 30 days in the hospital, undergo repeat surgical procedures to treat the infection, and cost the facility an additional \$20,000 to \$60,000¹ not to mention increases in morbidity and mortality. Understanding risk factors and preventive strategies across the continuum of surgical care can reduce the incidence of this potentially devastating complication.

Diagnosing Mediastinitis

The Centers for Disease Control and Prevention (CDC) has established standardized clinical definitions of health care-associated infections (HAI). Mediastinitis is established when (1) organisms are cultured from mediastinal tissue or fluid obtained during an operation or needle aspiration and/or (2) evidence of mediastinitis is visible during an operation or on histopathology and/or (3) fever, chest pain or sternal instability without another recognized cause. The signs and symptoms must be accompanied by purulent discharge from the mediastinum and/or organisms cultured from blood or discharge from the mediastinum and/or mediastinal widening on chest x-ray². Mediastinitis, a deep SSI, is differentiated from superficial SSI, which is limited to skin and subcutaneous tissue.

The incidence of mediastinitis ranges from <1% to 4% of all adults undergoing cardiac surgery^{3,4,5}. Most are *S. aureus* or *S. epidermidis*, confirming that these infections result from contaminating skin flora at the time of operation.⁶

Risk Factors for Mediastinitis

While mediastinitis is rare, risk factors are well defined. Key factors reduce perfusion and oxygen delivery to the surgical area: chronic obstructive pulmonary disease, diabetes, obesity (BMI >30), cigarette smoking, evidence of peripheral vascular disease, decreased cardiac output and use of internal mammary artery (IMA) for graft. Other factors include: infection at another site, renal insufficiency, emergency surgery, hospitalization prior to the procedure, longer duration operations, older persons, male gender, and repeat CABG^{4,7,8}. Median sternotomy presents much higher risk than minimally invasive approaches⁴.

Interestingly, women with larger breast size were 38 times more likely to develop mediastinitis compared with women with smaller breast size due to tension on the sternal incision – the same mechanism causing risk in obese patients. Large breast size increases vascular demand and internal mammary artery grafts may decrease vascular supply, which can impair healing.

Conversely, male chest hair acts as a bacterial reservoir and pre-operative hair removal can abrade the skin and provide an area for bacterial growth^{4,8,9}.

Practices to Reduce Mediastinitis

Hand hygiene. Proper hand hygiene is the cornerstone of any infection prevention program and reducing incidence of mediastinitis is no different⁸.

Antibiotic prophylaxis. The Society of Thoracic Surgeons (STS) guidelines^{5,10} address three aspects: the drug, the timing of the first dose, and the length of treatment. A first-generation cephalosporin, cefazolin (Ancef), is recommended — with vancomycin used in those who are allergic to cephalosporins. When patients have been exposed to MRSA, the two can be used together. Give Cefazolin, 1gm, IV within 60 minutes of skin incision (2gm >60kg) and a second dose after bypass if the procedure lasts 4 hours or more. Infuse vancomycin, 15mg/kg, over one hour, with completion within an hour of incision.

STS recommends prophylactic antibiotics for 48 hours or less. The timeframe should not be determined by the presence of chest tubes, as has been suggested in the past. Forty-eight hours' duration does not appear to be enough time to cause resistance, or to contribute to developing *C. difficile* infection. Intranasal mupirocin pre- and postop is a reasonable prophylaxis to cover the potential for MRSA colonization^{4,5,8,10}.

Glycemic control. Postoperative glucose less than 200mg/dL significantly decreases SSI risk. CABG patients should achieve and maintain this level by 6am of postop days one and two^{4,8}.

Hair removal. Use clippers to remove hair at the incision site as close to the time of surgery as possible and before the patient is moved to the OR^{1,4,8}.

Skin antisepsis. While recommended, patient compliance with instructions to shower at home with CHG cannot be assured. Wash the operative site with an antimicrobial soap before surgical skin prep. There is not yet enough evidence to recommend one antiseptic skin prep over another^{1,8}.

Surgical technique. Hemostasis and drains that reduce areas of dead space reduce infection risk. Choosing coated chest tubes, which are more biocompatible, will reduce clot adherence to the drain and will inhibit bacterial attachment, reducing the risk of infection. If a vein graft is used, each surgical field should be completely separated without shared instrument trays or personnel^{1,4,8}.

Postop dressing. Dressings should allow gas exchange, be impermeable to microorganisms and other sources of contamination, and maintain moisture at body temperature. Dressings should not be routinely changed for at least 48 hours unless compromised, and if changed, done with sterile technique^{4,8}.

Organizations that have successfully reduced mediastinitis in CABG patients have integrated these elements through the peri-operative continuum of care. An infection preventionist with clear responsibility for CABG patients will provide surveillance, analysis and education for continuous quality improvement^{1,3,8}.

In The Literature

The Meaning of Hand Hygiene

A fascinating article in the current issue of the *American Journal of Infection Control* explores potential challenges faced by the World Health Organization as it pilots the [Guidelines on Hand Hygiene in Healthcare](#). The authors identify religious traditions related to hand cleansing, interpretation of hand gestures, the concept of dirty hands and potential cultural barriers to alcohol-based hand scrubs. This review provides a new perspective for nurses working with colleagues and patients from cultures different from their own.

Source: Allegranzi B, Memish ZA, et al: Religion and culture: potential undercurrents influencing hand hygiene promotion in health care. *American Journal of Infection Control* 2009;37:28-34.

Extending Your Reach

Nurses from Jordan Hospital in Plymouth, MA describe a successful liaison program for elective joint replacement patients in the current issue of *Orthopaedic Nursing*. Their concept could be easily applied to cardiac and thoracic surgery patients. A hospital nurse liaison visits the patient at home preoperatively to assess the environment, teach the patient, and identify any potential problems with home recovery. The same nurse sees the patient immediately postop, then visits the rehab facility and home once the patient is discharged. This program has facilitated shorter lengths of stay, and been the catalyst for a number of educational initiatives that have improved outcomes and reduced complications.

Source: Almada P, Archer R: Planning ahead for better outcomes: preparation for joint replacement surgery begins at home. *Orthopaedic Nursing* 2009;28(1):3-8

Cancer Care by Non-Specialists

In response to a shortage of cancer care specialists, the organization C-Change developed a Cancer Core Competency Initiative to provide essential information to health professionals who need to care for persons with cancer. The experts who contributed to this project report on their implementation pilot in the current issue of *MEDSURG Nursing*. This is an ideal program for critical care, emergency, and perioperative nurses who have expertise in their specialties, but often care for oncology patients needing those services. The authors describe implementation pilot programs at four different healthcare organizations.

For additional information, visit:

<http://c-changetogether.org/pubs/cccpp.asp>

Source: Smith, AP, Lichtveld MY, et al: A competency-based approach to expanding the cancer care workforce: proof of concept. *MEDSURG Nursing* 2009;18(1):39-49.

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2. Horan TC, Andrus A, Dudeck MA. CDC/NHSN surveillance definition of healthcare-associated infection and criteria for specific types of infections in the acute care setting. *American Journal of Infection Control*. 2008;36:309-332. [PubMed Citation](#)

On the World Wide Web



Preventing Mediastinitis Guide

APIC has placed the four appendices for their guide on preventing mediastinitis online for download. These include a checklist for observing infection control practices in the OR, preoperative surgery showering instructions for patients, a sample data collection worksheet for investigating cardiac surgical site infections, and an example of a line list, which is used to for preliminary data analysis. <http://tinyurl.com/bf3e3bc>

Surgical Care Improvement Project

SCIP is an ongoing quality project to improve surgical care nationwide. Many of the indicators focus on infection prevention. This project is part of QualityNet, a partnership between CMS, quality improvement organizations and healthcare providers to share quality improvement methods, tools and resources. <http://tinyurl.com/c53opt>

National Healthcare Safety Network

The Centers for Disease Control and Prevention (CDC) operates the National Healthcare Safety Network (NHSN), which collects and shares surveillance data from a sample of facilities in the U.S. They have established clinical definitions of health care-associated infections to standardize data collection. Other resources available at this site include an overview of surveillance, annual reports, periodic newsletters, and other recommendations based on data analyzed by the agency. <http://www.cdc.gov/ncidod/dhqp/nhsn.html>

Healthcare-Associated Infections

In January, CMS published an action plan to prevent HAI, which is available at <http://www.hhs.gov/ophs/initiatives/hai/infection.html>

The CDC's division for HAI is at <http://www.cdc.gov/ncidod/dhqp/healthDis.html>

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