Author's response to reviews

Title: Surgical site infections following transcatheter apical aortic valve implantation: incidence and management.

Authors:

Richard Baillot (richard.baillot@chul.ulaval.ca)
Eric Frechette (eric.frechette@criucpq.ulaval.ca)
Daniel Cloutier (daniel.cloutier@crchul.ulaval.ca)
Josep Rodès-Cabau (josep.rodes@criucpq.ulaval.ca)
Daniel Doyle (daniel.doyle@chul.ulaval.ca)
Eric Charbonneau (eric.charbonneau@criucpq.ulaval.ca)
Eric Dumont (eric.dumont@criucpq.ulaval.ca)
Siamak Mohammadi (siamak.mohammadi@criucpq.ulaval.ca)

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Answer to Reviewers Report: Cardiothoracic Surgery

RE: MS: 5245890237629977 - Surgical site infections following transcatheter apical aortic valve implantation: incidence and management.

First we are grateful that you have accepted to review our manuscript and are considering it for publication in your journal.

Here are the answers for the panel of reviewers

REVIEW #1 Dr.Noiseux

Question 1: Antibioprophylaxis

Peri-operative prophylactic antibiotics are given per protocol to all patients undergoing trans-apical aortic valve implantation as well as standard open-heart procedures in our center and for the first 24 hours (2 gms upon induction then 1 gm q8 hrs). Antibiotics are given in due time before skin incision and Cephalosporins (Cefazolin) are usually given. Vancomycin can be prescribe in patients having a significant allergy to Penicillins or in MRSA carriers. Vancomycin has to be given at least one hour before surgery.

Question 2: Chest Tube Drainage

Chest tube drainage with standard Argyle tube is done in all patients submitted to a trans-apical valve implantation. Tubes are left in place for 24 to 48 hours or as long as a significant pleural effusion is seen on the chest X-ray. There is no tubes in the pericardium. Residual and significant pleural effusions will be tap before discharge with or without echo guidance if needed. Empyema has been describe
in one of our patients in this series but is certainly a rare event even in open heart surgery.

Question 3: Echocardiogram

All patients submitted to a cardiac procedure have transoesophageal echo in our center and in patients submitted to a valvular replacement will have a trans-thoracic echo before discharge and then at their 3 months follow-up visit. Echo can be performed earlier for significant valvular leaks and/or pericardial effusion.

Question 4: SSI Prevention

Surgical site infections are a major concern for all surgeons and hospitals and risks factors as well as preventive measures have been discussed in the Comments section of the paper. Risks factors are usually describe as pre-per and post-operative and in this study morbid obesity has been found to be an univariate analysis to be a predictor of these complications. A trans aortic approach via an upper small midline sternotomy could be recommended for these patients.

REVIEW # 2 Dr. B-K Lam

Question 1: Duration of Surgical Procedures

It has long been recognize that longer surgical procedures have been associated with a higher percentage of nosocomial infections. In this series and as stated in our paper following review of the operative protocols, none of these patients did present a significant complication during the initial procedure. Statistics for duration of all open heart procedures including off-bypass valvular implantation has recently been implemented in our center and are not available for analysis as this point in our database.

Question 2: Cr Clearance

Creatinine clearance was calculated for the 2 groups of patients and the data modified in TABLE 2 as suggested by the reviewer. There is no difference between groups.

Question 3: Debridement and wound coverage

As stated in our paper thorough surgical debridement of all necrotic and devitalized tissues remain a fundamental surgical aspect of wound care. Application of viable tissues i.e pectoralis muscles flaps and/or omentum following deep sternal wound infection has been describe as a major step ahead in thoracic surgery during the last decades and these techniques were all applied herein for the treatment of these infected patients presenting following a trans apical valve implantation.

Debridement and resection of the often traumatized rib cartilage overlying the left ventricular apex is important as well as the complete wound coverage with well
vascularized tissues is of paramount importance. Debridement alone with primary wound closure would probably lead to a higher percentage of wound failure and infectious recurrence as described in earlier papers written before the application of viable tissues to wound treatment in thoracic surgery.

Question 4: Patients infected the same day

Patients 2-3 and 4 were all infected the same day i.e June 2nd 2009. Patient #2 (TABLE 1) was the only male of this series with a BMI of 27. He was taking steroids for rheumatoid arthritis and did show up with a S. Epidermidis wound infection a month later. The two other were obese female patients (#3 & #4) that did present respectively with a S. Epidermidis and a S. Aureus wound infection. Patient #3 showed a continuous drainage from her wound following the initial procedure while patient #4 did present with an abscess.

Beside these demographic risk factors, all these patients were operated by the 2 same cardiac surgeons dedicated to this minimally invasive surgical technique. We have to assume that they were all contaminated during the initial surgical procedure and not by a faulty sterilization technique the bacteria being here of different species.

Otherwise these patients were operated early during the learning phase of this program and too many people may have been present in the OR during surgery contributing to the appearance of these infections.

Question 5: Use of Pledged Sutures

Use of foreign material has long been recognized to promote surgical site infections. Bacteria can seed these synthetic material and form biofilm that can be difficult to eradicate. Staph Epidermidis which is a normal skin inhabitant has this ability and is one of the most important pathogens encountered in cardiac surgery.

Haemostasis of the often friable left ventricular apex can sometime be very difficult especially in older female patients and use of reinforced pledged mattress sutures has been use probably since the beginning of cardiac surgery. Autologous pericardium could probably be used for this purpose and could be recommend instead of pledged sutures.