Reviewer's report

Title: Superficial and deep sternal wound infection after more than 9000 coronary artery bypass graft (CABG): incidence, risk factors and mortality

Version: Date: 14 February 2007

Reviewer: Kevin Garey

Reviewer's report:

General
This is a large, multi-year study to assess risk factors and outcomes of surgical site infection in CABG patients. The obvious strength of this study is a large sample size (n=9201) collected over a 4-year period. The data is also derived from an Iranian population, a group that to the best of my knowledge has not been extensively studied in regards to outcomes post cardiac surgery. The paper will also need grammatical improvement. The major limitation in this study is an infection rate that is perhaps the lowest ever published in patients undergoing CABG surgery making the possibility of misclassification bias extremely likely. The risk factors identified in this study have been previously recognized in other studies. Thus, if the reviewers can justify their extremely low infection rate, the primary contribution of this paper to the medical literature will be identification of previously recognized risk factors in an Iranian population.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1) Identification of surgical site infections (SSI):

As stated in my general comments, an SSI rate of 0.7% is extremely low in CV surgery (I've summarized SSI rates from other published studies in Table 1 below). In the methods section of the paper, the authors state that SWI were made according to CDC criteria. However, the personnel and methods devoted to collecting this information were not stated. The worry is that it is likely that patients with SSI were not identified and were included in the non-infected group. If a misclassification bias existed, this could completely change the results observed in this study. Likewise, the length of follow-up has been shown to significantly influence SSI rates (ICHE 2002 Jul;23(7):364-7). A full description of the methods used to diagnose SSI will be required in order to help justify these very low SSI rates.

Table 1. SSI rates in CABG patients:
Ref Country N SSI rate
Nagachinta, JID 1987 USA 1009 6.8%
Sofer Ann Surg 1999 Israel 545 1.7-2.8%
Gummert Thorac Cardiov Surg 2002 Germany 10,373 1.44% (deep only)
Kohli Infect Control Hosp Epidemiol Canada 11,508 3.0%
Martorell. Am J Infect Control 2004 USA 6465 1.9%
Chih-Hung Amer J Epidemiol 2005 Taiwan 471 5.1%
Finkelstein Am J Infect Control 2005 Israel 2051 10.4%

Abstract, conclusion: The last sentence is unclear and is not supported by the presented data.

Background: Line 8: The sentence that begins with “This classification is also…” is of unclear significance and should be modified.

Background, third paragraph: The SSI rate of 2% should be referenced and should be presented as a range based on the studies above.

Background, fourth paragraph: The Oakley classification is not widely used. A 1-sentence description would be helpful.

Methods, paragraph 2: As above, the method used to identify patients with SSI should be expanded. Also, any limitations of this method should be mentioned in the discussion.
Methods, paragraph 2, last sentence: I doubt the investigators waited until the diagnosis was made before they started therapy (ie. when culture results came back positive?). I would suspect that antibiotics were started upon suspicion of SWI.

Methods, paragraph 3: the patients functional class according to CCS criteria should be referenced. Also, the proportion of missing data in this database should be mentioned.

Methods, statistics: The selection process for the multivariate model (backwards or forwards) and the criteria for inclusion or exclusion of the variables should be stated. The significance level (p<0.05) is stated twice in this section.

Results: The authors should avoid “about” and simply state the exact number rounded to the correct number of decimal places.

Results: The authors should avoid “and this difference was significant” and simply state the p value.

Results: The standard deviation (SD) should be presented with mean values.

Results second paragraph: It is interesting that mortality rates for SWI in general (9.1%) were similar to mortality rates for mediastinitis (14%) as many other studies have reported a higher mortality rate for mediastinitis. Do the authors feel this could have been due to misclassification of SWI?

The authors report a very low incidence of infections caused by S. epidermidis or other coagulase negative Staphylococcus. Is there any explanation for these low rates? This should likely be addressed in the discussion.

Discussion, last paragraph: Low rates of SWI was hypothesized to be due to peri-operative care, early diagnosis, and good follow-up. I am unsure what is meant by “early diagnosis”. Is the author referring to early diagnosis of SWI? If so, how would this affect SWI rates?

Conclusion: The last sentence is unsupported by the data in the manuscript.

References: Reference 3 includes the authors first and last names.

Tables:

Tables 1 and 2 could be combined into 1 table.

Tables 5: This is a confusing table. The authors appear to be testing the distribution of antibiotic use in patients with SWI compared to patients without SWI. Why is the p value included three times?

Table 6: Same comment. Also, as this is based on a very low sample size, I would suggest that the authors delete this table.

Table 7: Was re-exploration for bleeding only assessed for a defined period post-operatively to assure that the bleeding did not occur after the SWI?

Abstract; results section. The sentence that begins with “Female gender, … “ is a run-on sentence. Consider changing into 2 sentences.

Results second paragraph: Consider than the sentence to “In multivariate analysis, hypertension (OR=10.7) re-exploration (OR=13.4), and female gender (OR=2.7) were identified as significant predictors of SWI (p<0.05 for all).

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major
compulsory revisions

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Not suitable for publication unless extensively edited

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

No conflicts of interest