Surgical site infection in cardiothoracic surgery: A single intervention surveillance study from Lancashire Cardiac Centre comparing chlorhexidine-isopropyl alcohol to povidone iodine-alcoholic tincture:

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Objectives

Continuous Surgical site infection (SSI) surveillance for patients undergoing cardiothoracic surgery is currently voluntary in the UK. In order to standardise surveillance & reduce the incidence of SSIs for patients undergoing cardiothoracic surgery, we established a new comprehensive SSI surveillance system [including post discharge] that included a checklist, HPA defined surveillance data sheet, SSI identification questionnaire for patients, and direct observations. In addition, despite numerous guidance documents recommending 2% chlorhexidine for pre-operative skin preparation, there remains a lack of data comparing different alcoholic based solutions in clean / clean contaminated surgery. This standardised surveillance system was utilised and implemented by the study team to compare 2% chlorhexidine/70% isopropyl alcohol (ChloraPrep) and 10% povidone iodine / alcoholic tincture (Videne).

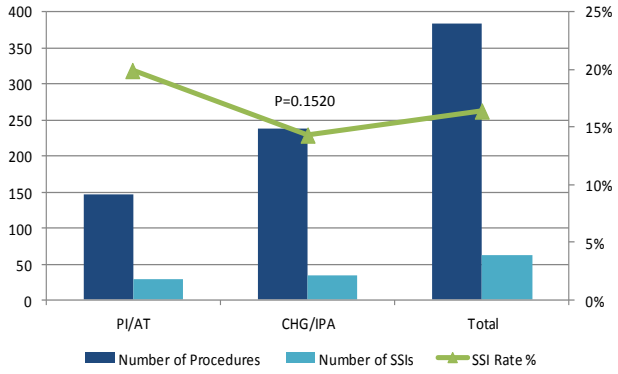
Methods

All patients undergoing cardiothoracic surgery during a 15-week period were included in the standardised SSI surveillance system that was customised for cardiothoracic surgery. For pre-operative skin preparation, for four weeks all patients (Group A) received 10% povidone iodine/alcoholic tincture (PI/AT). After the four weeks, all patients (Group B) received 2% chlorhexidine/ 70% isopropyl alcolol (CHG/IPA). All patients were followed for 30 days post-operatively utilising UK Health Protection Agency definitions.

Results

Out of a total of 416 patients, 32 did not adhere to the standardised SSI surveillance system and were excluded. Of the remaining 384 patients, the overall SSI rate was 16.4%. With regards to patient risk factors for SSIs, the mean age was 65.6 years, 15.1% underwent clean-contaminated surgery, the mean BMI was 27.7 kg/m2, and the mean duration of operation was 223 minutes. CHG/IPA was used for 238 patients with a 14.3% SSI rate. PI/AT was used for 146 patients with a 19.9% SSI rate (P=0.1520).

SkinPrep	SSIs	No SSI	Total	SSI % rate
CHG/IPA	34	204	238	14.3%
PI/AT	29	117	146	19.9%
Total	**63**	**321**	**384**	**16.4%**



SSI Location: # 63 Total SSI	
ABDOMINAL	2%
CHEST DRAIN SITE	5%
CHEST INCISION	29%
DONOR SITE INCISION	48%
GROIN WOUND	2%
PACING WIRE	5%
THORACOTHOMY	9%

Conclusion

Despite over 90% of procedures being elective and performed on patients where the majority had an ASA score of 3 (80 %). The overall rate of infection seen was 16.4%, - significantly higher than the voluntarily reported rates as published by the Health Protection Agency. These results suggest that, like orthopaedic surgery, SSI surveillance, including 30 day follow up post discharge, for cardiothoracic surgery should be mandatory. CHG/IPA was more effective than PI/AT. Absolute and relative risk reductions were 5.6% and 28% respectively. The SSI reduction seen echoes the seminal Darouiche et al, 2010 publication comparing CHG/IPA with PI aqueous. These results however represent the first study the authors are aware of using an alcohol based comparator in cardiothoracic surgery. A larger study should be conducted to investigate statistical significance.

Impact of change implemented	
Relative Risk Reduction	28%
Absolute Risk Reduction	5.6%
Incremental cost of change Per 100 patients*	£1,366
Net savings to health economy **	£16,206

* 2 x 26ml applicators per patient : BNF list price (£6.83) per applicator

** Cost of CABG Superficial SSI (£3138) Coello et al, 2005

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