

Skin Prep Solution: Cardiac Surgery Joins the Chlorhexidine vs Povidone Iodine Debate

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THE PROBLEM

In the United Kingdom, common skin preparation solutions used to prevent surgical site infection (SSI) include chlorhexidine (CHG) (Figure 1) and povidone-iodine. (Figure 2). The first global guideline¹ recommends an alcohol-based antiseptic solution based on CHG for surgery.

There are no studies comparing CHG-alcohol and PVI-alcohol in cardiac surgery with SSI as an end point.

Coronary artery bypass graft (CABG) surgery is distinct from other groups under mandatory or voluntary SSI surveillance in that upper and lower body skin preparation may be required. This usually results in a 2-3 fold increase in costs of skin preparation solution if the licensed chlorhexidine-alcohol is used instead of the licensed povidone-iodine-alcohol.

OBJECTIVE

The aim of this study² is to assess the efficacy of 2% chlorhexidine-alcohol and 10% povidone iodine-alcohol on the incidence of SSI after CABG surgery.

METHOD

From January 2013 to October 2015, 738 consecutive patients undergoing cardiac surgery had skin preparation with 2% chlorhexidine gluconate in 70% isopropanol (IPA) (ChloraPrep, BD Ltd, UK) were propensity matched to 738 patients who had skin preparation with 10% povidone-iodine in 30% industrial methylated spirit (Videne Alcoholic Tincture, Ecolab Ltd, UK) (Figure 3). Continuous, prospective SSI surveillance data was collected by trained specialist nurses for all these patients. A retrospective analysis of prospectively collected perioperative data was performed.

Patient Characteristics of Chlorhexidine Group Versus Povidone-iodine Group in 1476 Matched Cases			
	Chlorhexidine Group n = 738 (%)	Povidone Group n = 738 (%)	p Value
Demographics			
< 60 years	156 (21.2)	169 (22.9)	0.84
60-74 years	289 (39.1)	301 (40.8)	0.78
> 75 years	293 (39.7)	268 (36.3)	0.64
Female	168 (22.8)	187 (25.3)	0.48
Diabetes	256 (34.7)	268 (36.3)	0.67
Hypertension	254 (34.4)	271 (36.7)	0.73
Hypercholesterolemia	242 (32.8)	245 (33.2)	0.79
PVD	76 (10.3)	71 (9.6)	0.83
BMI < 30	589 (79.8)	593 (80.4)	0.86
BMI > 30	149 (20.2)	145 (19.6)	0.92
Previous stroke/TIA	43 (5.8)	46 (6.2)	0.88
COPD	78 (10.6)	81 (10.9)	0.96
Serum creatinine ≥200 µmol·L ⁻¹	47 (6.4)	51 (6.9)	0.89
LVEF > 49%	432 (58.5)	448 (60.7)	0.74
LVEF 30-49%	182 (24.7)	181 (24.5)	0.94
LVEF <30%	124 (16.8)	109 (14.8)	0.64
Elective	499 (67.6)	488 (66.1)	0.88
Urgent	201 (27.2)	207 (28.0)	0.76
Emergency	38 (5.2)	43 (5.8)	0.88
BIMA	69 (9.3)	74 (10.0)	0.72

BIMA = bilateral internal mammary arteries; BMI = body mass index; COPD = chronic obstructive pulmonary disease; IQR = interquartile range; LVEF = left ventricle ejection fraction; PVD = peripheral vascular disease; TIA = transient ischemic attack



Figure 1 .



Figure 2.

CHG-alcohol and PVI-alcohol Skin Preparation Solutions
SSI rates and classification
CABG surgery January 2013 - October 2015

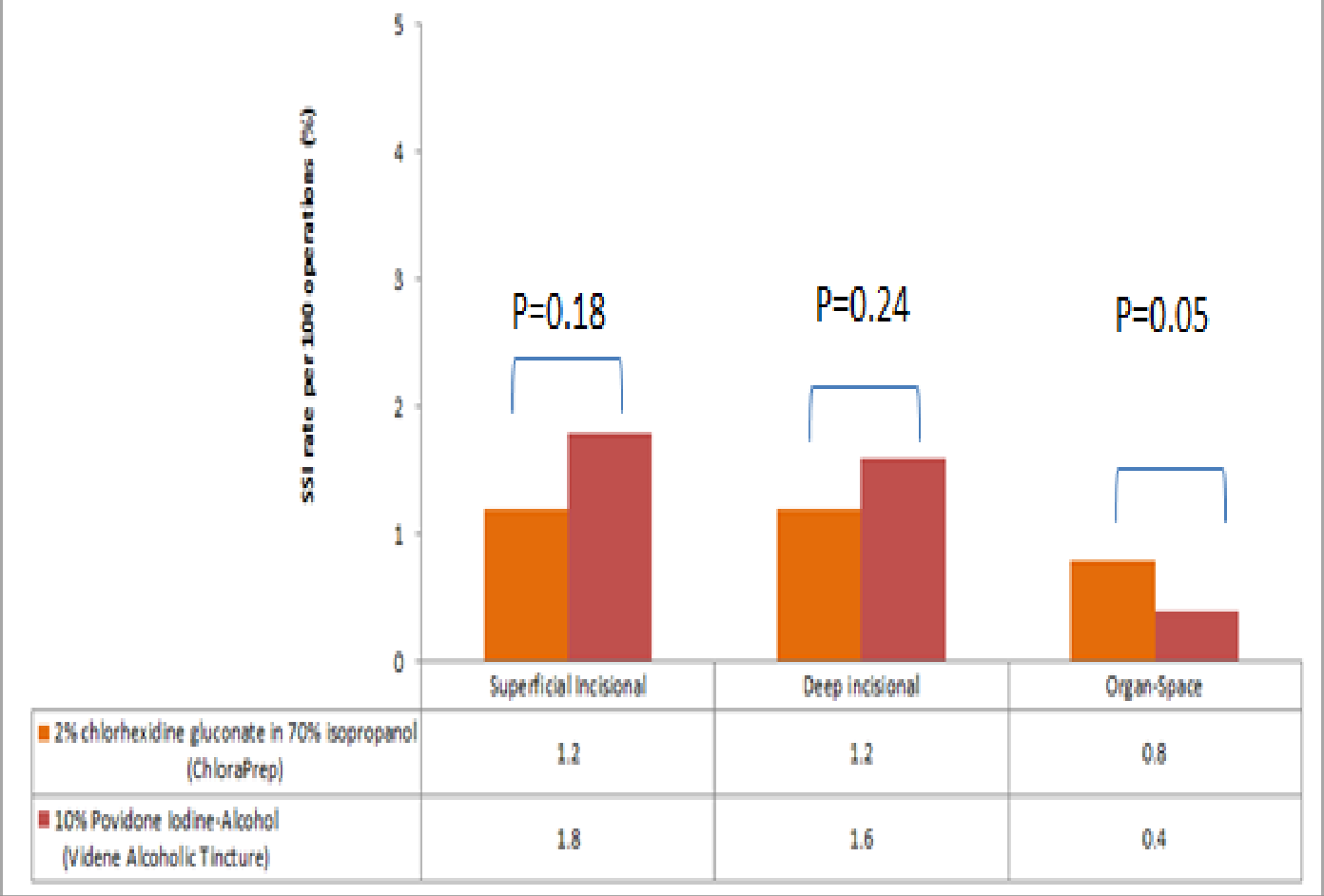


Figure 4.

RESULTS

The overall rate of SSI was similar in the chlorhexidine-alcohol group and 10% povidone-iodine-alcohol (3.3% vs. 3.8%; P=0.14; relative risk, 0.98; 95% confidence interval, 0.52 to 1.78). The rates of superficial SSI (1.2% vs. 1.8%, P=0.18; RR 0.97; 95%CI, 0.48 to 1.80) and deep incisional SSI (1.2% vs. 1.6%, P=0.24) were also similar with 10% povidone iodine-alcohol being more effective against organ-space infections (0.8% vs.0.4%, P=0.05; RR 0.38; 95%CI 0.20 to 1.01) (see Figure 4).

CONCLUSION

CABG surgery is relatively unique in its requirement to prep upper and lower body in the majority of cases. Comparisons between cardiac surgery and other surgical categories participating in national surveillance suggests that there are important differences SSI risk⁴, as well in micro-organisms responsible for SSI between categories⁵ and gender⁶.

Our study suggests that **CHG-alcohol** and **PVI-alcohol** are **safe** and **efficacious** in **CABG surgery**, with the latter offering modest benefit against organ/space classification. **This analysis provides evidence to inform skin preparation practice for cardiac patients.**

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