

ARE DROPPED BONE GRAFTS SAFELY REUSED?: AN EXPERIMENTAL STUDY COMPARING EFFICACY OF CHLORHEXIDINE, POVIDONE-IODINE AND ALCOHOL

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INTRODUCTION:

A dilemma arises when a bone graft or fracture fragment is inadvertently dropped on the operation theatre floor and becomes contaminated. The aim of this study was to determine the efficacy of simple and readily available antiseptic solutions in disinfecting contaminated bones.

METHODS:

This experimental study involved 225 bone specimens prepared from discarded bone fragments during a series of forty-five knee and hip arthroplasty surgeries. The bone fragments were cut into five identical cubes, and were assigned to either control (positive or negative), or experimental groups (0.5% chlorhexidine, 10% povidone-iodine or 70% alcohol). Control negative was to determine pre-contamination culture. All bone specimens, except the control negative group, were uniformly contaminated by dropping on the operation theatre floor. Subsequently, the dropped bone specimens except the control positive group, were disinfected by immersing in a respective antiseptic solution for 10 minutes, before transported to the microbiology laboratory for incubation.

RESULTS:

Simple logistic regression analysis demonstrated that chlorhexidine was significantly effective in disinfecting contaminated bones (p-value <0.001, odd ratio 0.009). Povidone-iodine and alcohol were not statistically significant (p-value 0.059 and 0.53 respectively). Organism identified were *Bacillus* species and coagulase-negative *Staphylococcus*. No gram negative bacteria isolated.

Table 1 showing incidence rate

Group	Growth	Incidence	95% CI
		rate	
Control	32	86.5%	72.0 – 94.1
Chlorhexidine	2	5.4%	1.50 – 17.7
Povidone-iodine	25	67.6%	51.5 – 80.4
Alcohol	30	81.1%	65.8 – 90.5

Total bone specimens N=37 per group, CI=confidence interval

DISCUSSIONS:

The incidence of positive culture from a dropped bone fragment was 86.5%. Due to a high contamination rate, surgeons need a correct and impromptu decision whether to discard and use other bone grafts which would reflect cost and morbidity, or to decontaminate with an effective disinfectant. Previous literature showed that povidone-iodine was the most commonly used antiseptic in disinfecting dropped bone grafts among surgeons. Our study discovered that chlorhexidine as an effective and superior disinfectant, therefore signifying for a change in the current practice. Similar findings could be extrapolated in sterilization of dropped instruments or implants intraoperatively using chlorhexidine.

CONCLUSION:

0.5% chlorhexidine is effective and superior in disinfecting contaminated bones.

REFERENCES:

1. Bruce et. al, Are dropped osteoarticular bone fragments safely reimplantable in vivo? 2011;93;5:430-438.
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