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HYDROGEN PEROXIDE APPLIED TO THE DERMIS FOLLOWING SKIN INCISION DECREASES DEEP CUTIBACTERIUM ACNES CONTAMINATION DURING SHOULDER ARTHROPLASTY; A RANDOMIZED CONTROLLED TRIAL

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Background: Despite all efforts to minimize risk, periprosthetic joint infections occur in 1-4% of primary total shoulder arthroplasties (TSAs). Cutibacterium acnes is the most implicated organism and has been shown to persist in the dermis despite use of preoperative antibiotics and standard skin preparation. Multiple studies have shown decreased C. acnes rates with the use of preoperative benzoyl peroxide or hydrogen peroxide (H2O2), but positive deep cultures are still common. We sought to determine if an additional application of H2O2 directly to the dermis following skin incision would further decrease deep culture positivity rates.

Methods: We performed a single-blinded , randomized controlled trial comparing rates of positive tissue cultures at the time of primary TSA in male patients with no prior shoulder surgery who received our standard skin preparation consisting of H2O2, ethanol, and ChloraPrep vs. an additional application of H2O2 to the dermis immediately after skin incision. Bivariable and multivariable analysis was performed comparing rates of positive cultures based on demographic and surgical factors.

Results: Positive C. acnes dermal cultures occurred at similar rates between experimental and control cohorts during the initial (22% vs. 28%, P=0.500) and final dermal swabs (61% vs. 50%, P=0.843). On bivariable analysis, the rate of positive deep cultures for C. acnes trended towards being lower in the experimental group (28% vs. 44%, P=0.054). Patients who underwent anatomic TSA had a significantly greater rate of positive C. acnes deep cultures (57% vs. 28%, P=0.006), however, and when controlling for this on multivariable analysis, the experimental cohort was found to be associated with a significantly lower odds of positive deep cultures (Odds Ratio=0.37, 95%CI=[0.16-0.90], P=0.023). There were no wound complications in either cohort.

Conclusions: An additional H2O2 application directly to the dermis following skin incision resulted in a statistically significant decrease in the odds of having deep cultures positive for C. acnes without obvious adverse effects on wound healing. Given the negligible added cost, this intervention may be considered as an adjuvant to preoperative use of BPO or H2O2 in revisions where accurate culture results will affect further treatment.