

Pretreatment of the Pilosebaceous Unit Decreases Cutibacterium Acnes Burden during Shoulder Arthroplasty

Ian Hutchinson, Joshua I. Mathew¹, Andrew Posner, David M Dines², Joshua S Dines², Michael Fu, Samuel Arthur Taylor³, Lawrence V Gulotta⁴, Joseph Zimmerman⁵

¹Icahn School of Medicine At Mount Sinai, ²Hospital For Special Surgery, ³Hosp for Special Surgery-Cornell, ⁴Hosp for Special Surg-Cornell, ⁵Capital Region Orthopaedics

INTRODUCTION: Cutibacterium acnes (C. acnes) is the most common pathogen associated with shoulder prosthetic joint infection (PJI). Unfortunately, C. acnes may be cultured from within the surgical field despite standard perioperative measures. The goal of this study was to investigate the effect of preoperative targeting of the pilosebaceous unit on intraoperative C. acnes burden using benzoyl peroxide wash and blue light phototherapy.

METHODS: Following an *a priori* analysis, 122 consecutive patients undergoing shoulder arthroplasty at two institutions were randomized into three groups: Group I (control, 41), Group II (benzoyl peroxide wash- BPO, 41), and Group III (BPO and blue light phototherapy, 40). The surgical teams were blinded and three intraoperative cultures were performed. Two superficial cultures were taken on the surgical approach: a subcutaneous swab and full thickness skin biopsy from the incision edge (pulverized for culture). After implantation of the prosthesis, a deep capsular swab was taken prior to closure.

RESULTS: Demographic characteristics did not differ between treatment groups. Culture positivity was decreased in Group III (13.3%) compared to Group I (26.8%, $P=0.026$). There was no difference between intervention groups: Group II (16.5%) and Group III (13.3%). Superficial culture positivity on the approach (subcutaneous swab and full thickness biopsy) was associated with deep culture positivity at closure ($P<0.001$). Otherwise, culture positivity was associated with increasing height ($P<0.001$), Body Mass Index ($P=0.0235$), and male sex ($P<0.001$). No adverse side effects were reported.

DISCUSSION AND CONCLUSION: By way of a prospective, randomized controlled trial, pretreatment with benzoyl peroxide wash and blue light phototherapy significantly reduced intraoperative C. acnes culture positivity. Superficial C. acnes culture positivity during the surgical approach was associated with deep culture positivity at the time of closure.