
A Preliminary Assessment of Surgical Site Infection Prophylaxis with Topical Micronutrients

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INTRODUCTION AND OBJECTIVES:

Surgical site infection (SSI) is the most common and costly healthcare-associated infection. Strategies to reduce SSI have been focused on IV antibiotics and intraoperative changes; however, topical prophylactic measures have not been extensively studied. Currently, topical antimicrobials are applied to surgical sites as a standard of care. Anecdotal evidence indicates antimicrobial properties of micronutrients such as vitamin A, vitamin D, zinc oxide, and silver. Our study examined antimicrobial properties of micronutrients and silver using commercially available topical products.

METHODS: An agar well diffusion assay and agar surface assay were used. Bacitracin, Calcipotriene, Desitin, Acticoat, silver sulfadiazine (SSD), Tretinoin were used as proxies for the antimicrobial properties of the current standard of care, vitamin D, zinc oxide, silver, and vitamin A. In the well diffusion trial, each product was dispensed into a 6mm well on Mueller-Hinton agar (MHA) inoculated with *Staphylococcus epidermidis*. For the surface experiment, a one-inch slit was made on MHA inoculated with *S. epidermidis* in order to simulate the surgical incision site, then a line of topical product or a strip of Acticoat was applied over the slit. The plates were stored at 37°C

and the zone of inhibition was measured at 24h and 72h.

RESULTS: Agar well diffusion trial results showed that silver sulfadiazine (SSD) had the largest zone of inhibition and zone of suppression. T-test data between experimental groups indicated that SSD had a significantly larger zone of inhibition than that of Desitin on day 1 and day 3. SSD also showed a significantly larger zone of suppression than that of calcipotriene in day 3. Agar surface trial t-test result indicated that silver containing agents, Acticoat and SSD, showed significantly larger zones of inhibition than those of Bacitracin, Calcipotriene, Desitin, and Tretinoin on day 1 and day 3.

CONCLUSIONS: Antimicrobial properties of topical products with micronutrients appear to be equal to that of Bacitracin in the well trial. Acticoat and SSD, two silver containing topical products, promising results when applied on the surface as better than the standard of care. Further testing with larger sample sizes needs to be done along with assessing the duration of effect of each agent.

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