A5-1: The Effect of Iodine Preparations on Type I Collagen and Fibroblast Migration in Dermal Equivalents

Author List:
Presenting Author: Annette B. Wysocki
Additional Author: Laura R. Vick

Presenting Author: Annette B Wysocki
Address: 2500 North State Street
Jackson, Mississippi 39216-4505
United States
Ph: 601-815-4267
Fax: 601-984-5127
Email: awysocki@son.umsmed.edu
Institution: University of Mississippi Medical Center

Additional Author: Laura R Vick
Address: 2500 North State Street
Austin, Mississippi 39216
United States
Ph: 601-815-4267
Fax:
Email: lvick@umsmed.edu
Institution: University of Mississippi Medical Center

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Abstract:
Introduction: Iodine solutions have routinely been used on intact skin for surgical preparation to remove surface bacteria and on chronic wounds to decrease bacterial colonization of exposed dermal components. These solutions contain various excipients and concentrations of iodine. The use of iodine preparations remains controversial.

Method(s): Type I collagen, both acid solubilized and neutralized, were combined with varying dilutions (ranging from 10 - 80%) of either a prep solution (10% povidone iodine) or a scrub solution (7.5% povidone iodine) with and without serum at 25°C and 37°C. Collagen degradation was observed following separation using 8% SDS PAGE and colorimetric detection with Coomassie blue. Cell viability and migration were determined using dermal equivalents where fibroblasts incorporated into 3D collagen gels were exposed to either 1%, 5%, 10%, 40%,
or 80% dilution of either the prep or scrub solution combined with media with and without serum. Rescue experiments were also performed where exposure was limited to 15, 30 or 60 minutes.

**Results:** Collagen degradation at 24 hours occurred more readily for neutralized collagen exposed to the prep solution, compared to acid solubilized collagen. In contrast, collagen degradation occurred more readily for acid solubilized collagen when exposed to the scrub solution. Serum and temperature had minimal effect on collagen. No cell migration was seen at 24 or 48 hours from the dermal equivalents when either the prep or scrub solution was used. Cell viability was observed only for fibroblasts in the center of the dermal equivalent exposed to a 1% prep solution both with and without serum. Rescue experiments were only successful for dermal equivalents with limited exposure to a 1% prep solution where limited cell migration was seen at 48 hours.

**Discussion & Conclusions:** Type I collagen is less affected by dilute concentrations of both povidone iodine prep and scrub solutions. However, skin fibroblasts in a dermal equivalent suffer cytotoxic effects regardless of the concentration used, unless rescued after limited exposure. Clinicians should take these results into consideration and limit exposure to iodine preparations in the absence of an intact epidermal layer.

**Abstract History:**
This abstract has been presented or accepted for presentation in whole or in part at the SNRS or other scientific meeting. Preliminary results were presented at the Wound Healing Society meeting in Dallas, TX in April 2009.

**Financial Disclosure:**
No, I (or a member of my immediate family) have not received something of value* from or own stock (or stock options) in a commercial company or institution related directly or indirectly to the subject of my presentation.

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I will not be describing any pharmaceutical and/or medical device.

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Submitted by:
awaysocki@son.umsmed.edu