The Efficacy of Five Silver Based Dressings on Concentrated Acinetobacter Baumannii at Four, Seven and Fourteen Days[1]

Roger Huckfeldt MD FACS, Phillip Finley MS

St John's Medical Research Institute, Springfield MO

Introduction: Silver based dressings are widely accepted and utilized in the care of acute traumatic and thermal injury and chronic wounds. These dressings are generally cleared as barrier dressings and usually advertise an indication of up to seven days although the incidence of fourteen day claims is now more commonly encountered. In addition, clinicians frequently harness the antimicrobial properties of silver dressings to treat acute and chronic bacterial infections and colonization. This 3 x 6 factorial study was designed to evaluate the efficacy of Mepilex Ag, Acticoat 7, Acticoat Flex 7, TheraBond 3D, Aquacel Ag and non woven gauze (control) in the presence of concentrated *Acinetobacter baumannii* in a collagen/skin model at 4, 7 and 14 days.

Procedure: A collagen/skin model was constructed by preparing 144 specimens with a 3/4 x 3/4 inch square of sterile bovine collagen each deposited on a petri dish of nutrient agar. The collagen square was then covered with a 3/4 x 3/4 inch square of sterile meshed porcine xenograft. One-half milliliter of 8.5 x 10 (12) *Acinetobacter baumannii* in nutrient broth was then used to saturate the collagen/skin complex. The specimens were divided into three groups to allow 4, 7 and 14 day analysis. Each group was divided into 6 subgroups to evaluate the 5 silver dressings and the control group. In 7 plates of each subgroup a 1 by 1 inch moistened square of the assigned dressing was used to cover the collagen/skin complex. A sterile glass slide was used to maintain contact of the dressing with the collagen/skin complex. The 8th specimen in each subgroup was maintained in a similar fashion and used as a control to assure adequate nutrition in the nutrient agar plate by transferring the collagen/skin/dressing complex to a new plate at 7 days. The skin was removed from each plate on the assigned day and vortexed in nutrient agar at 3000 rpm for 60 seconds. The supernatant was then pipetted off and used for serial dilutions which were plated onto nutrient agar and incubated at 37^0C for 24 hours. Colony counting was then performed followed by standard log reduction evaluation.

Results: Clinical analysis was performed by assigning success as 99.99% efficacy (4 log reduction) or greater. Results were evaluated using both average log reduction (reported in parenthesis) as well as the number of successes out of seven evaluations. Results are reported in the table below.

	Mepilex Ag	Acticoat 7	Acticoat Flex	TheraBond 3D	Aquacel Ag	Control
Day 4	1/7 (3.15)	0/7 (2.43)	0/7 (2.43)	4/7 (3.57)	4/7 (3.57)	0/7 (<1)
Day 7	6/7 (4.14)	6/7 (5.14)	3/7 (3.86)	7/7 (4.56)	5/7 (4.29)	0/7 (<1)
Day 14	4/7 (3.57)	7/7 (5.00)	2/7 (3.00)	7/7 (5.00)	1/7 (3.57)	0/7 (<1)

Summary: Four day analysis showed successful bio-burden control in four of seven plates with TheraBond 3D and Aquacel Ag. The remaining dressings were less successful. Progressive antimicrobial action yielded successful efficacy of all samples at day seven for only TheraBond 3D. Day fourteen analysis showed successful efficacy on 7/7 plates for Acticoat 7 and TheraBond 3D. The remaining dressings showed inferior kill rates to their day seven quantifications.

[1] [abstract]. In: Proceedings of the John A. Boswick Burn and Wound Care Symposium; 2010 Feb 22-26; Maui, HI. p. 52-53.