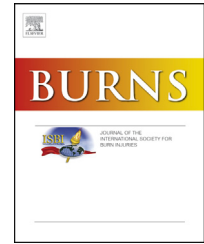


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## Editorial

# Silver in wound care: A review of the state-of-the-art



I first became intrigued with the medical properties of silver ion in 1992, when I was assigned as a young burn surgeon and researcher to the US Army Institute of Surgical Research/US Army Burn Center at Brooke Army Medical Center in San Antonio, Texas. The Institute operated a robust bench research program in support of the burn care mission, and two scientists, Dr Chi-Sing Chu and Dr Natalia Matylevich were actively investigating the effects of weak direct current on wound healing. To apply electrical current to wounds, they chose electrodes made of a silver-nylon cloth, which was originally designed for use as a radar reflector or electrostatic shield. The choice was fortuitous, as silver has the highest electrical conductivity of any element and the fabric was flexible enough to cover irregular wound surfaces. It soon became apparent that silver ion, with or without electricity, was beneficial in wound healing. As a result, when silver-based wound dressings became commercially available, the Army Burn Center was an early adopter. When hostilities broke out in Afghanistan and Iraq, silver-nylon dressings found utility in deployed Combat Support Hospitals and in flight for the transcontinental evacuation of burn casualties. In this supplement, an article by Barillo, Pozza and Brandt reviews the military use of silver-nylon dressings from the point of view of three experienced trauma surgeons.

The US military is one large integrated healthcare system, and once silver dressings gained acceptance, it was not always necessary to seek new approval from each location where use was anticipated. The civilian world is far more complex. Introducing a new dressing to a hospital or wound care center can be a lengthy process involving presentations to administrators, pharmacy and therapeutics committees, and wound care specialists. Many have a healthy skepticism of new products, and all would like to see some science supporting the purported benefits. An article by Barillo and Marx examining the historical uses of silver in medicine is included to make the point that silver is not a new compound and has found utility in medicine for several millennia. A second article by the same authors explores the basic science of silver from the point of view of an inorganic chemist. Unlike nickel or mercury, silver is not an allergen, sensitizer, or regulated toxic substance.

In contemporary medical practice, we all see patients educated at the "Internet School of Medicine". An informed patient is an important partner in the delivery of health care. Unfortunately the internet also provides much incorrect information. On the subject of silver, horror stories of patients turning blue can be found on the internet, along with blogs claiming that silver will make all microbes resistant and destroy the ecosystem. An article by Sterling addresses these urban legends well.

To this point, we have considered the use of silver-based dressings to treat infection. There is a second, and probably more important indication of silver-based dressings, the prevention of wound infection. Krieger and colleagues at the University of South Florida published a classic paper showing how silver-nylon dressings could be utilized to decrease the incidence of surgical site infection (SSI) after colon-rectal surgery [1]. After seeing this study, I asked Dr. Sanchez and Dr. Abboud to write a literature review on the subject. As seen in the resulting article, the literature supports the use of silver-nylon dressings for the prevention of SSI in colon-rectal, neurological, spinal and certain cardiovascular and orthopedic procedures. Transplant, obese, diabetic and obstetric patients are populations at high risk of SSI, and recommendation is made for prospective studies of silver-nylon dressings for the prevention of SSI in these populations.

Finally, a number of anecdotal reports suggest that silver-nylon dressings may reduce pain. Pain is subjective and very difficult to quantify or study in an objective fashion. The application of a moist, occlusive dressing to protect a wound surface, of itself, may reduce pain. In terms of pain relief, the manufacturers of silver dressings (we happen to use products from Argentum Medical, LLC) make no claim for any mechanism of action other than the above. Nevertheless, it is quite possible that other mechanisms are at work. A prospective study and literature review on the subject of pain reduction is presented by the colon-rectal surgery team from the University of South Florida. Recommendation is made for future studies examining the pain-modulating studies of silver dressings using pain as a primary outcome.

I am indebted to the Editor of Burns for allowing me to assemble this collection of articles on the wound management applications of silver dressings. I would also like to thank the

authors who produced these well-researched and well-written articles.

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### Disclaimers

The opinions or assertions herein contained are the private views of the author and do not represent official policy of the US Army or the US Department of Defense.

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- [1] Krieger BR, Davis DM, Sanchez JE, Mateka JLL, Nfonsam VN, Frattini JC, Marcet JE. The use of silver nylon in preventing surgical site infections following colon and rectal surgery. *Dis Colon Rectum* 2011;54(6):1014–9.

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