Selected Abstracts From The Wilderness Medical Society's 2013 Summer Scientific Conference

Poly-Arginine Topical Compound Tested in a Murine Model for Frostbite

Background.—We recently created and reported a novel murine model of frostbite injury that mimics human skin pathophysiology, with the intent of allowing screening-type testing of therapeutic interventions directed against frostbite.

Objective.—Using this model, the current investigation tested a poly-arginine compound for the treatment of frostbite injury.

Methods.—A unique topical compound containing poly-arginine was tested. There were 7 subject conditions: pretreatment with placebo, pretreatment with compound, posttreatment with placebo, posttreatment with compound, pretreatment and posttreatment with placebo, pretreatment and posttreatment with compound, and untreated (control). Mice were monitored for 28 days for healing rate and tissue loss until the wounds were fully healed. Certain mice were sacrificed at scheduled intervals during this 28-day period for histologic analysis. Wounds were measured to calculate wound size and tissue loss.

Results.—There was a decrease ($<40\%$ in both pretreatment and pretreatment/posttreatment conditions versus $>43\%$ in all other conditions) in tissue loss in the mice treated with poly-arginine. All conditions completely healed (100% epithelialization) by day 27, with the placebo conditions showing complete healing sooner (day 20 vs day 25) than subjects treated with poly-arginine. Histologic analysis was performed for neovascularization, reepithelialization, inflammation, and tissue necrosis.

Conclusions.—In a murine model for frostbite injury, this unique poly-arginine compound shows a potentially beneficial effect. That warrants testing it on a larger animal model more closely resembling frostbite injury leading to limb loss.

Lauren J. Auerbach, MS
Brittney K. De Clerck, MD
Garrison C. Fathman, MD
Paul S. Auerbach, MD
Stanford, CA, USA

Hematologic Abnormalities and Bleeding in Copperhead Snakebite

Background.—Patients with copperhead snakebite tend to have less severe hematologic abnormalities than with other pit viper bites, yet those laboratory studies are routinely ordered.

Objective.—The purpose of this study was to characterize the incidence of abnormal hematologic studies in patients with copperhead bite, and to determine whether these abnormalities are associated with clinically significant bleeding.

Methods.—Using established methodology for retrospective chart review, we performed blinded, dual chart abstraction for all patients who had verified copperhead bite presenting to a tertiary care emergency department from April 2009 to October 2012. Data collected included platelet count, serum fibrinogen, prothrombin time, partial thromboplastin time, predefined clinically significant bleeding, death, and antivenom use. Confidence intervals of proportions were calculated using the Wilson score interval.

Results.—Ninety-four patients presented with copperhead bite during the 41-month study period. The mean age was 37 years (SD 21 years); 51% (48 of 94) were male. In all, 98% of patients (92 of 94) had at least a single set of the studies performed. Hematologic abnormalities occurred in 27% (95% CI: 0. 21–0.39) of these patients: 4% (4 of 92) had thrombocytopenia (range 96–147 $\times 10^9/L$); 18% (17 of 92) had hypofibrinogenemia (range 142–212 mg/dL); 5% (5 of 92) had an elevated prothrombin time (range 13.4–14.1 s); and 3% (3 of 92) had an elevated partial thromboplastin time (range 38.5–39.3 s). No clinically significant bleeding or death was observed (0%, 95% CI: 0–0.04). Ninety percent of patients received antivenom therapy.

Conclusions.—Although a substantial proportion of patients had a measurable hematologic abnormality, no clinically significant bleeding occurred. Routine hematologic tests to detect significant bleeding in all patients with copperhead snakebite and access to antivenom therapy are not warranted. Which patients will benefit from testing, and the role of these tests as prognostic markers of systemic or local tissue symptoms, remains unclear.

C. Scott Evans, DO
Weiyang G. Drake
Mariam Diskina
Alexander T. Limkakeng, MD
Charles J. Gerardo, MD
Durham, NC, USA

Kathryn T. Kopec, DO
Philadelphia, PA, USA

May Yen, MD
Boston, MA, USA