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New approaches to evaluation, management, and treatment of neonatal extravasations: Point-of-care ultrasound, honey, and amniotic membrane

Vita Boyar
Hofstra University, USA

Purpose: Primary objective is to illustrate the utility of Point-of-Care Ultrasound (POC-US) as an adjunct tool in the diagnosis and management of neonatal peripheral intravenous extravasation injuries (PIVI). The secondary objective is to quantitatively describe severity staging instrument based on the POC-US imaging. We depict the tissue-level morphological change in the skin after hyaluronidase therapy. Finally, we will offer suggestions on new, natural treatments for severe neonatal extravasations.

Subjects and Setting: Neonates with PIVI Stage 3 and 4, who were treated with hyaluronidase. Mean GA was 31.6 weeks.

Methods: Three POC-US exams were done. First, right after the injury occurred but before hyaluronidase treatment, second 3-6 hours after hyaluronidase was given and final exam 24-30h later. The assessment of the extravasation changes included a physical exam (PE) and quantitative POC-US measurements. Treatment was administered according to our unit's protocol. Extravasations with full-thickness wounds were treated with various natural modalities, including active Leptospermum honey and/or amniotic membrane-based products.

Results: POC-US confirmed extravasations and helped define anatomy and extent of the injury. Ultrasound measurements of epidermal-dermal-subcutaneous tissue thickness (skin elevation) over the area of the biggest fluid pocket were obtained and compared to the normal skin thickness on the same or contralateral side. Elevation ratio was calculated. Based on the ratio, we defined 3 groups' extravasations: mild (ER>1 and <1.33) moderate (ER >1.33 and <1.66) and severe (>1.66 or any clumping of subcutaneous fat). Combination of PE, the chemical composition of infusate and extravasation stage determined the need for treatment. Location of hyaluronidase administration was based on the ultrasound images. Tissue images before and after hyaluronidase treatment supported injury resolution. Treatment of wounds is described.

Conclusion: Along with PE, POC-US represents a valuable tool in the description of the extent of PIVI internal trauma, it helps guide treatment, and allow for more objective follow up. Medical grade honey and dehydrated amniotic membrane allograft are excellent choices for full-thickness wounds inflicted via extravasation

Biography

Vita Boyar, an Assistant Professor of Pediatrics at Hofstra University Medical School, is a Board Certified Neonatologist and Certified Wound Specialist Physician, practicing both neonatology and wound care at Cohen Children's Medical Center of NY, Northwell Health. She combines both specialties as a director of Neonatal Wound Services. Her neonatology research involves respiratory care and devices; it is closely intertwined with her work in Quality Improvement, specializing in pressure injury reduction. As a chair of Pressure Injury Prevention group at CCMC, she had implemented numerous protocols in Pressure Injury Prevention, achieving a reduction in medical-device related and ECMO related pressure injuries. Additional studies include treatments with natural products, point-of-care ultrasound in pediatric cutaneous wounds and skin integrity in preterm neonates. She serves as an advisor to Neonatal Israeli Society in their quest to implement Neonatal Skin Improvement Initiative and is a member of the International Society of Pediatric Wound Care.

Vboyar@gmail.com

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