

# THE TREATMENT OF EXTRAVASATION OF INTRAVENOUS MEDICATIONS AND FLUIDS IN NEONATES AND CHILDREN WITH COLLAGEN/ORC//SILVER

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## SECTION 1 Background

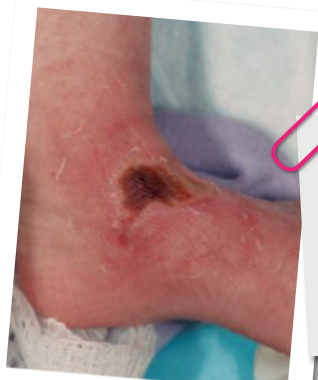
The first parenteral (IV) administration of blood into man was by Denys in Paris on June 15, 1667 followed by the first IV administration of saline solution by Latta, Weatherhill, and Miller in 1831 and 1832<sup>1,2</sup> In the early 1900's IV administration of saline became common practice<sup>3</sup>.

## SECTION 2 Risk factors

Neonates and children are at high risk for the development of an injury due to infiltration of intravenous fluids and medications because of the small, fragile veins, small catheter size (large catheter gauge), use of needles ("butterfly" catheters, etc.), and darker skin in many patients. Because of the delicate nature of the skin, virtually any medication or fluid infused outside of the vein can result in significant injury to skin and surrounding structures.

## SECTION 3 Treatment

The Collagen/ORC/Silver dressing is composed of 55% Type 1 bovine collagen, 44% oxidized regenerated cellulose (ORC), and 1% silver or salt. The ORC/Silver salt releases only 0.25% ionic silver thus delivering enough silver to control bacteria without damaging cells and slowing healing<sup>3,4,5</sup>. The collagen component provides structural support for cellular and capillary ingrowths. The product is capable of reducing proinflammatory cytokines and mediators and proteases<sup>7</sup>. In acute wounds the combination of materials decrease cell death (apoptosis), increases levels of growth factors (PDGF, IGF-1, and KGF), and activates KGF receptors<sup>8</sup>. The product dissolves into the wound bed within 2-3 days making the effort and discomfort of removal unnecessary. These characteristics make Collagen/ORC/Silver an ideal product for the treatment of wounds in neonates and children.



Treated with  
Collagen/ORC/Silver

Necrosis of Skin of Ankle Due to  
IV Infiltration Healed 4 Weeks  
After Debridement and Treatment  
with Collagen/ORC/Silver.

## SECTION 4

### Treatment protocol

1. Discontinue the infusion and remove catheter. If the catheter is out of the vein, aspirate to remove residual fluid
2. Elevation of limb or warm or cold compresses are NOT needed
3. Consider use of medications to relieve tissue damage
  - A. Hyaluronidase infiltration (Wydase, Wyeth-Ayerst)
  - B. Phentolamine infiltration (Regitine, Ciba-Novartis)
  - C. Nitroglycerin ointment
4. Cover the injured area with a moisture retentive, protective dressing
5. If necrosis of the skin occurs, debridement is needed either sharply or with Santyl Collagenase
6. Following debridement, apply Collagen/ORC/Silver. Cover with a non-adherent and secondary bandages
7. Reapply the Collagen/ORC/Silver dressing and bandage every three days until wound heals.

## SECTION 5

### Outcomes

1. Healing generally occurs within 2-4 weeks depending on size of injury
2. No tissue staining or systemic problems with silver have been noted

1



Example 1

IV Infiltration of Saline Healed After 2 Weeks Treatment with Collagen/ORC/Silver.

2



Example 2

2 Week Old with IV Infiltration in Antecubital Fossa Healed 2 Weeks After Debridement and Treatment with Collagen/ORC/Silver.

3



Example 3

2 Week Old with IV Infiltration of Saline Healed 3 Weeks After Debridement and Treatment with Collagen/ORC/Silver.

#### References

1. Weatherhill T. Lancet 1831-1832;2:688. 2. Miller S. London Medical Gazette, 1832, p. 450. 3 Moyer CA. Fluid Balance: A Clinical Manual, 1952, pp. 19-23. 4. Poon VKM, Burd A. In Vitro Cytotoxicity of Silver: Implication for Clinical Wound Care. Burns 2004;30:140-147. 5. Ovington L, et. al. Podiatry Today 2002; Oct(Suppl): 2-13. 6. Treadwell TA, Fuentes ML, Walker D. Treatment of Second Degree Burns with Dehydrated, Decellularized Amniotic Membrane (Biovance) vs a Silver Dressing (Acticoat). Wound Rep Reg. 2008;16:A39. 7. Gregory SJ, Boothman S, Cullen BM. "Effect of ORC/Collagen Matrix Containing Silver on Inflammatory Mediators Elevated in Response to Bacterial Endotoxins," Abstract presented at 15th Annual Meeting of the European Tissue Repair Society, Stuttgart, Germany, September 14-17, 2005. (Published in Wound Rep Reg 2006;14:A17). 8. Jeschke MG, et.al. Wound Rep Reg 2005;13:324-331.

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