

# The use of an ionic hydrogel in a neonate with a necrotic extravasation injury

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1 On referral.



2 ActiFormCool® dressing applied.



3 Autolytic debridement commenced.



4 Complete debridement.

## Aim

The aim of the case study is to report the use of an ionic hydrogel (ActiFormCool®) in a neonate with an extravasation injury.

These types of injuries can result in major tissue loss in this patient group and can provide a clinical challenge for the healthcare profession (Young 1995). Unfortunately there is a dearth of clinical examples of successful dressing regimens used in the neonatal population. This case study reports one of the first use of the ionic hydrogel in the neonatal population.

## Background

The skin of a neonate originates from two of the three germ cell layers that make up the embryo; the ectoderm serves as the origin of the epidermis and the mesoderm for the dermis (Rudy 1991). In the uterus the skin has two distinct periods of development - the embryonic period and the foetal period. During the embryonic period (0-8 weeks) the dermis and epidermis can be distinguished, with the latter only consisting of two layers. The major development takes place during the foetal period (9-40 weeks). This period is subdivided into four stages, with the complete formation of the epidermis occurring during the third stage.

At 28 weeks the formation of the skin is complete and its functional capacity develops during the last twelve weeks of the final period (the premature period).

The skin continues to develop following birth until puberty. If a child is born between 28 and 40 weeks they have an immature epidermis, the stratum corneum is not fully developed and consequently the barrier function of the epidermis is weakened. The skin does not have the ability to limit transepidermal water loss and prevent the absorption of chemicals, drugs and micro-organisms (Cartilidge 2000).

If a child is born prematurely there is often the need for life sustaining interventions, which include delivery of fluid via an intravenous line. Extravasation injuries are a result of intravenous fluids leaking into the tissues. Consequently there is a localised build up of pressure in the tissues and tissue necrosis can occur (Irving 2001).

## Principles of paediatric wound care

The care delivered to the child and the family in this case study was based upon the following principles of paediatric wound care.

- **Respect**
- **Communication**
- **Safety**
- **Choice**

**Respect** challenges the traditional role of the expert undertaken by the healthcare professional and acknowledges that the child and the family are also experts and have a role in delivering complex care packages.

**Communication** relates to the sharing of information. This is essential if the child and family are to be true partners in their wound care.

**Safety** of the child is paramount and this can be challenging due to the lack of clinical research in wound care products and equipment in this patient group.

**Choice** is dependent on the above factors. Empowerment of the child and, in this case, their family, was essential to enable them to choose their level of participation into the planning, delivery and evaluation of the wound care programme.

## History

The child was referred to the tissue viability service with a necrotic lesion in the area of the Achilles tendon, left leg (1). The damage was the result of an extravasation injury from a peripheral line used to deliver systemic fluids to the child. The clinical challenges with this neonate were:

- the site of the wound and the potential for damage to the underlying structures and ultimately limb function.
- the choice of debridement method in a neonate who was actively moving her lower limbs.
- the shortage of clinical evidence for wound debridement in this patient population.
- the lack of familiarity with and knowledge of wound care within the neonatal care setting.

The tissue viability nurse immediately referred the neonate to the plastic surgeon due to concerns regarding the long term viability of the Achilles tendon and thus future function and movement of the limb. The necrosis prevented a full assessment of the extent of tissue depth and it was not appropriate to delay the referral until this had been achieved.

The choices of debridement methods are limited in this patient population and there have been previous references in the literature to the use of amorphous hydrogels used in bags on the limbs of neonates. However the weight of the bag containing the gel can often act as a splint and restrict movement (Thomas et al 1987). Alternatively a thin hydrocolloid can be used to soften and debride the necrotic tissue by promoting autolysis (Irving, Young and Atkinson 1996). The tissue viability nurse considered both of these options, but a major concern was the presence of erythema surrounding the wound and the potential this had for causing pain. At this time there had been anecdotal reports of the pain relieving properties of the ionic hydrogel. The potential ability of the dressing to both debride and relieve pain was therefore seen as a plausible choice. Before this could be applied, the company was contacted and at that time they had no experience of using the product in the neonatal population. The company provided the constituents of the dressing which were discussed with the tissue viability nurse, pharmacist, paediatrician and the child's parents focusing on the risks of using the product against the advantages and disadvantages of the known alternatives.

Consequently it was decided to go ahead and use the product on the child.

The tissue viability nurse spent time discussing the treatment aims and objectives with the parents and the nursing team, and agreed goals were set. Due to the lack of familiarity with the product the wounds were initially redressed on a daily basis to assess the dressing performance in an incubator environment. The child's mother would observe the dressing changes and, when confident, undertook the procedure under supervision and then took complete ownership of the procedure with the nursing staff acting in an advisory role. The ease of application and removal of the dressing hastened this eventuality.

## Results

Debridement of the non-viable tissue was achieved (2) and eventually a sheet of necrosis was seen to be hanging loosely from the wound bed (3). At this stage the tissue viability nurse would normally use conservative sharp debridement to remove the loose tissue. However the child had very active limbs and the tissue viability nurse was reluctant to use this method on such a mobile neonate. Therefore the dressing was used until complete debridement had been achieved (4).

## Conclusion

An ionic hydrogel was used to debride necrotic tissue and achieve re-epithelialisation in an extravasation injury in a neonate. There were no reported adverse events during the treatment period and, although difficult to assess, it was also chosen for its ability to provide localised pain relief caused in this case by peri wound erythema and oedema.

This case study, albeit limited in its ability to generalise to the neonatal population, adds to the dearth of literature to guide clinical practice in this patient group.

## Declaration of interest

Activa Healthcare provided the dressings for use and assisted in the production of the poster. The content of the poster is the sole work of the author.

## Acknowledgements

The family of the child gave consent for publication of the material. Mr Mike Jones, Hospital Photographer for the wound images.

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