Royal Hobart Hospital Extravasation Burn Injuries: an 8-year review

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Introduction

Extravasation injuries, particularly in neonates, are often referred to plastic surgery and burns units for advice and management. The need for intravenous therapy for long period of time paired together with the fragile nature of neonatal veins makes this injury more common in this population. Tissue damage occurs due to changes in pH, osmolarity and sometimes due to direct toxicity to the surrounding tissue. The injury therefore can be of variable severity depending on type and quantity of fluid extravasated .

Grade 1	Grade 2	Grade 3	Grade 4
Pain at infusion site	Pain at infusion site Swelling No skin blanching Normal capillary refill and peripheral pulsation	Pain at infusion site Swelling Skin blanching Cool blanched area Normal capillary refill and peripheral pulsation	Pain at infusion site Swelling Skin blanching Cool blanched area Reduced capillary refill +/- arterial occlusion +/- blistering

Table 1: extravasation injury grading system (*1, adapted from RCH guidelines, Melbourne, Australia*)

Although treatment recommendations are present in certain hospitals in Australia, at our hospital, there are currently no treatment guidelines on time to referral and initial treatment.

Method

Ethics approval was granted to retrospectively review all Royal Hobart Hospital extravasation burn patients whose data was registered with the Burns Registry of Australia and New Zealand and patients identified from Royal Hobart Hospital coding on extravasation burn complications from January 2009-2017. Factors contributing to and which may worsen the severity of injuries (fluid, quantity, time to burns/plastic surgery referral, first aid) were identified. We also reviewed management, time to healing and scar management.

Results

- Nineteen cases were identified of which 16 were less than 1 year of age. Seventeen of the 19 cases were referred to the plastic surgery unit within 1-2 days.
- Most burns were caused from intravenous antibiotics (37%), followed by maintenance fluids (26%) and total parenteral nutrition (23%).
- Average total body surface area (TBSA) of injury was 0.74%.
- First aid was generally limited - only 7 patients (37%) had limb elevation, 26% underwent vascular observations and only 1 patient had normal saline infiltration.
- 8 patients required surgical intervention (42%).
- Average healing time was 41 days ranging from 14 to 140.
- All referred patients underwent scar management and appropriate allied health input.

Figure 1. Initial extravasation burn injury on referral 31/10/16 vs nearly healed 18/11/16

Discussion

This 8 year review has helped to identify aspects in the provision of care to extravasation injuries that can be improved in our institution. Early referral to a plastic surgery/burns service was in the majority of our cases done well. However, the provision of first aid could certainly be enhanced. Royal Children's Hospital guidelines (1) advocate for limb elevation in *all* cases, followed by the appropriate acute management depending on the severity of the injury.

Given the abnormally large proportion of cases requiring surgery, above 40% in our cohort, there are likely a significant number of less severe extravasation injury cases that are failing to be reported and referred for wound care. Scarring can be a long term complication of extravasation injuries and scar management can aid reducing this risk. Better publicity and education of these injuries to our paediatric medical and nursing staff will hopefully improve first aid and ensure appropriate timely referral if advice is required.

Conclusion

Extravasation burn injuries add significant morbidity to hospital stays, and can often have severe impact on young children and their families. Prevention, early detection and immediate first aid are the cornerstones for appropriate care and successful outcomes. This small single centre retrospective study has demonstrated how we can improve the care currently offered at our institution.

References

1) 'Extravasation Injury Management', The Royal Children's Hospital Melbourne, May 2016. http://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Extravasation_Injury_Management, accessed 10/9/17.
2) Association of Women's Health, Obstetrics, and Neonatal Nurses. Neonatal Skin Care; Evidence-based Guidelines. 3rd Ed. Washington, DC: Association of Women's Health, Obstetric and Neonatal Nurses; 2013. p. 57–62.

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