Ashford and St. Peter's Hospitals
NHS Foundation Trust

Peripheral Extravasation Management in Paediatrics

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Guideline History		
Date	**Comments**	**Approved By**
16/01/2023	Created by J. Oldham (Paediatric Deputy Sister) and Dr Rebecca Bailey	
16/01/2023	First ratified	Paediatric Guidelines Committee
Jan 2024	Reviewed by K. O'Toole (Paediatric Ward Manager)	Paediatric Guidelines Committee
April 2026	Review with addition of action to take pump out for review prior to use	Paediatric Guideline Committee Chair

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1.

Introduction

This guideline has been produced to standardise management of extravasation injuries within paediatrics. Infiltration and extravasation is a complication whereby the drug or IV therapy leaks in to the tissues surrounding the vascular access device. Extravasation is often associated with chemotherapy agents; however non-chemotherapy drugs have been reported as having a greater risk of serious complications. Extravasation may cause serious and often life changing injuries. NIVAS Feb 2024

From 1 April 2011 until 31 March 2021 NHS Resolution received 444 claims relating to extravasation injuries. *NHS Resolution, May 2023*

Contributory factors to include:

- Incorrect medication infusion pump pressures
- Bandaging the cannula in infants, hindering access and observations
- Wrong route of administration
- Failure to act on patient's complaint of pain or discomfort
- Delay in recognising extravasation injury
- Staff not following manufacturer's or local guidance on administration of intravenous drugs. *NHS Resolution, May 2023*

Prompt recognition of an extravasation injury and early intervention offers the best outcomes for patients. **Treatment should ideally be initiated within the first hour** post extravasation injury and **ideally should be no later than 12 hours post**. However, in late presentation of extravasation, there are some benefits offered up to 24 hours after injury. Evelina Clinical Guidance 2022.

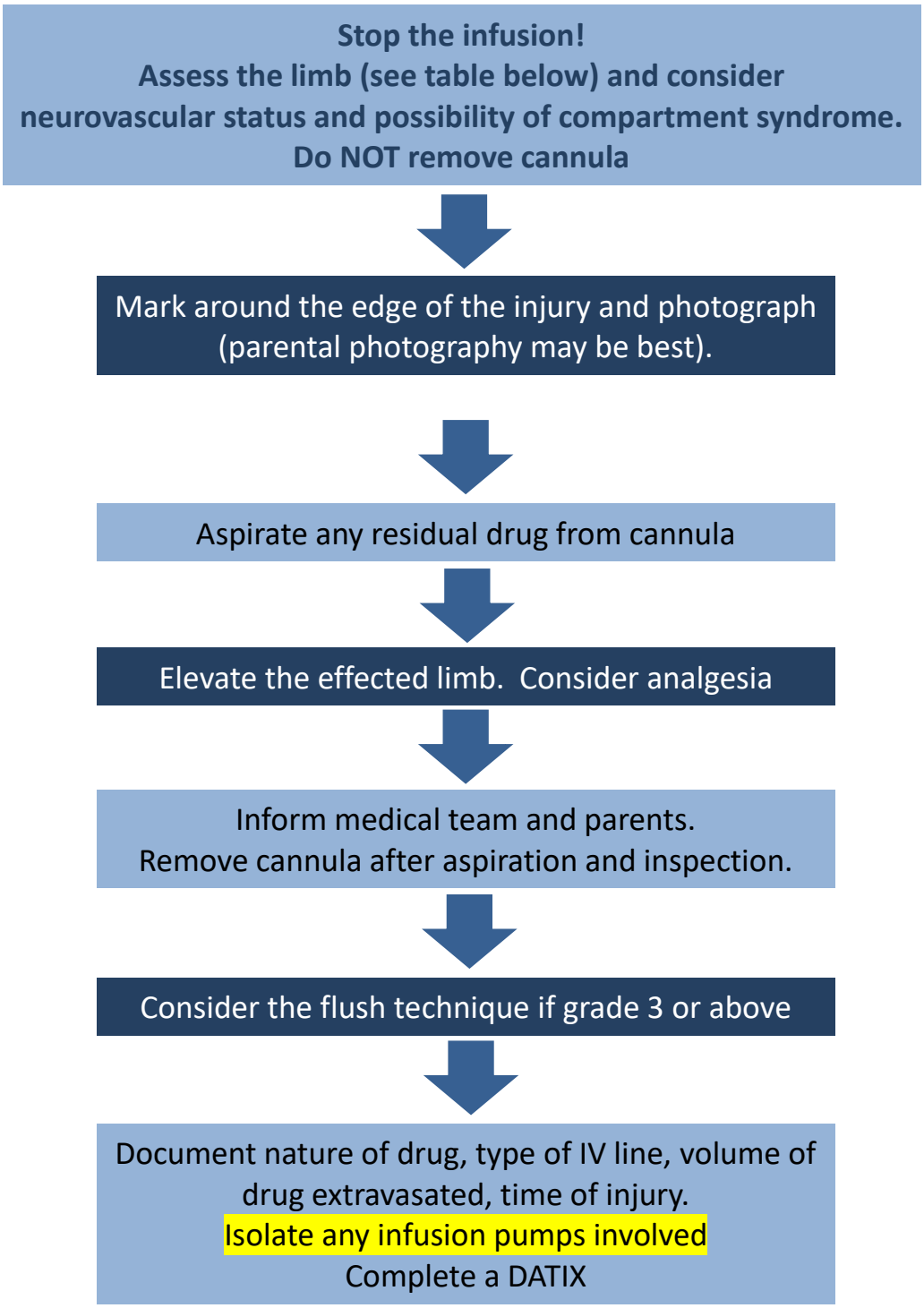
Hyaluronidase, an enzyme that breaks down hyaluronic acid, has long been used to increase the absorption of drugs into tissue and to reduce tissue damage in cases of extravasation of a drug. H. Jung. 2020

Drugs posing the most risk to extravasation are those that are hyperosmolar (290 mOsm), alkaline (pH>7.5) or acidic (pH<5). Examples of more high-risk medications in the table below (table 1.1). This list is not exhaustive and should always be further researched if injury obtained. Evelina Clinical Guidance 2022.

Table 1.1 High-risk medications

Alkali / Acidic solutions	Vascular Regulators	Hyperosmolar Solutions
Thiopentone	Adrenaline	Calcium Chloride
Phenytoin	Noradrenaline	Potassium Chloride
Methyleneblue	Dopamine	Sodium Bicarbonate
Amphotericin B	Dubutamine	TPN
Vancomycin	Vasopressin	X-ray Contrast Medium
Acyclovir		Dextrose
Gentamicin		Mannitol 15%
Cefotaxime		

Management of extravasation



<u>Do not remove the cannula until the site has been reviewed, graded and aspirated if required by the medical team.</u>

Millam Scoring System to assess the injury:

Grade 1	Grade 2	Grade 3	Grade 4
Pain at infusion site	Pain at Infusion site	Pain at infusion site	Pain at infusion site
Difficulty flushing cannula	Difficulty flushing cannula	Difficulty / Inability to flush cannula	Marked swelling
Minimal swelling	Mild swelling	Swelling	Skin blanching
Nil Redness	No skin blanching	Skin blanching +/- redness at the site	Cool blanching area
	Minimal redness	Sluggish Capillary refill time	Reduced capillary refill time
	Normal capillary refill time	Normal / decreased perfusion	Decreased perfusion
	Normal Perfusion		.+/- arterial occlusion

Acute Management of Extravastaion Injury

Grade 1	Grade 2	Grade 3	Grade 4
Stop infusion	Stop Infusion	Stop infusion	Stop infusion
Elevate Limb	Elevate Limb	Leave cannula insitu until reviewed by a doctor.	Leave cannula insitu until reviewed by a doctor.
		Photograph injury	Photograph injury
		Commence Flush technique within 1 hour of extravasation	Commence Flush technique within 1 hour of extravasation
		Give appropriate pain releif at beginning of procedure	Give appropriate pain releif at beginning of procedure
		Apply sitable non occlusive dressing	Apply sitable non occlusive dressing
		Elevate Limb	Elevate Limb
		.+/- refer to plastics team	Refer to plastics team.

N.B Any infusion pumps involved should be taken out of service, labelled and isolated, until an appropriate member of staff is able to look at them. If needed thay can be sent to EBME.

Non-Oncological Extravasation medicines consists of:

- Hyaluronidase for Injection BP 1,500iu (x1)
- 09.% Sodium Chloride ampoule (Up to 500mls may be required)
- 1% Lidocaine
- These can be found stocked in Paeds ED and on both Ash Ward and Oak Ward.

Additional Equipment consists of:

- Blue (23G) or Green (21G) needles
- 10ml or 20 ml syringes
- Chloraprep
- Aseptic Dressing Pack
- Sterile Gauze
- Adhesive dressings

An Oncology specific Extravasation kit can be found in Little Oaks – Refer to the St Lukes Cancer Alliance Guidelines for prevention and management of Chemotherapy Extravsation which can be found in the kit.

Flush Technique

1. Collect the blue (23G) or Green (21G) needles, either a 20ml or a 10ml syringe (based on patient, i.e. 10ml for neonates, 20ml for teenagers) and a dressing pack.

2. Clean the skin and prepare a sterile field.

3. Infiltrate the affected area with 1% Lidocaine – up to 3mg/kg, equivalent to 0.3ml/kg of 1% solution. Maximum of 3mg/kg per dose. To be repeated no more than every 4 hours. (BNFC, 2023-24). *Please note local anaesthetic should be calculated on age and weight of the child. Please refer to the BNFC.*

4. Dissolve 1,500 units of hyaluronidase in 1ml 0.9% Sodium Chloride. Aspirate to check position and no blood in syringe then infiltrate the subcutaneous area immediately surrounding the extravasation with the hyaluronidase saline mixture. The hyaluronidase is used to render the tissues more readily permeable to injected fluids, e.g. for introduction of fluids by subcutaneous infusion.

5. Using a blue (23G) or green (21G) needle draw up 0.9% sterile sodium chloride for injection. Use a syringe size proportional to the size of the patient i.e. 20 ml syringe for teenagers, 10 ml for neonates.

6. Inject aliquots (small amounts) of the sterile sodium chloride for injection subcutaneously through the skin to dilute and flush out the extravasated fluid from the tissues. Inject in a clockwise manner. You may need to inject at 10-20 sites within the zone of the extravasation injury. Injected fluid will collect in the subcutaneous tissues and dilute the extravasated drug. After each 10ml injection, press on the area with a dry piece of sterile gauze to express the fluid out. Ensure that all the sodium chloride is expressed out prior to injecting in a further site.

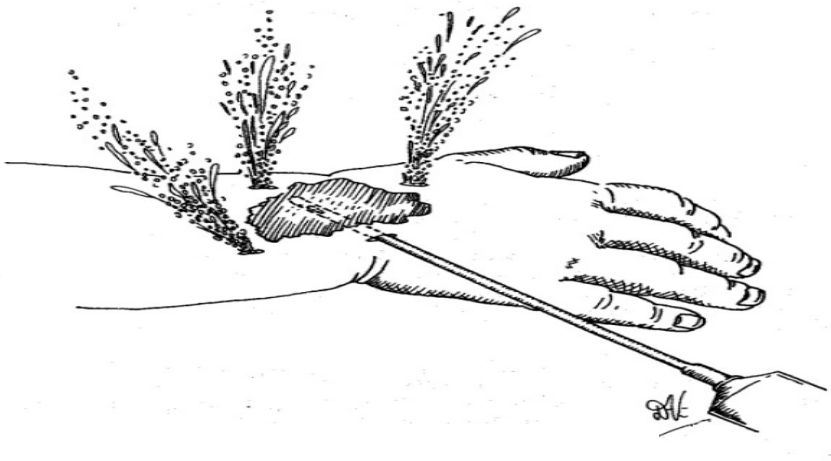
7. Repeat the process of injection and expressing the fluid out with gauze. This helps to both wash the area out and dilute the drug remaining under the skin. Up to 100mls may be needed for a neonate and 500mls for a teenager, depending on the extent of the injury. Stop when the extravasated area appears to have been flushed out and the skin improves in colour.

8. Apply an adhesive dressing and gauze to the affected area.

9. Elevate the affected limb for 24 hours. Neurovascular observations must be completed on the limbs in this time and the site reviewed regularly.

10. Refer to paediatric plastic surgical team at Queen Victoria Hospital, East Grinstead via refer a patient website or to the plastic surgical team at St Georges Hospital. Number via operator and ask for the plastics team.

11. Consider prophylactic antibiotics in immuno-compromised patients. Steroids are not indicated in these cases.



Consent

1. People aged 16 or over are entitled to consent to their own treatment.

2. Children under the age of 16 can consent to their own treatment if they're believed to have enough intelligence, competence and understanding to fully appreciate what's involved in their treatment. This is known as being Gillick competent. Otherwise, someone with parental responsibility can consent for them:

    a. The child's mother or father
    b. A legally appointed guardian
    c. A person with a residence order concerning the child
    d. A local authority designated to care for the child
    e. A local authority or person with an emergency protection order for the child

3. Parental responsibility

    a. A person with parental responsibility must have the capacity to give consent.

4. When consent can be overruled

    a. If a young person refuses treatment, which may lead to their death or a severe permanent injury, their decision can be overruled by the Court of Protection.
    b. This is the legal body that oversees the operation of the Mental Capacity Act.

Supporting References

Did you know? Extravasation, NHS Resolution (2023) Did-You-Know-Extravasation.pdf (resolution.nhs.uk)

Children and young people – Consent to treatment, Consent to treatment - Children and young people - NHS (www.nhs.uk) Accessed 26th April 2024

Ching, Wong & Milroy (2014) Paediatric Extravasation injuries: A review of 69 consecutive cases *International Journal of Surgery 12 (2014) 1036-1037*

Infiltration and Extravasation: A toolkit to improve practice. National Infusion and Vascular Access Society (NIVAS). February 2024

What to know about Extravasation, Healthline Media UK Ltd, Lauren Martin September 2023

Paediatric peripheral extravasation treatment guideline (2019) *Clinical guidance* Evelina Children's Hospital

BNFC, 2023-2024, Page 956

Hyaluronidase: An overview of its properties, applications, and side effects, H. Jung Arch Plast Surg. 2020 Jul;47(4):297-300. doi: 10.5999/aps.2020.00752. Accessed April 2024

Extravasation injury management (2020) The Royal Children's hospital Melbourne

Soft-tissue disorders, (2024) NICE, Soft-tissue disorders | Treatment summaries | BNF | NICE accessed 1st Feb 2024

Little M, Dupré S, Wormald JCR, et al (2020) Surgical intervention for paediatric infusion-related extravasation injury: a systematic review. BMJ Open 2020;10:e034950. doi:10.1136

Supporting relevant trust guidelines

Microsoft Word - Extravasation Injuries Management in Neonates Jul 2023 (asph.nhs.uk) – Neonatal ASPH Trust Guidelines

Guideline Governance

a. Scope

This guideline is relevant to all staff caring for all children from 0-18 years old across the emergency department, inpatient ward and outpatient department.

b. Purpose

i. This guidelines aims to facilitate a common approach to the management of children form 0-18 years. At times deviation from the guideline may be necessary, this should be documented and is the responsibility of the attending consultant.

ii. This guideline is subject to regular review to ensure ongoing evidence based practice.

c. Duties and Responsibilities

All healthcare professionals responsible for the care of all children 0-18 years should be aware of practice according to this guideline.

d. Approval and Ratification

This guideline will be approved and ratified by the Paediatric Guidelines Group.

e. Dissemination and Implementation

a. This guideline will be uploaded to the trust intranet 'Paediatric Guidelines' page and thus available for common use.
b. This guideline will be shared as part of ongoing education within the Paediatric Department for both medical and nursing staff.
c. All members of staff are invited to attend and give comments on the guideline as part of the ratification process.

f. Review and Revision Arrangements

a. This policy will be reviewed on a 3 yearly basis by the appropriate persons.
b. If new information comes to light prior to the review date, an earlier review will be prompted.
c. Amendments to the document shall be clearly marked on the document control sheet and the updated version uploaded to the intranet. Minor amendments will be ratified through the Paediatric Guidelines Group. A minor amendment would consist of no major change in process, and includes but is not limited to, amendments to documents within the appendices.

Equality Impact Assessment

Background • Who was involved in the Equality Impact Assessment
Author and the supervising consultants.
Methodology • A brief account of how the likely effects of the policy was assessed (to include race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age) • The data sources and any other information used • The consultation that was carried out (who, why and how?)
All groups of staff and patients were taken into consideration and there is no bias towards or against any particular group.
Key Findings • Describe the results of the assessment • Identify if there is adverse or a potentially adverse impacts for any equalities groups
There is no evidence of discrimination.
Conclusion • Provide a summary of the overall conclusions
There is no evidence of discrimination.
Recommendations • State recommended changes to the proposed policy as a result of the impact assessment • Where it has not been possible to amend the policy, provide the detail of any actions that have been identified • Describe the plans for reviewing the assessment
This guideline is appropriate for use.

Document Checklist

To be completed (electronically) and attached to any document which guides practice when submitted to the appropriate committee for approval or ratification.

Title of the document: Extravasation management in Paediatrics

Policy (document) Author: Dr Rebecca Bailey

Executive Director: N/A

		Yes/No/ Unsure/NA	Comments
1.	**Title**		
	Is the title clear and unambiguous?	**Y**	
	Is it clear whether the document is a guideline, policy, protocol or standard?	**Y**	
2.	**Scope/Purpose**		
	Is the target population clear and unambiguous?	**Y**	
	Is the purpose of the document clear?	**Y**	
	Are the intended outcomes described?	**Y**	
	Are the statements clear and unambiguous?	**Y**	
3.	**Development Process**		
	Is there evidence of engagement with stakeholders and users?	**N/A**	
	Who was engaged in a review of the document (list committees/ individuals)?		**Paediatric Guideline Committee**
	Has the policy template been followed (i.e. is the format correct)?	**Y**	
4.	**Evidence Base**		
	Is the type of evidence to support the document identified explicitly?	**Y**	
	Are local/organisational supporting documents referenced?	**Y**	
5.	**Approval**		
	Does the document identify which committee/group will approve/ratify it?	**Y**	

		Yes/No/ Unsure/NA	Comments
	If appropriate, have the joint human resources/staff side committee (or equivalent) approved the document?	**N/A**	
6.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	**Y**	
	Does the plan include the necessary training/support to ensure compliance?	**Y**	
7.	**Process for Monitoring Compliance**		
	Are there measurable standards or KPIs to support monitoring compliance of the document?	**N**	
8.	**Review Date**		
	Is the review date identified and is this acceptable?	**Y**	
9.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for coordinating the dissemination, implementation and review of the documentation?	**Y**	
10.	**Equality Impact Assessment (EIA)**		
	Has a suitable EIA been completed?	Y	

Committee Approval (Paediatric Guidelines Group)			
If the committee is happy to approve this document, please complete the section below, date it and return it to the Policy (document) Owner			
Name of Chair	**Dr Alexandra Jones**	**Date**	**29/4/2026**
Ratification by Management Executive (if appropriate)			
If the Management Executive is happy to ratify this document, please complete the date of ratification below and advise the Policy (document) Owner			
Date: n/a			