

**Title CSOP Vascular Access & Fluid Administration**

Version No: 2.4

Effective date 19/10/2020

**APPROVALS**

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**HISTORY**

<b>Effective Date</b>	<b>Version No.</b>	<b>Summary of Amendment</b>
27 <sup>th</sup> Nov 2012	2.0	Modified trauma fluid resuscitation
23 <sup>rd</sup> Oct 2014	2.1	Remove need for 2 attempts at IV access prior to IO
Dec 2016	2.2	IO access for trauma in children – consideration as first line
Nov 2017	2.3	Provision of blood to scene procedure
June 2020	2.4	Reviewed

**REFERENCES**

<b>Document Reference Number</b>	<b>Document Title</b>
1	Early fluid resuscitation in severe trauma. BMJ 2012; 345
2	NICE Major Trauma- Assessment and Initial Management (2016)



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### Annexes/Appendices

Annex/Appendix	Title
1	UHCW Trust Blood to Scene Information for Clinical Areas

#### 1. Purpose

This SOP provides guidance on the approved methods of vascular access and the use of intravenous fluids for resuscitation in different patient groups

#### 2. Definitions/Acronyms:

Abbreviations/Acronyms	Definitions
SOP	Standard Operating Procedure
IV	Intravenous
CSOP	Clinical Standard Operating Procedure
ACF	Antecubital Fossa
IO	Intraosseous
MRI	Magnetic Resonance Imaging
BP	Blood pressure

#### 3. Scope

Early Vascular access should be gained in all trauma patients. For patients with hypovolaemic shock there is now clear evidence that a haemostatic resuscitation approach combining haemorrhage control, tranexamic acid and volume correction with blood and blood products produces survival benefits <sup>1</sup>.

Intravenous (IV) fluids should be used *as a last resort* in trauma patients with hypotension. IV fluids will cause acidosis, and risk increasing bleeding as blood pressure is restored.

Permissive hypotension therefore is now the standard of care for patients with uncontrolled bleeding and no head injury <sup>2</sup>. The period of permissive hypotension must be kept as short as possible thus the patient needs to be rapidly transported to a Major Trauma Centre for surgical intervention. There is no consensus on what fluid resuscitation regime to use if a closed head injury is also present with uncontrolled bleeding, and therefore clinical judgement will be required to



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assess the likely underlying pathology. If it is thought that haemorrhagic shock is the dominant condition, restrictive volume resuscitation should be continued. If it is thought that traumatic brain injury is the main condition, use a less restrictive volume resuscitation approach to maintain cerebral perfusion.

Prior to fluid resuscitation all efforts should have been made to minimise blood loss and clot disruption. This includes:

- External haemorrhage control with direct pressure, tourniquets or haemostatic agents – see CSOP 22
- Splintage and traction of limb fractures e.g. manual traction of femur and application of Kendrick traction device
- Application of pelvic splint for mechanism of injury and any shocked patient – see CSOP 18
- Administration of initial dose of Tranexamic acid
- Careful handling and avoidance of excessive movement e. g log-rolling

In the severely injured trauma patient with signs of shock ensure alternative causes of shock have been excluded e. g. tension pneumothorax.

**VASCULAR ACCESS**

**Venous cannulation**

Gold standard access is at least one, ideally two 14G/16G cannula in the ante-cubital fossa, though in shut down patients smaller access such as an 18G or 20G may be all that is initially possible.

Where possible, use an uninjured arm, which is not associated with an ipsilateral chest injury. For patients travelling by air ambulance the left arm should be preferentially selected. An extension line connected to the cannula in the right ACF may be useful if this is not possible.

Ensure the cannula and fluid line is adequately secured and will not become dislodged during transport.

**Intraosseous access**

If adequate intravenous access cannot be established the EZ-IO should be used to site IO access:

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1. In proximal humerus
2. Proximal tibia if humerus not suitable
3. It is acceptable to use more than one IO if necessary

Where there is a potential pelvic fracture ensure there is intravenous/ IO access above the diaphragm. For patients with a suspected pelvic fracture ensure the humeral head site is used.

For circulatory access in children with major trauma, consider intra-osseous access as first-line access if peripheral access is anticipated to be difficult <sup>2</sup>. Analgesia or sedation with intranasal agents may be required to facilitate this if the child is not obtunded.

Alternatives to IO access include external jugular cannulas.

Contra-indications to IO access at a proposed site include:

- Inability to locate landmarks
- Fractures within that long bone
- Previous orthopaedic procedures near insertion sites
- Infection at the area of insertion

EZ-IO needle are all 15G and come in three sizes:

Color of needle	Length of needle	Size of patient
Pink	15mm	3-39kg
Blue	25mm	40kg+ with little overlying tissue
Yellow	45mm	40kg+ with excessive tissue e.g. muscle, fat, oedema

Insertion should follow manufacturers training. All doctors and paramedics must be signed off in IO insertion before using the equipment.

Note that IO needles must be removed within 24 hours of insertion and are not MRI compatible: this must be handed over to hospital staff.



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Lignocaine can be used in conscious patients after I/O insertion in accordance with the manufacturers instructions to reduce pain during IO use.

### FLUIDS

#### Indications

##### Trauma

- Peri-arrest hypovolaemic shock
- Neurogenic shock following spinal cord injury

##### Medical

- Shock due to: sepsis, anaphylaxis, poisoning etc
- Diabetic Ketoacidosis in adults
- Severe dehydration

#### Type of fluid

0.9% 'normal' Saline is the crystalloid fluid currently carried by the air ambulance.

#### Doses

All fluids should be given as 250mls boluses titrated to response with the following targets:

Patient group	Target
Adult medical	'Normal' BP
Paediatric medical (pre-puberty)	20ml/kg except cardiac failure, renal failure and diabetic ketoacidosis where 10ml/kg should be administered
Adult isolated head injury	SBP 110mmHg or MAP 80mmHg
Adult polytrauma	Use clinical judgement No definitive target suggested Consider age, co-morbidities, distance/length of time to MTC
Paediatric trauma (pre-pubertal)	10ml/kg if any signs of shock
Diving Emergency	1L fluid stat.



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**Important points**

The decision on when to give IV fluids is multifactorial. NICE states that in the pre-hospital setting, IV fluids should only be given if there is a loss of a radial pulse (2). However in practice, consideration should be given to other factors, including the likely source of bleeding, age of the patient and any comorbidities. Clinical decision making should be based around distance/length of time to an MTC for delivery of blood products, and on clinical features to suggest the patient is exsanguinating ie conscious level, capillary refill time, etCO2 level, capillary refill time. Administration of fluids should be through a fluid warmer wherever possible to mitigate against the risk of hypothermia worsening bleeding.

Permissive hypotension has not been proven to benefit children, or pregnant women, in these patient groups blood pressure is maintained until late in the haemorrhagic process and thus hypotension may be a pre-terminal sign.

Remember to activate the Massive Transfusion Protocol or Code Red Protocol where appropriate at the receiving hospital at the earliest opportunity.

If, due to prolonged extrication, blood is required on scene this can be requested through the regional trauma desk when operating in the West Midlands region. Procedures are in place with the West Midlands MTCs which will enable blood to be provided to scene once the request has been made. The procedure used in UHCW is shown as an example in Appendix 1. Within the East Midlands region, no such procedures are in place and liaison with the individual hospitals will be required.

Do not 'keep the drip open' with slow-running fluid as large volumes may inadvertently be administered.

**End of Document**