



## University Hospitals Coventry & Warwickshire NHS Trust

Clinical Guideline (full)

### EMERGENCY MANAGEMENT OF EXTREMITY VASCULAR TRAUMA GUIDELINE

E-Library Reference	CG 2184
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Version:	V1.0
Approving forum (QIPS or equivalent):	Vascular
Specialty Clinical Guideline Lead:	Matthew Wyse
Contributing Author(s) and reviewer(s):	David Wallace. Professor Chris Imray
Department(s) / Primary Speciality:	Vascular Surgery Plastic Surgery T&O Surgery

Approval Date:	September 2019
Expiry Date:	November 2022
Target Audience:	All trauma clinicians Theatre staff

Superseded UHCW Clinical Guideline(s): (if applicable)	
UHCW Associated Records:	
Keywords:	Major Trauma, Vascular Trauma, Emergency Vascular Management, CG

Clinical Operating Procedures relating to this guidance (please list)	COP for Emergency Department Tourniquet.
Summary version available	<input type="checkbox"/>

## **Guideline clinical content**

Clinical Guidelines assist in decision-making; they do not replace clinical judgement. Regardless of the strength of evidence, it remains the responsibility of the clinician to interpret the application of the clinical guidance to local circumstances and the needs and wishes of the individual patient. Where variations of any kind do occur, it is important to document the variations and the reason for them in the patient's health record. If in doubt, seek senior advice.

## **Introduction**

Traumatic vascular injuries are uncommon but present management dilemmas and if poor outcome achieved lead to significant patient morbidity including permanent disability, amputation and complex regional pain syndromes.

## **Summary**

Traumatic vascular injuries present as one of the following sub sets:

- Mangled extremity, where the vascular injury is associated with soft tissue loss and bone injury
- Penetrating trauma with or without haemorrhage
- Blunt trauma with vascular compromise distal to the injury

In all the above scenarios there is a threat to the patient's life from blood loss and/ or infection and the systemic complications of severe limb ischaemia and threat to the limb from ischaemia and local infection.

The decisions about how to manage such patients are complex and require a team approach. As a minimum two Consultant Surgeons should be involved in the decision making. Depending on exact presentation the surgeons involved will come from Vascular Surgery, Trauma & Orthopaedics, Plastic Surgery and General Surgery.

In all cases where an acute amputation is being considered as part of the management plan a second consultant from a relevant speciality should be present in theatre.

Photographs of the injured limb must be obtained in situ.

## **Definitions**

None

## **Guideline details**

## Emergency Department (ED) Management.

Patients with vascular trauma will usually present to the ED directly or be referred from networked hospitals. The Trauma Team Leader (TTL) should ensure that the patient is resuscitated using the standard clinical procedures but in addition as soon as a vascular compromise is identified notify the correct surgical specialities. In the case of Vascular Surgery, the referral should go to the vascular registrar on call but if there is any delay in the vascular registrar responding the referral should go directly to the Consultant Vascular Surgeon on call (4). Plastic Surgery and Orthopaedics should also be notified and asked to attend ED as it is likely that both specialities will be involved in providing ongoing care. If a pre-hospital tourniquet has been placed follow the COP for Emergency Department Tourniquet.

## Imaging

Patients presenting with isolated vascular trauma may not require imaging, particularly if the injury is a penetrating wound with active bleeding. The majority of cases will be imaged either with a major trauma CT scan (Bastion protocol) or a focussed CT angiogram of the affected part (1). If a Major Trauma CT scan is being performed please request that the limb is included within the scan. CT angiogram (CTA) of the limb is very useful to the surgeons when planning reconstructive surgery in particular when considering if arterial anastomoses can be performed.

## Mangled Limbs

A mangled limb is a complex injury where the balance between limb salvage and making an early decision for amputation is difficult. It is mandatory that all decisions for amputations are made with two consultants present, ideally from two specialities.

- Clinical photographs must be obtained of the limb prior to amputation/ reconstruction. Use SCIT app or Theatres digital camera (held at floor control desk)
- If amputation is required, damage control principles must be applied. Perform primary debridement, haemorrhage control and distal amputation, and then use VAC dressing.
- If reconstruction is being considered ensure plastic surgeon (Consultant or microvascular fellow) present to advise on surgery.
- Use vascular shunting as temporising measure whilst orthopaedic stabilisation is being performed.
- If patient is unstable as defined by abnormal serum lactate or ongoing blood transfusion requirements perform primary debridement and temporary skeletal stabilisation only and delay formal reconstruction until stable.

## Penetrating Trauma

Penetrating trauma with evidence of vascular injury must be explored and vessel repair or grafting performed. The decision whether to proceed with surgery prior to CTA will be a clinical one depending on the degree of bleeding and other injuries.

## Blunt Trauma

A pulseless limb following blunt trauma is a surgical emergency. Presence of a Doppler signal or capillary refill should not be used to exclude a vascular injury (2). As soon as identified ask the Vascular Surgery Consultant on call and, if fractures or dislocation is also present, the T&O Consultant to attend the patient.

On presentation the Trauma Team should aim to restore anatomical alignment as soon as possible. If the pulse does not return or is weak the limb should be imaged with a CTA or the patient taken to theatre for exploration.

Once imaged the surgical team will make a decision over the best course of action to re-vascularise the limb.

Usually open exploration with repair of the vessel is required, possibly with temporary shunting of the vessel(2).

The limb should be re-perfused within four hours of the injury occurring (3).

Fasciotomy of the distal compartments must be considered (4).

There is limited evidence of the benefit of endovascular management of distal vascular injuries however cases should be discussed with the Interventional Radiology Consultant on a case by case basis.

## Vascular Shunting

Shunting is an established technique to restore arterial flow to a distal portion of a limb or to the lower body in the case of torso trauma.

Shunts are available in Theatres 20, 7 and 8. (In theatre 20 all the shunt devices are kept in the tall Gratnell trolley)

For very large vessels the surgeon should use a sterile tube of suitable diameter e.g. a tracheal tube

Other devices available are:

Pruitt carotid shunts

Javid carotid shunts

Medtronic intracoronary shunts (1.5, 2.0 and 2.5mm diameter)

End of clinical content
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<b>Guideline Governance</b>
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**Implementation**

(If the guideline relates to a service, pathway or external agency, provide details and reference any associated clinical operating procedure (COP) or corporate business record (CBR) )

**Training**

Disseminate guidance via Vascular, Plastics, T&O and ED QIPS.

Include in induction information for surgical specialities.

**Patient Information**

Nil relevant

**Audit & Monitoring**

(Detail how the implementation and effectiveness of the clinical guideline will be monitored)

Aspect being monitored	Monitoring method	Responsible department(s)	Frequency	Group / committee receiving report & responsible for actions

End of Governance content

**Guideline References****CEBIS Evidence Summary**

(, NICE Guidelines, and other National Guidance. Other national guidance may include those issued by speciality college, patient safety agency, monitoring agencies, or other external governing bodies )

References cited in guideline	Grade*
1. Eastern Association for the Surgery of Trauma. Penetrating Lower Extremity arterial trauma. Evaluation and Management of. 2012	5
2. Fractures (Complex) Assessment and management NG37	5
3. Vascular Injuries. BAO / BAPRAS Joint guidance	5
4. British Orthopaedic Association Standards for Trauma Management of arterial injuries associated with fractures and dislocations (BOAST 6).	5

**\*Grade:- The references are graded through the CEBIS process according to the criteria outlined below.**

<b>Grade of evidence</b>	<b>Based on</b>
<b>1</b>	Systematic review or meta-analysis
<b>2</b>	Randomised controlled trial/s
<b>3</b>	Controlled study without randomisation (e.g. case controlled) or quasi-experimental study, such as a cohort study
<b>4</b>	Descriptive studies such as case series and reports.
<b>5</b>	Expert opinion, narrative review

**Add any Appendices below**

(Please use a "Page Break" before each appendix, and list each clearly in the section on the title page. Appendices may include a summary, a flowchart, a proforma, or other materials, but its purpose must be clearly identified)