Standard Operating Procedure

Peninsula Trauma Network

Vascular Injuries

Issue Date	Review Date	Version
September 2019	September 2020	V3.2

Purpose

The purpose of this document is to provide advice to clinical teams within the Peninsula Trauma Network (PTN) for the provision of care of patients with traumatic vascular injuries.

It is also the purpose of the SOP to drive forwards the improvement of major trauma care across the Southwest Peninsula.

Who should read this document?

This SOP should be read by the following members of the Peninsula Trauma Network Major Trauma clinical teams:

- All Major Trauma Clinical Leads
- All Trauma Team Leaders
- All Emergency Medicine Doctors
- All Trauma Nurse Co-ordinators
- Anaesthetists, ITU Doctors, General Surgeons
- All rehabilitation specialists working with patients experiencing vascular injury

Key Messages

This SOP demonstrates the vascular services available across the Southwest Peninsula and explains the processes that should be used for patients that have sustained a traumatic vascular injury either isolated or as part of a polytrauma.
It also provides clear guidance on what to do in the event of a paediatric traumatic vascular injury.

Core accountabilities

Owner	Lt Col ER Faulconer
Review	12 months after initial launch and then every 3 years.
Ratification	Peninsula Trauma Network Advisory Group
Dissemination (Raising Awareness)	Major Trauma Clinical Leads All Trauma Team Leaders All Emergency Medicine Doctors Anaesthetists, ITU Doctors, and General Surgeons, Rehabilitation specialists
Compliance	All clinicians involved in Major Trauma at the Peninsula Trauma Centre and the following Trauma Units: • Northern Devon District Hospital • Royal Cornwall Hospital • Royal Devon and Exeter Hospital • Torbay Hospital

Links to other policies and procedures

- Automatic Acceptance & Secondary Transfer Policy
- Blunt Abdominal Trauma Policy
- Interventional Radiology SOP

Version History

V1	Dr Mark Jadav	Peninsula Trauma Network Clinical Director
V2	Lt Col ER Faulconer	Consultant Vascular Surgeon
V3.1	Lt Col ER Faulconer	Consultant Vascular Surgeon

V3.2	Lt Col ER Faulconer	Consultant Vascular Surgeon

The Network is committed to creating a fully inclusive and accessible service. Making equality and diversity an integral part of the business will enable us to enhance the services we deliver and better meet the needs of patients and staff. We will treat people with dignity and respect, promote equality and diversity and eliminate all forms of discrimination, regardless of (but not limited to) age, disability, gender reassignment, race, religion or belief, sex, sexual orientation, marriage/civil partnership and pregnancy/maternity.

An electronic version of this document is available on the PTN Website

http://www.peninsulatraumanetwork.nhs.uk/network-policies

Larger text, Braille and Audio versions can be made available upon request.

Contents

1 Introduction

This SOP replaces all previous policies and is the overarching SOP for Vascular Surgery within the Peninsula Trauma Network. It outlines the underlying vascular surgical principles which should be used in the management of trauma patients within the PTN

2 Purpose

The purpose of this document is to provide an overarching SOP for reference by Surgical teams, Anaesthetic teams, Emergency Medicine, Interventional Radiology, Blood Transfusion and rehabilitation specialists, all of which may touch on the care of Vascular injuries

3 Definitions

MTC: Major Trauma Centre.

TU: Trauma Unit

ATLS: Advanced Trauma Life Support

DCS: Damage Control Surgery

NCTH: Non Compressible Truncal Haemorrhage

4 Duties

It is incumbent upon all staff involved in delivering care to major trauma patients within the PTN that they have an understanding of this SOP. Local Vascular Surgery Departments can use this SOP to develop guidance, but this document provides the overarching approach to caring for patients with vascular injuries within this network.

5 Vascular SOP

5.1 Over-arching Principles

Patients should be assessed and managed in line with ATLS principles but understanding that catastrophic haemorrhage needs addressing immediately.

Not all vascular injuries will require transfer to the MTC.

The Peninsula Major Trauma Network has 24 hour Vascular On-call at the MTC and 2 of the TUs.

Patients requiring intervention for a vascular injury should be managed in a location with access to a vascular surgeon.

If soft signs of vascular injury are present or there is a high degree of suspicion then imaging of the vascular tree is required to exclude an injury.

All patients should be assessed for any rehabilitation needs.

5.2 Background

In the UK[1], vascular trauma remains a low percentage of the injuries seen secondary to trauma. Despite this low incidence, associated mortality and morbidity are high as untreated injuries can either bleed, leading to exsanguination, or occlude, causing distal

ischaemia. Haemorrhagic injuries can be subdivided by anatomical location and then classed as to whether they are compressible or non-compressible. Haemorrhage remains the second highest cause of death in trauma and non-compressible truncal haemorrhage (NCTH) accounts for the highest number of preventable deaths in this group.[2] Vascular injuries will often present in the context of haemorrhagic shock and resuscitation should be performed in conjunction to arresting the haemorrhage.

Vascular injuries sustained within the footprint of The Peninsula Trauma Network could present to any of the hospitals within the network due to transfer timelines and potential need for blood or stabilisation and closer to a TU than the MTC. It is therefore important to understand the capabilities of the different units for dealing with different vascular injury patterns. Depending on the location and immediacy of the injury, patients may require vascular surgery, interventional radiology, ENT surgery or cardiothoracic surgery or DCS by a general surgeon. Some vascular injuries present late or are incidental findings on imaging.

5.3 Situation

The current availability of vascular, ENT and cardiothoracic services are as follows:

- MTC (Derriford): 24 hour Vascular Surgery, Interventional Radiology, ENT, Cardiothoracic Surgery, Damage Control Surgery (General Surgeon)
- TU (Exeter): 24 hour Vascular Surgery, Interventional Radiology, Damage Control Surgery
- TU (Truro): 24 hour Vascular Surgery, Interventional Radiology, Damage Control Surgery
- TU (Barnstaple): 24 hour Damage Control Surgery
- TU (Torbay): 24 hour Damage Control Surgery

5.4 Management of Injuries and MTC Referral

Isolated Vascular Injury

Isolated vascular injuries should be managed at the MTC or a TU with a vascular capability. This excludes thoracic vascular injuries which should be managed by the cardiothoracic team at the MTC. Isolated abdominal or extremity injuries presenting to TU's without vascular surgery will be part of a vascular 'hub and spoke' network as well as part of the TU/MTC PTN. Peripheral injuries that do not require surgical intervention may not need transfer after discussion with a specialist service. Patients should be stabilised and transferred to one of these hubs. This may require emergency surgery to ligate or shunt the bleeding vessel if direct pressure or proximal control is not sufficient to arrest the haemorrhage.

Vascular Injury Within Polytrauma

Vascular injuries sustained as part of a polytrauma will normally be transferred to the MTC as per the 'PTN Automatic Transfer Policy'.

At the receiving hospital, patients should be assessed, resuscitated and imaged in line with local guidelines/SOPs. Damage control surgery may be required to arrest bleeding before imaging. Patients may require activation of the massive transfusion protocol and DCS may be required for proximal control prior to allow resuscitation prior to focusing on the injured vessel.

Hard signs of vascular injury such as active haemorrhage, distal ischaemia or expanding haematoma require emergency surgery. The role of DCS vs definitive surgery will depend on the facilities available and the skill set of the operating surgeon. It may be necessary to temporarily ligate and shunt, before transfer for definitive surgery.

Soft signs of vascular injuries such as injuries in proximity to a major artery, a history of major blood loss or absent/reduced distal pulses should be imaged to exclude injuries such as pseudoaneurysms and dissection flaps that may require intervention. In trauma patients with vascular injuries and a history of vascular disease (atherosclerotic, connective tissue or embolic) CT angiography should be performed to show the distribution of disease in relation to the injury.

5.5 Rehabilitation

Many patients with vascular injury will have rehabilitation requirements. Patients should have a rehabilitation assessment within 48 hours of admission by an appropriate rehabilitation clinician. In the acute phase rehabilitation clinicians required may include consultants in rehabilitation medicine, dieticians, physiotherapists, occupational therapists, hand therapists, orthotics/prosthetics services, and clinical psychology.

Pain should be adequately managed to enable early rehabilitation as appropriate. This includes management of neuropathic and nocioceptive pain.

If injuries might lead to amputation the PTC Traumatic Amputation Guideline should be followed, including a pre-amputation consultation with the local Prosthetic and Amputee Rehabilitation Service. Ideally this would include review by a Rehabilitation Medicine Consultant.

On discharge, patients with ongoing rehabilitation needs should have a rehabilitation prescription that has been completed in conjunction with them. Copies should be forwarded to their GP and any ongoing rehabilitation provider.

A range of inpatient, outpatient and community based services in the above specialities may still be required on discharge from the acute setting.

5.6 Paediatric Vascular Injuries

All paediatric Vascular Major Trauma injuries should be discussed with the Paediatric Trauma Team Leader at Bristol Children's Hospital as per the South West Paediatric Major Trauma Network Acceptance, Transfer & Repatriation Policy.

Children with traumatic vascular injuries need an early coordinated approach between the paediatric team, plastic surgery, counselling service, primary care, occupational therapy and differing community services including social services and school service.

Bristol Royal Hospital for Children, Paediatric Trauma Team Leader

0300 0300 789 (select option 2 for Paediatric TTL)

PTN Paediatric Policies

(http://www.peninsulatraumanetwork.nhs.uk/network-policies)

5.7 Summary

Vascular injuries should be treated in TUs with a vascular capability or at the MTC. Polytrauma patients should be transferred to the MTC in line with other policies/guidelines. Both open and endovascular options exist for the management of vascular injuries but they are often suited to different cohorts/patterns of injury rather than one being better than the other. Vascular injuries may require DCS with MTP due to catastrophic haemorrhage.
Patients with vascular injuries must have a rehabilitation assessment and may require ongoing intervention. All patients with ongoing rehabilitation needs should have a rehabilitation prescription.

6 Overall Responsibility for the Document

The Peninsula Trauma Network Advisory Group is responsible for developing, implementing and reviewing this SOP.

7 Consultation and Ratification

The review period for this document is set as a default of one year from the date it was created and then every 3 years after it is last ratified, or earlier if developments within or external to the Peninsula Trauma Network (PTN) indicate the need for a significant revision to the procedures described.
This document will be reviewed by the PTN Advisory Group and ratified by the PTN Clinical Director and Clinical Governance Lead or Executive Board as deemed appropriate. Non-significant amendments to this document may be made, under delegated authority from the PTN Clinical Director, by the nominated owner. These must be ratified by the PTN Clinical Director.

Significant reviews and revisions to this document will include a consultation with named groups, or grades across the Peninsula Trauma Network. For non-significant amendments, informal consultation will be restricted to named groups or grades who are directly affected by the proposed changes.

8 Dissemination and Implementation

Following approval and ratification, this SOP will be published on the PTN website (public facing or secure as deemed appropriate) and all staff will be notified through the PTN normal notification process, currently via email to Trauma Clinical Leads and the Network Advisory Group.

Document control arrangements will be noted and kept current on the PTN SOP list maintained by the PTN management team.

The document owner will be responsible for agreeing the training requirements associated with the newly ratified document with the named PTN Clinical Director to arrange for the required training to be delivered.

9 Monitoring Compliance and Effectiveness

Monitoring and compliance will be reviewed via the PTN Governance form submissions and discussion at the monthly PTN Governance teleconference.

This is a requirement of the NHSE Major Trauma Quality Indicators and compliance will be reviewed via the annual Network Peer Review process and/or National Quality Surveillance Team (QST) peer review for MTCs. If concerns are raised, these will be notified to the relevant Chief Executive and Trauma Leads who will be required to provide timely action plans to resolve the concerns. These concerns will be reviewed by the PTN Management Team and fed back to relevant parties. Concerns raised by the National QST peer review for MTCs will be fed back through the appropriate channels.

This is a National Major Trauma Network standard and will be monitored via the annual Network Peer Review process directly to relevant Trauma Leads.

10 References and Associated Documentation

1. Perkins ZB, De'Ath HD, Aylwin C, Brohi K, Walsh M, Tai NRM. Epidemiology and Outcome of Vascular Trauma at a British Major Trauma Centre. European Journal of Vascular and Endovascular Surgery. 2012; 44 (2): 203-209

2 Faulconer ER, Branco B & Loja M, Grayson K et al. Use of open and endovascular surgical techniques to manage vascular injuries in the trauma setting: A review of the American Association for the Surgery of Trauma PROspective Observational Vascular Injury Trial registry. J Trauma Acute Care Surg 2018 84(3): 411-417

3 Peninsula Trauma Network. Automatic Acceptance and Secondary Transfer Policy V12.1. April 2017. Accessed online 24 September 2018. http://www.peninsulatraumanetwork.nhs.uk/download.cfm?doc=docm93jijm4n1300.pdf&ver=1553

4 A Report of the Working Party of the British Society of Rehabilitation Medicine. Amputee and Prosthetic Rehabilitation – Standards and Guidelines (3rd Edition, 2018) Accessed online 17 June 2019 https://www.bsrm.org.uk/downloads/prosthetic-amputeerehabilitation-standards-guidelines-3rdedition-webversion.pdf