

## Management of extremity bleeding and use of tourniquet SOP



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# WTN Management of extremity bleeding and the use of Tourniquets SOP

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## Document Status

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## Executive Summary

This procedure defines the principles of the Wessex Major Trauma Network towards management of extremity bleeding and the use of Tourniquets..

### 1. Scope and Purpose

This SOP applies to all pre-hospital providers and hospitals within the Wessex Major Trauma Network.

It is to support the safe management of extremity bleeding and advise on the use of and management of tourniquets when used to stem bleeding.

### 2. Definitions

#### 2.1. CAT (Combat Application Tourniquet)

A basic tourniquet that uses a windlass system to completely occlude arterial and venous blood flow of an extremity in the event of a traumatic wound with significant haemorrhage.

#### 2.2. Major Trauma Centre (MTC):

Manages all types of trauma but specifically have the lead for managing major trauma patients, providing consultant-level care and access to tertiary and specialised level services. Within the Trauma Network the MTC:

- Is optimised for the definitive care of injured patients. In particular it has an active, effective trauma programme. It also provides a managed transition to rehabilitation and the community.

#### 2.3. Pneumatic Tourniquet

Uses compressed gas to inflate a bladder or cuff to occlude or restrict blood flow. A regulating device on the tourniquet machine can control the amount of cuff pressure exerted on the limb. The pressure, determined by the clinician, is delivered by an electrically driven pump or by a central compressed air supply.

#### 2.4. Pre hospital Services

The WTN works with 3 ambulance trusts and multiple Air Ambulance organisations, in particular;  
South Central Ambulance Service (SCAS)  
South West Ambulance Service (SWASfT)  
South East Coast Ambulance Service (SECAMB)  
Hampshire and Isle of Wight Air Ambulance (HIOWAA)  
Dorset and Somerset Air Ambulance (DSAA)

#### 2.5. Standard Operating Procedure (SOP):

A SOP is a set of instructions to be followed in carrying out a given operation, or in a given situation, which lend themselves to a definite or standardized procedure without loss of effectiveness.

#### 2.6. Trauma Unit (TU)

A Trauma Unit is to accept and manage, at any time, arrival of patients from the following two groups:

- Those considered having injuries not requiring expertise of MTC
- Those critically injured for whom direct transfer to MTC could adversely affect outcome (with subsequent plans to transfer).

## 2.7. Wessex Trauma Network (WTN)

Wessex Trauma Network is an Operational Delivery Network (ODN) encompassing

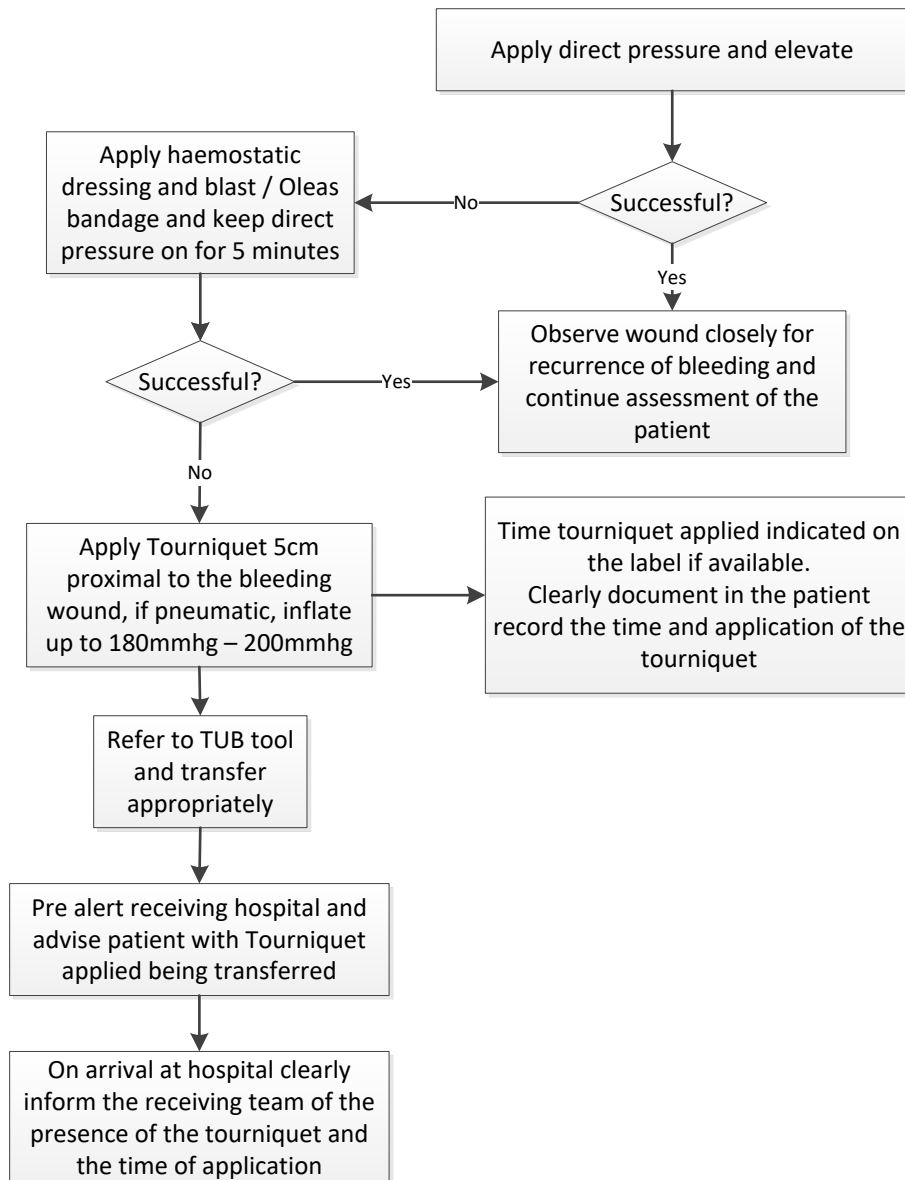
- UHS as Major Trauma Centre,
- North Hampshire Hospital; Dorset county hospital, Dorchester; Queen Alexandra Hospital, Portsmouth; St Mary's Hospital, Isle of Wight; Salisbury District Hospital, Poole General Hospital as Trauma Units and
- Royal Hampshire County Hospital, Winchester and Royal Bournemouth Hospital as local emergency hospitals.
- Local ambulance and air ambulance Trusts

## 3. Principles

- 3.1. Tourniquets are indicated for life threatening extremity haemorrhage not controlled by haemostatic dressing, for example celox, and direct pressure. Examples may include traumatic amputation, partial amputation and the mangled extremity.
- 3.2. Once applied the limb is threatened. The patient should be immediately discussed with the MTC and consideration given to immediate transfer to the MTC.
- 3.3. When a tourniquet is applied a record of the time should be clearly documented; on the Tourniquet itself if there is a space and / or in the patient record.
- 3.4. All staff should be made aware if a Tourniquet is applied and the time was it was applied.
- 3.5. Pre hospital teams MUST verbally handover to the hospital receiving team
- 3.6. Apply at least 5cm proximal to the wound but as distally as possible. A tourniquet **does not** have to be over a single long bone.
- 3.7. Where possible, and after appropriate training a pneumatic cuff should be used as opposed to a CAT.
- 3.8. On arrival in ED the need for a CAT must be re-evaluated, and if still required replaced with a pneumatic tourniquet as this reduces tissue damage (See figure 4.2)
- 3.9. De-escalation from the use of a tourniquet early will save life and limb
- 3.10. Optimise the patients clotting
- 3.11. Bleeding that required CAT in pre hospital setting may not require a tourniquet within the hospital setting (see Page 5 of this SOP)
- 3.12. Traumatic amputation is not an absolute indication for tourniquet
- 3.13. Once a tourniquet is placed surgical haemorrhage control and reperfusion should be achieved within two hours to avoid limb loss. Use of a Tourniquet to stem catastrophic bleeding requires vascular opinion. In the event of a tourniquet being in situ for over 2 hours, the tourniquet should be released in order to provide a period of tissue reperfusion for 10 minutes.
- 3.14. A patient should not move laterally (i.e. TU to TU) their care should be escalated if required (i.e. TU to MTC)

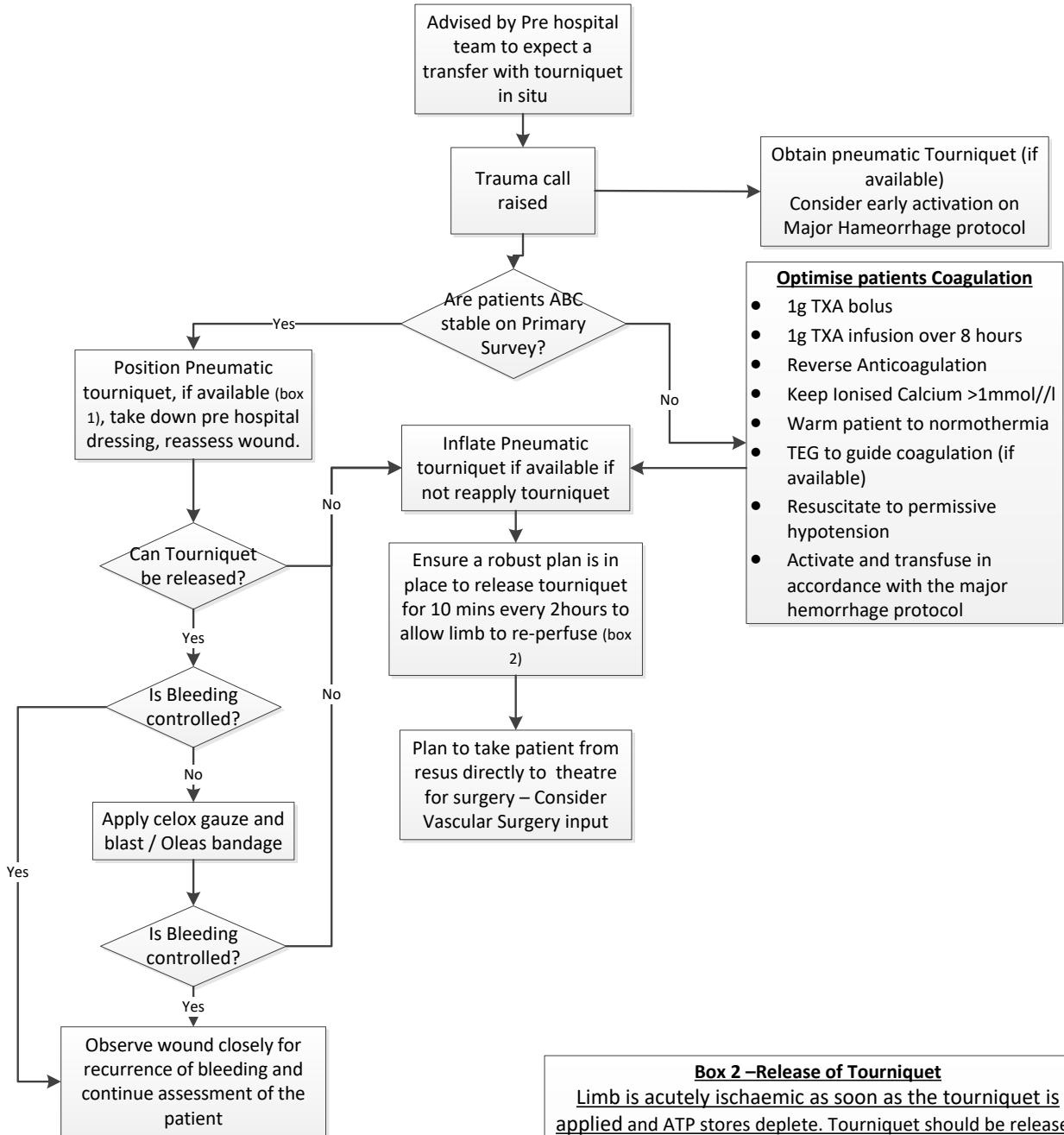
#### 4. Procedure to be followed

##### 4.1. Application of Tourniquet outside of the hospital environment



## 4.2. Management and de-escalation of a patient with a tourniquet in Situ

A TOURNIQUET INSITU IS NOT A STABLE SITUATION AND REQUIRES URGENT INTERVENTION



### Optimise patients Coagulation

- 1g TXA bolus
- 1g TXA infusion over 8 hours
- Reverse Anticoagulation
- Keep Ionised Calcium >1mmol/l
- Warm patient to normothermia
- TEG to guide coagulation (if available)
- Resuscitate to permissive hypotension
- Activate and transfuse in accordance with the major hemorrhage protocol

### Box 1

Pneumatic Tourniquet should be placed above the CAT before removing the CAT. Remove the CAT, if bleeding recurs and cannot be controlled by direct pressure, inflate the pneumatic tourniquet. If no longer bleeding, leave pneumatic tourniquet in place, but deflated until definitive decision made about destination of patient

### Box 2 –Release of Tourniquet

Limb is acutely ischaemic as soon as the tourniquet is applied and ATP stores deplete. Tourniquet should be released for a minimum of 10 mins every 2 hours to allow period of reperfusion. This is in order to reduce the risk of irreversible microvascular injury.

### Risks with release of tourniquet.

- Potentially fatal arrhythmia
- Increased PaCO<sub>2</sub> and lactate
- Increased intracranial pressure
- Severe pain
- Compartment syndrome
- Rhabdomyolysis

## 5. Supporting Trust Documents

5.1. UHS Management of Catastrophic Haemorrhage protocol

## 6. Roles and Responsibilities

- **Pre-hospital Providers**

Assess patient for the need of a tourniquet

If available, time applied is to be indicated onto the label on the Tourniquet (picture below).



Clear document within the patient record, indicating Tourniquet applied and time applied.

Verbal handover to clearly indicate Tourniquet applied and time.

Communicate to hospital that patient is expected with a tourniquet in situ

- **Trauma Units**

Assess patient and wound

Aim to de-escalate tourniquet for pressure dressing with celox where possible

Apply pneumatic tourniquet as soon as possible if removal is not possible

Optimise patient coagulation

Invoke the WTN secondary transfer / automatic acceptance criteria if case is beyond the capabilities of the TU.

A patient should not move laterally (i.e. TU to TU) their care should be escalated if required (i.e. TU to MTC)

- **Major Trauma Centre**

Assess patient and wound

Aim to de-escalate tourniquet for pressure dressing with Haemostatic dressing /celox where possible

Apply pneumatic tourniquet as soon as possible if removal is not possible

Optimise patients coagulation

Provide definitive treatment

- **WTN Management team**  
Develop, review, implement and monitor the procedure across the WTN
- **MTC management team**  
Inform, implement and monitor this procedure within the MTC (UHS) and audit times lines
- **TU Trauma Leads**  
Inform, implement this policy within their local TU

## 7. Communication plan

For communication across the Wessex Trauma Network to all pre hospital and hospital providers. Within all Emergency departments of the WTN hospitals via the WTN trauma leads

## 8. Process for Monitoring Compliance/Effectiveness

The purpose of monitoring is to provide assurance that the agreed approach is being followed – this ensures we get things right for patients, use resources well and protect our reputation. Our monitoring will therefore be proportionate, achievable and deal with specifics that can be assessed or measured.

Key aspects of the procedural document that will be monitored:

What aspects of compliance with the document will be monitored	What will be reviewed to evidence this	How and how often will this be done	Detail sample size (if applicable)	Who will co-ordinate and report findings (1)	Which group or report will receive findings
Appropriate use of tourniquets and timely removal	No. of WTN incident involving Tourniquets  No. of TU / MTC incidents raised citing tourniquet usage	When incidents are raised	N/A	MTC / WTN manager and WTN Clinical governance lead	WTN Clinical governance MTC Clinical governance ED clinical governance

(1) State post not person.

Where monitoring identifies deficiencies actions plans will be developed to address them.

## 9. Arrangements for Review of the Policy

This SOP will be reviewed 3 years after ratification or earlier if required.

## 10. Contributors

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Signature of ratifying Committee Group/Chair:	
Lead Name and Job Title of originator/author or responsible committee/individual:	Emma Bowyer – WTN manager Bryan Macleod – WTN Clinical Director
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Target audience:	UHS Trauma accepting Specialities, UHS Major Trauma Nurse practitioners, WTN Trauma Leads, WTN Pre hospital providers
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Should this document be made available on the public website?	No
Is this document to be published in any other format?	No