TOURNIQUET CONVERSION TOOL

Trauma Services Network

Interior Health

- All patients with a Tourniquet (TQ) in place on arrival to an Emergency Department need rapid assessment for placement, necessity, and effectiveness.
- Tourniquet Time (TT) equals total time from TQ application to time of assessment.
- Consult the Trauma Team Lead (TTL) via PTN for patients that require a TQ to control ongoing hemorrhage.

Less than 2hrs TT

Greater than 2hrs but less than 6hrs TT

Additionally see *High Risk TQ Conversion Checklist Pg. 2

Greater than 6hrs TT

Contraindications?

- **Traumatic Amputation** with a tourniquet placed immediately proximally to the amputation stump.
- **Decompensated shock** / other life-threatening injuries / peri-arrest
- **Inability to closely monitor** wound for signs of bleeding and patient for signs of shock

YES

STOP HERE

Call TTL via PTN to arrange specialist consultation and follow their instruction

- Leave TQ in place
- Continue with resuscitation and continuously monitor

NO

Proceed to Conversion

Complete High Risk TQ Conversion Checklist pg.2 if indicated.

Conversion

1. Place secondary tourniquet on bare limb proximal to primary TQ, leave secondary TQ loose.
2. Slowly release primary TQ (over 1 min) and observe wound for signs of bleeding.
3. **Bleeding observed?**

NO

- Monitor patient and wound for re-bleeding.
- Consider Imaging / Angiography
- Distal Pulse Check

YES

1. Apply direct digital pressure
2. Pack wound with hemostatic gauze while maintaining pressure. {video reference https://combatmedicine101.com/wound-packing/}
3. Continue to apply pressure for at least **5 min**
4. Apply pressure dressing over packing
5. **Bleeding Observed?**

NO

- Monitor patient
- Monitor wound
- Continue with transfer via PTN if appropriate

YES

- Re-tighten primary TQ as close to the wound as possible (4 cm proximal to wound)
- If bleeding continues, tighten secondary TQ
- **Inform TTL** and continue to prepare for LLTO transfer.

TOURNIQUET CONVERSION PHYSICIAN TOOL

Trauma Services Network

Interior Health

Pre-Procedure Considerations:

- This attempt at conversion is part of a secondary survey / post resuscitation phase of care and not to be attempted prior to completion of a primary survey and life saving interventions.
- Ensure safety of environment and sufficient resources, ensure additional tourniquet is available in event that primary tourniquet malfunctions.
- **Expose wound entirely –** ensure constant visualization of the wound and adequate staff and equipment for monitoring of patient status, cardiac monitor, Q2MIN VSS, and blood availability.
- TQ should be placed as close to the wound as possible (4-7 cm / 2-3 inches) and always ON BARE SKIN.
- TQ replacement / repositioning should follow same algorithm as conversion on page 1.

*HIGH RISK (Between 2hr-6hrs TT) Tourniquet Conversion Pre-Procedure Checklist:

- Patients with prolonged (greater than 2hrs) TT are at risk for **reperfusion syndrome** which results in various forms of physiologic derangement.
- These include **Acidosis, Reperfusion Hypotension, Cardiac Arrythmia, Hypothermia, and Acute Renal Injury**.

PRIOR TO RELEASE of the TQ it is imperative to optimize the following physiologic parameters to protect patients from the sequelae of reperfusion syndrome:

A Correct Metabolic **Acidosis** and aim for mild **Alkalosis** prior to TQ release

B Ensure adequate **Balanced** resuscitation, ideally with blood products, to a **Blood pressure** high enough to accommodate for hypotension that will occur with tourniquet release

C **Calcium** – pre treat with calcium for cardio protection and correct iatrogenic hypocalcemia related to blood transfusion

Consultation – ensure TTL and appropriate subspecialty (Ortho, Vascular) aware of patient condition and rely on their guidance prior to attempting conversion

D Place cardiac monitor AND **Defibrillation** pads on patient and anticipate hyperkalemic arrythmias or need for cardioversion

E **Electrolyte** imbalances-anticipate **HYPERkalemia**, attempt to shift K+ to low normal (3.5 as a target) prior to TQ release

- **Environment** – ensure patient is appropriately warmed and with ongoing core temperature monitoring
  - Ensure adequate staff to monitor exposed wound for ongoing or recurrence of hemorrhage
- **Elimination** – monitor urine output and anticipate potential for Rhabdomyolysis and impaired renal function

Checklist adapted from:

Weinrauch, P; Peters, N. The Reperfusion Toolbox. How to resuscitate a casualty in preparation for tourniquet removal after an extended duration of application. Nov 2023. Online

The Reperfusion Toolbox: How to Resuscitate a Casualty in Preparation for Tourniquet Removal after an Extended Duration of Application | The Cove (army.gov.au)

For complete list of references please email: traumaservicesnetwork@interiorhealth.ca