NORTHERN TRAUMA NETWORK NTN

Open Fracture Management

Executive summary

The outcome for a patient sustaining an open fracture is closely related to the manner in which the injury is managed through the hospital system. Having significant potential for complications due to energy transfer or through fragility of the host, its compound nature of skin and bone trauma requires early and coordinated specialist care.

Upper and lower limb open fractures share the same basic principles but differ in elements of care required. Upper limb open fractures, whilst necessitating the same level of *early* care and effective assessment, are less likely to require specialist reconstructive surgery and aftercare.

In the Northern Trauma network, suspected open lower limb fractures (OLLF) are taken **direct** to one of the two Orthoplastics centres: RVI, Newcastle or JCUH Middlesbrough (Open Lower Limb Fracture divert). Upper limb suspected open fractures **are not automatically taken to orthoplastic centres** and will be triaged for their overall best care and immediate transport by prehospital teams.

Any open fracture requiring transfer in the early phase of care between hospitals (Trauma Unit to Orthoplastic Centre) will have an Emergency Department to Emergency Department move following Consultant Orthopaedic surgeon discussion only. At all times the patient and their injury components will be managed in accordance with relevant BOAST guidelines.

Prehospital Care of Open Fractures

The early recognition of injury, timely administration of intravenous antibiotics and enabling the appropriate pathway of care is fundamental to patient outcome. Whilst occasionally isolated; open fractures are commonly associated with other injuries and this may influence decision making regarding choice of hospital.

Increasingly, open lower limb fractures in older patients feature across the region. Often under-triaged, these paradoxically are injuries that require early expert decision making and necessitate the 'get it right first time' approach just as equally as more complex seeming, high-energy transfer fractures in younger patients. Whilst transport of an isolated ankle fracture with a small wound to a Trauma Unit (TU) may seem appropriate on an energy transfer / associated injury burden perspective, these injuries benefit *just as equally* from early expert review and care. This is best seen by separating the open lower limb fracture population away from necessitating Major Trauma Centre (MTC) care and more through the lens of this injury population requiring Orthoplastic Centre (OC) care. In our region the MTC and OC are co-located and therefore the majority of open lower limb injuries will be taken to the appropriate place regardless. For the older patient with seeming lesser injury burden both in the limb segment and overall, it is imperative that the requirement for OC care is considered and therefore these patients must be taken to an OC. In alignment with the BOAST guideline for Open fracture care, open fractures of the lower limb are inclusive of those involving the hindfoot (talus and calcaneum).

The above is detailed in the Prehospital Open Lower Limb Fracture Pathway here

Hospital Care of Open Fractures

Open lower limb fractures (OLLF) will be taken as above to either of the OC in the region. Occasionally, patients with OLLF will present or be transported to a TU quite understandably either due to under-triage, self-presentation or requirement for resuscitation. Sometimes a cause for misunderstanding and communication issues between units, the next steps for this patient group are again dictated by their requirement for OC care and comprise four main features:

- Movement of these patients to the OC should be through an ED to ED transfer.
- All patients with OLLF should be seen by an orthopaedic registrar or consultant prior to transfer and all radiographic images and wound photographs made available to the receiving centre and their receipt confirmed prior to transfer.
- The patient should have received care according to the Open Fracture BOAST guidelines. Intravenous antibiotics, saline soaked gauze dressings applied after photographs taken and tetanus status addressed as well as appropriate splints applied prior to transfer are imperative.

- Discussion should take place between the consultant orthopaedic surgeons at transferring and receiving centre prior to any transfer. This is a necessary courtesy to allow planning, it is expected that all such referrals will be accepted. It is not a request for acceptance but more a handover of care.

If there is concern regarding vascular or peripheral nerve injury, the transfer and information handover will still occur as above. The senior treating orthopaedic surgeon should manage the patient in accordance with the relevant BOAST guideline (Peripheral Nerve Injury and Arterial Injuries associated with fractures and dislocations BOAST - Peripheral Nerve Injury).

Whilst the BOAST guideline for open fracture care details all elements involved, for completeness the key features to be followed in all patients with open fractures are:

1. Prompt administration of intravenous antibiotics
2. Checking of tetanus status and appropriate prophylaxis
3. Removal of only gross contamination of the wound
4. Obtaining a clinical photograph of the wound and provision of transfer to medical notes
5. Application of a simple saline soaked dressing
6. Application of appropriate splintage
7. X-ray of the affected bone including the joint above and below
8. Immediate referral to the orthopaedic on call registrar and simultaneous discussion with the on-call plastic surgical team (protocols determined in individual units)

Orthoplastic Centre (OC) Services

The Royal Victoria Infirmary, Newcastle and the James Cook University Hospital, Middlesbrough are the two designated Orthoplastic centres in the region. They are the receiving centres for all OLLF and following consultant to consultant discussion only, selected open fractures not felt appropriate by the referring consultant to be managed in the TU environment.

Orthoplastic Centres have been described in various documents, including a Quality Statement published by NICE in March 2018 (NICE Quality Standard QS166 for Trauma) and the NICE Guideline [37] Fractures (complex): assessment and management. The key features include:

- A combined service of Orthopaedic and Plastic Surgery Consultants
- Sufficient combined operating lists with consultants from both specialities to meet the standards for timely management of open fractures.
- Scheduled, combined review clinics for severe open fractures
- Specialist nursing teams able to care for both fractures and flaps

In addition, an effective orthoplastic service will also: • Submit data on each patient to the national trauma database (TARN) • Hold regular clinical audit meetings with both orthopaedic and plastic surgeons present It is expected that the OC at both the RVI and JCUH meet these standards and will be held accountable to the NTN for doing so.	
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