

Diagnosis and management of arterial injuries associated with musculoskeletal trauma

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Background and justification: Accurate diagnosis and emergency surgical repair of arterial injuries associated with extremity musculoskeletal trauma is crucial for an optimum outcome. These are time critical emergencies with no safe ischaemic time; emphasis should, therefore, be on immediate revascularisation (NCEPOD 1).

Inclusions: Patients with arterial injuries associated with musculoskeletal trauma.

Exclusions: Supracondylar fractures in children (see [Supracondylar BOASTⁱ](#)).

Standards for Practice:

Pathways and process

1. All hospitals and networks that are responsible for the management of musculoskeletal trauma must have:
 - a. clear emergency referral and transfer protocols that allow early identification and definitive care of patients with potential arterial injury.
 - b. an agreed pathway facilitating rapid diagnosis and emergency revascularisation (NCEPOD 1) by consultant led clinical teams competent in haemorrhage control, open and endovascular surgery, and skeletal trauma.
 - c. regular audit and review of outcomes for patients with arterial injury.

Emergency clinical care

2. Haemorrhage must be controlled immediately by direct pressure, wound packing, or tourniquet applied as distally as possible. Blind clamping should not be undertaken.
3. Haemodynamically unstable patients with uncontrolled bleeding should undergo simultaneous emergency resuscitation and surgical intervention.
4. Clinical arterial examination is mandatory and specific findings and timings must be documented.
5. A pulseless deformed limb must be urgently realigned and splinted. Arterial examination must be repeated and documented.
6. Neurological examination of relevant peripheral nerves must be documented.
7. Where arterial injury is suspectedⁱⁱ consultant input is mandatory.
8. CT angiogram is recommended if arterial injury is suspected and should be performed concurrently with whole-body CT.
9. Consultant led care from orthopaedic and either vascular or plastic surgery is mandatory in confirmed injury.
10. Revascularisation is an emergency procedure (NCEPOD 1) and should be commenced within one hour of arrival to hospital.
11. The use of a temporary vascular shunt to rapidly restore blood flow in the extremity is recommended.
12. Rapid skeletal reduction and stabilisation should be achieved immediately following reperfusion and prior to definitive revascularisation.
13. Arterial repair or interposition grafts should be used for revascularisation. Bypass grafts should only be considered in blast or ballistic injury, or where anatomic reconstruction is not feasible.
14. Where cognition allows, patients must be aware of the possibility of amputation. Any decision to perform early amputation must be made by two consultantsⁱⁱⁱ and clearly documented.
15. Fasciotomies must always be considered after revascularisation. Any contrary decision should be documented with the name of the senior decision maker.

Post operative care

16. Post-operative care should be delivered in an appropriate area with nursing and medical staff competent in the assessment of a critically injured limb.
17. Post-operative single antiplatelet therapy should be considered, after an appropriate bleeding risk assessment.
18. Out-patient follow-up should be provided by the surgical team performing revascularisation.

ⁱ <https://www.boa.ac.uk/resource/boast-11-pdf.html>.

ⁱⁱ Suspected: i.e. the limb has been reduced / splinted, and appropriate emergency first aid provided, yet still remains dysvascular. If the injured limb pulse DOES NOT feel the same as the contralateral (uninjured) pulse suspect a vascular injury until the CTA demonstrates otherwise.

ⁱⁱⁱ Two consultants from different specialties including (but not limited to) Orthopaedics, Plastic Surgery, Vascular Surgery.