

Clinical Practice Guideline 14:

Damage Control Surgery

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KEY MESSAGES

- **Prioritise physiology over anatomy.**
- **Strategy to achieve temporary control of injuries and bleeding.**
- **Synchronised approach with Damage Control Resuscitation.**
- **Control haemorrhage then control contamination.**
- **Estimated to be required in up to 10% of Trauma Laparotomies.**
- **Make the decision early (Consultant General/Vascular Surgeon must be involved).**
- **Aim for < 90 minutes operative time.**
- **Temporary abdominal closure.**

NIMTN Clinical Practice Guidelines are intended to inform standardised, best-practice care for injured patients across Northern Ireland. Although they are based on up to date evidence at the time of writing, readers should note that it remains the responsibility of individual clinicians to make final decisions regarding the most appropriate treatment for specific patients in their care.

Prehospital practitioners employed by Northern Ireland Ambulance Service (including those involved in specialist teams such as HEMS and HART) may find these guidelines informative but should continue to follow guidance contained within JRCALC, NIAS and HEMS guidelines and SOPs.

Background

Rotundo and Schwab coined the term “Damage Control” in 1993, demonstrating a survival rate of 77% (vs. 11%) in patients with severe intra-abdominal injury (major vascular injury and two or more visceral injuries).

The aim is to prevent the lethal triad of Hypotension, Coagulopathy and Acidosis. Damage control surgery is only indicated in a certain subset of patients and should be performed in conjunction with damage control resuscitation (DCR).

Related Guidelines

[CPG 3: The Trauma Team](#)

[CPG 8: Circulation](#)

Indications

The decision to proceed to damage control surgery should involve the following considerations:

1. Physiological

The Exsanguinating patient (or patient at risk of exsanguination)

Significant or large volume blood loss requiring massive transfusion

Evidence of Metabolic Exhaustion

- Hypothermia – Temp <35°C
- Lactate >5mmol/L
- pH <7.3
- Coagulopathy - INR >1.4

Bedside parameters of shock

- BP/HR/RR/Sats

2. Burden of Injury

Multi-system polytrauma where the predicted clinical course is patient deterioration.

- Combined head, chest and abdominal injury with significant haemorrhage
- Combined orthopaedic and vascular injuries in the same limb

3. Intra-operative

Need for re-look surgery to reassess viscera and/or other injuries.

4. The surgeon's skill set

5. Other complex anatomical injuries in need of damage control and superspecialised input (including interventional radiology)

- Deep liver injuries
- Retrohepatic IVC/Venous injuries
- Head of pancreas/duodenal injuries
- Complex pelvic injuries
- Oesophageal injuries
- Complex genito-urinary injuries

DC0 Pre-operative phase

Permissive hypotension (target value will depend on the presence/absence of TBI)

Minimise the use of crystalloid fluid

1:1:1 blood product transfusion (activate massive transfusion protocol)

Keep patient warm

Rapid transfer to hospital/ theatre

Early and aggressive haemorrhage control

- Tourniquet
- Compression dressings/wound packing
- Pelvic binders
- Repair/ suture actively bleeding wounds
- Chest drain placement

DC1 Theatre

Aim for environmental temperature of 30°C

Control Haemorrhage

Intra-abdominal packing

Specific liver packing

Pringle manoeuvre (occlusion of portal triad)

Topical haemostatic agents

Clamping of supra-coeliac aorta

Thoracotomy for proximal control

Vascular: proximal + distal control, shunts, ligation

Consider Interventional Radiology as an adjunct

Extraperitoneal packing for pelvic trauma

- Replace pelvic binder
- Consider IR

Control Contamination

Staple off bowel ends (leave bowel in discontinuity)

Suture

Bowel Clamps

Temporary Abdominal Closure

Commercially available devices e.g. Abthera™

Opsite™ sandwich

ICU

Watch the trend in physiology and metabolism

Correct Acidosis

Correct coagulopathy

Correct hypothermia

Replace calcium

Optimise oxygenation/ventilation

Monitor for development of complications e.g. abdominal compartment syndrome

Tertiary Survey - assess for other injuries

Consider other adjunctive products to enhance coagulation (e.g. fibrinogen, Octaplex™, aFVIII) once haemorrhage control is satisfactory. ROTEM / TEG may guide best practice. Involve consultant haematologist.

DC2 Theatre

24-48hrs (no later than 72hrs!)

Once physiology has normalised

Removal of packs (under warm saline)

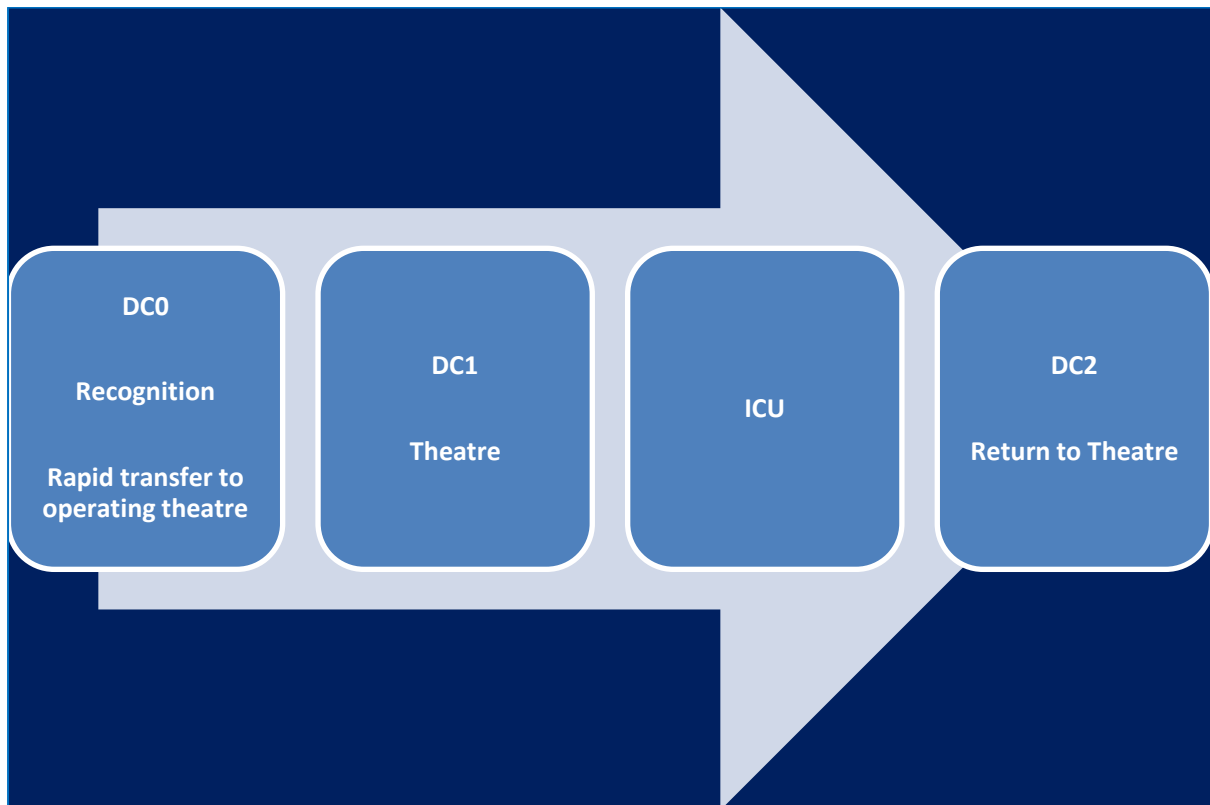
Re-exploration of entire abdominal cavity

Haemostasis

Definitive repair/restoration of intestinal continuity

Abdominal Closure

- Abdominal closure may need to be delayed again for another re-look. Ideally aim to close abdomen by post-operative day 5-7 as thereafter it may become 'unclosable' requiring either staged closure or other anterior abdominal wall reconstruction



References

Rotundo MF, Schwab CW et al. "Damage Control" An Approach for Improved Survival in Exsanguinating Penetrating Abdominal Injury. J Trauma 1993;35:375-382.

Lamb C et al. Damage Control Surgery in the era of Damage Control Resuscitation. BJA 2014;113:242-249

Grabo D, Reilly P, Schwab CW. The Philosophy of Damage Control. In Trauma: Code Red. Khan M, McMonagle M, Nott D (Eds). CRC Press, Boca Raton. 2018