DAMAGE CONTROL RESUSCITATION (DCR)

Damage Control Resuscitation is a physiologically driven resuscitation strategy for patients with life threatening haemorrhage, designed to buy time until definitive haemorrhage control while preventing irreversible physiological collapse.

It is not fluid resuscitation and not transfusion alone, rather a coordinated approach to stop bleeding, restore perfusion, and avoid iatrogenic death.

CORE OBJECTIVES (WHY DCR EXISTS)

DCR aims to interrupt the lethal triad:

- **Hypothermia**
- **Acidosis**
- **Coagulopathy**

Once established, the triad is **self perpetuating and rapidly fatal.**

WHEN TO USE DCR (ED TRIGGERS)

Initiate DCR early, before collapse, when any of the following are present:

- Ongoing or suspected major haemorrhage
- Traumatic shock not responding to minimal fluids
- Penetrating trauma with hypotension
- High risk blunt trauma with shock
- Anticipated need for massive transfusion

DCR is a pre ICU / pre OR strategy.

PHYSIOLOGICAL PRINCIPLES (WHAT CHANGES YOUR PRACTICE)

A PERMISSIVE HYPOTENSION

- Lower blood pressure reduces clot disruption and bleeding
- Targets:
  - SBP 80–90 mmHg (Trauma)
  - MAP ~60 mmHg
  - SBP 60-80 mmHg (Penetrating abdominal trauma only)
- EXCEPTION: traumatic brain injury/ SCI → do NOT permit hypotension

Normal blood pressure is not the goal until haemorrhage is controlled.

B HAEMOSTATIC RESUSCITATION

- Replace what is lost, not saline
- Blood components correct:
  - Oxygen delivery
  - Coagulation deficits
  - Volume

Preferred (if blood available):

- 1:1:1 PRBC : Plasma : Platelets
- Whole blood if available

Crystalloids (if no blood available):

- Only as brief bridge therapy
- Large volumes worsen coagulopathy and acidosis

C TEMPERATURE CONTROL

- Hypothermia directly impairs clotting
- Bleeding patients cannot clot if cold
- Actively warm:
  - Patient
  - Fluids
  - Environment

HAEMOGLOBIN & PERFUSION TARGETS (REALISTIC)

- Hb target during active bleeding:
  - ~70–90 g/L
- Urine output:
  - ≥0.5 ml/kg/hr
- Lactate:
  - Clearance more important than absolute number

ADJUNCTS THAT SAVE LIVES

TRANEXAMIC ACID (TIME CRITICAL)

- Give within 3 hours of injury
- Dose:
  - 1 g IV bolus
  - then 1 g over 8 hours
- Late administration (>3 h) may increase harm

CALCIUM

- Citrate in blood products binds calcium
- Hypocalcaemia → poor cardiac output + worsened coagulopathy
- Actively replace if transfusing

WHAT DCR DOES NOT DO

- It does not replace surgery
- It does not aim for perfect vitals
- It does not tolerate delays to bleeding control

DCR buys time — it does not fix haemorrhage.

COMMON CAUSES OF FAILURE

- Delayed haemorrhage control
- Too much crystalloid
- Failure to warm patient
- Chasing blood pressure instead of perfusion
- Under recognition of ongoing bleeding

CHECKLIST
DAMAGE CONTROL RESUSCITATION

IMMEDIATE ACTIONS (SIMULTANEOUS)

- [ ] Call for help / senior involvement
- [ ] Treat as time critical haemorrhagic shock
- [ ] Activate local haemorrhage / transfusion pathway if available
- [ ] Identify likely bleeding source early

PRIMARY SURVEY WITH DCR PRINCIPLES

Airway

- [ ] Secure early if risk of deterioration
- [ ] Avoid prolonged hypotension during induction

Breathing

- [ ] Oxygen to maintain SpO_2 ≥94%
- [ ] Treat tension pneumothorax immediately

Circulation

- [ ] 2 large bore IV or rapid access device
- [ ] Minimal crystalloids (250 mL max if needed)
- [ ] Blood products early if available
- [ ] Direct pressure / tourniquets as needed

Disability

- [ ] GCS
- [ ] Consider TBI → **no permissive hypotension**

Exposure

- [ ] Undress fully with spinal protection
- [ ] Prevent hypothermia

RESUSCITATION STRATEGY

- [ ] Blood > crystalloids
- [ ] Aim for balanced products (1:1:1)
- [ ] Use whole blood if available
- [ ] Avoid large saline/Ringer's volumes

PHYSIOLOGICAL TARGETS

- [ ] SBP 80–90 mmHg (unless TBI)
- [ ] MAP ≈60 mmHg
- [ ] Urine output ≥0.5 ml/kg/hr
- [ ] Hb ~70–90 g/L during active bleed

ADJUNCTS

- [ ] Tranexamic acid:
  - [ ] 1 g IV bolus
  - [ ] 1 g over 8 hrs
  - [ ] Calcium replacement during transfusion
  - [ ] Warm patient + fluids

MONITORING

- [ ] Continuous ECG & BP
- [ ] Urine output via catheter
- [ ] Lactate / base deficit if available
- [ ] Frequent reassessment for ongoing bleeding

HAEMORRHAGE CONTROL (DO NOT DELAY)

- [ ] External bleeding controlled
- [ ] Pelvic binder if suspected pelvic bleed
- [ ] Early surgical / interventional referral
- [ ] Imaging only if it does not delay control

WHAT TO AVOID (CRITICAL)

- [ ] Excess crystalloids
- [ ] Normalising BP before haemostasis
- [ ] Hypothermia
- [ ] Delayed TXA
- [ ] "Watchful waiting" in active haemorrhage

DISPOSITION

- [ ] Immediate OR / interventional radiology if available
- [ ] ICU once haemorrhage controlled
- [ ] Clear handover:
  - Injury pattern
  - Time of bleed
  - Products given
  - Physiological response