

# Massive transfusion protocol (MTP) template

The information below, developed by consensus, broadly covers areas that should be included in a local MTP. This template can be used to develop an MTP to meet the needs of the local institution's patient population and resources

Senior clinician determines that patient meets criteria for MTP activation

## Baseline:

Full blood count, coagulation screen (PT, INR, APTT, fibrinogen), biochemistry, arterial blood gases

Notify transfusion laboratory (insert contact no.) to:  
**'Activate MTP'**

## Laboratory staff

- Notify haematologist/transfusion specialist
- Prepare and issue blood components as requested
- Anticipate repeat testing and blood component requirements
- Minimise test turnaround times
- Consider staff resources

## Haematologist/transfusion specialist

- Liaise regularly with laboratory and clinical team
- Assist in interpretation of results, and advise on blood component support

## Senior clinician Request:<sup>a</sup>

- 4 units RBC
- 2 units FFP

## Consider:<sup>a</sup>

- 1 adult therapeutic dose platelets
- tranexamic acid in trauma patients

## Include:<sup>a</sup>

- cryoprecipitate if fibrinogen < 1 g/L

<sup>a</sup> Or locally agreed configuration

Bleeding controlled?

YES

NO

Notify transfusion laboratory to:  
**'Cease MTP'**

## OPTIMISE:

- oxygenation
- cardiac output
- tissue perfusion
- metabolic state

## MONITOR

(every 30–60 mins):

- full blood count
- coagulation screen
- ionised calcium
- arterial blood gases

## AIM FOR:

- temperature > 35°C
- pH > 7.2
- base excess < -6\*
- lactate < 4 mmol/L
- Ca<sup>2+</sup> > 1.1 mmol/L
- platelets > 50 × 10<sup>9</sup>/L
- PT/APTT < 1.5 × normal
- INR ≤ 1.5
- fibrinogen > 1.0 g/L

\*The numerical representation of base excess can be shown differently in varying texts. Please be aware that for the purposes of this template, a base excess of <-6 refers to a base excess of -5, -4, -3 and so forth. A base excess of -7, -8, -9 and so on is associated with a worsening prognosis. The normal range for base excess is -2 - +2.

# Suggested criteria for activation of MTP

- Actual or anticipated 4 units RBC in < 4 hrs, + haemodynamically unstable, +/- anticipated ongoing bleeding
- Severe thoracic, abdominal, pelvic or multiple long bone trauma
- Major obstetric, gastrointestinal or surgical bleeding

## Initial management of bleeding

- Identify cause
- Initial measures:
  - compression
  - tourniquet
  - packing
- Surgical assessment:
  - early surgery or angiography to stop bleeding

## Specific surgical considerations

If significant physiological derangement, consider damage control surgery or angiography

## Cell salvage

Consider use of cell salvage where appropriate

## Dosage

|                                          |                                                               |
|------------------------------------------|---------------------------------------------------------------|
| Platelet count < 50 x 10 <sup>9</sup> /L | 1 adult therapeutic dose                                      |
| INR > 1.5                                | FFP 15 mL/kg <sup>a</sup>                                     |
| Fibrinogen < 1.0 g/L                     | cryoprecipitate 3–4 g <sup>a</sup>                            |
| Tranexamic acid                          | loading dose 1 g over 10 min, then infusion of 1 g over 8 hrs |

<sup>a</sup> Local transfusion laboratory to advise on number of units needed to provide this dose

## Resuscitation

- Avoid hypothermia, institute active warming
- Avoid excessive crystalloid
- Tolerate permissive hypotension (BP 80–100 mmHg systolic) until active bleeding controlled
- Do not use haemoglobin alone as a transfusion trigger

## Special clinical situations

- Warfarin:
  - add vitamin K, prothrombinex/FFP
- Obstetric haemorrhage:
  - early DIC often present; consider cryoprecipitate
- Head injury:
  - aim for platelet count > 100 × 10<sup>9</sup>/L
  - permissive hypotension contraindicated

## Considerations for use of rFVIIa<sup>b</sup>

- The *routine* use of rFVIIa in trauma patients is not recommended due to its lack of effect on mortality (Grade B) and variable effect on morbidity (Grade C).
- Institutions may choose to develop a process for the use of rFVIIa where there is:
  - uncontrolled haemorrhage in salvageable patient, and failed surgical or radiological measures to control bleeding, and adequate blood component replacement, and pH > 7.2, temperature > 34°C.
- Discuss dose with haematologist/transfusion specialist

<sup>b</sup> rFVIIa is not licensed for use in this situation; all use must be part of practice review.

ABG: arterial blood gas, APTT: activated partial thromboplastin time, BP: blood pressure, DIC: disseminated intravascular coagulation, FFP: fresh frozen plasma, FBC: full blood count, INR: international normalised ratio, MTP: massive transfusion protocol, PT: prothrombin time, RBC: red blood cells, rFVIIa: activated recombinant factor VII