

# 27. CLINICAL INDICATIONS FOR CRYOPRECIPITATE AND FIBRINOGEN CONCENTRATE

Cryoprecipitate is indicated in the treatment of fibrinogen deficiency or dysfibrinogenaemia.<sup>1</sup>

Fibrinogen concentrate is licenced for the treatment of acute bleeding episodes in patients with congenital fibrinogen deficiency, including afibrinogenaemia and hypofibrinogenaemia,<sup>2</sup> and is currently funded under the National Blood Agreement.

## Key messages

- Fibrinogen is an essential component of the coagulation system, due to its role in initial platelet aggregation and formation of a stable fibrin clot.<sup>3</sup>
- The decision to transfuse cryoprecipitate or fibrinogen concentrate to an individual patient should take into account the relative risks and benefits.<sup>3</sup>
- The routine use of cryoprecipitate or fibrinogen concentrate is not advised in medical or critically ill patients.<sup>2,4</sup>
- Cryoprecipitate or fibrinogen concentrate may be indicated in critical bleeding if fibrinogen levels are not maintained using FFP. In the setting of major obstetric haemorrhage, early administration of cryoprecipitate or fibrinogen concentrate may be necessary.<sup>3</sup>

## Clinical implications

- The routine use of cryoprecipitate or fibrinogen concentrate in medical or critically ill patients with coagulopathy is not advised. The underlying causes of coagulopathy should be identified; where transfusion is considered necessary, the risks and benefits should be considered for each patient. Specialist opinion is advised for the management of disseminated intravascular coagulopathy (MED-PP18, CC-PP7).<sup>2,4</sup>
- Cryoprecipitate or fibrinogen concentrate may be indicated in critical bleeding if fibrinogen levels are not maintained using FFP. In patients with critical bleeding requiring massive transfusion, suggested doses of blood components is 3-4g (CBMT-PP10)<sup>3</sup> in adults or as per the local Massive Transfusion Protocol.
- Published critical bleeding guidelines recommend keeping the fibrinogen level above 1.0 g/L.<sup>2</sup>
- Paediatric dosing is not established however common practise is 5mL/kg or 1-2 units per 10kg.
- If required, fibrinogen dose can be calculated based on the patient's plasma volume, actual

fibrinogen level and desired increment (e.g. using the formula in the AABB Technical Manual).<sup>5</sup>

- Refer to:
  - ♦ Australian Haemophilia Centre Directors' Organisation (AHCCDO) guidelines for patients with specific factor deficiencies ([www.ahccdo.org.au](http://www.ahccdo.org.au))
  - ♦ Thrombotic Thrombocytopenic Purpura: Guidelines for the Use of Fresh-Frozen Plasma, Cryoprecipitate and Cryosupernatant (2004).<sup>6</sup>

## Background

Cryoprecipitate and fibrinogen concentrate are prepared from human plasma. Cryoprecipitate contains factors VIII and XIII, von Willebrand factor and fibronectin and fibrinogen, whereas the concentrate contains a purified form of fibrinogen.

In Australia there are two different sized bags of cryoprecipitate. A bag of apheresis cryoprecipitate is approximately equal to 2 bags of whole blood cryoprecipitate.<sup>1</sup> The fibrinogen content for a bag of apheresis cryoprecipitate is 856 +/- 298 mg per bag (mean +/- 1SD) and for whole blood cryoprecipitate is 378 +/- 125 mg per bag (mean +/- 1SD).<sup>1</sup>

Typically 1 bag of whole blood cryoprecipitate given per 5–10 kg body weight would be expected to increase the patient's fibrinogen concentration by 0.5–1.0 g/L.<sup>1</sup>

Typically 1 bag of cryoprecipitate apheresis given per 10–20 kg body weight would be expected to increase the patient's fibrinogen concentration by 0.5–1.0 g/L.<sup>1</sup>

A standard adult dose of cryoprecipitate (3–4g of fibrinogen for a 70kg adult) is equivalent to:

- 10 bags of whole blood cryoprecipitate or
- 5 bags of apheresis cryoprecipitate

When necessary, a standard adult dose can be made up of both types of bags using this conversion factor, taking care to avoid errors.

Paediatric dosing is not established however common practise is 5mL/kg or 1–2 whole blood cryoprecipitate units per 10kg. If in doubt, or in the case of neonates, contact a neonatologist, haematologist or senior transfusion laboratory scientist.

The table below indicates how many bags per cryoprecipitate type are suggested per patient weight range.<sup>7</sup>

	Dose of Cryo (number of bags) for patient weight <sup>7</sup>				
Patient weight (kg)	5–20	>20–35	>35–50	>50–65	>65
WHOLE BLOOD cryo	2	4	6	8	10
APHERESIS cryo	1	2	3	4	5

Some adult patients and children may be prescribed doses outside the above table based on their individual circumstances. Contact a haematologist or senior transfusion laboratory scientist for advice.

### References

1. Australian Red cross Blood Service. [Blood Component Information Circular of Information – An extension of blood component labels](#). Australia 2012.
2. National Blood Authority [Patient blood management guidelines: Module 3 – Medical](#). Australia, 2012.

3. National Blood Authority Patient blood management guidelines: [Module 1 – Critical Bleeding Massive Transfusion](#). Australia, 2012.
4. National Blood Authority [Patient blood management guidelines: Module 4 – Critical Care](#). Australia, 2012.
5. AABB Technical Manual, 17th Edition (2011)
6. O’Shaughnessy DF, Atterbury C, Bolton Maggs P, Murphy M, Thomas D, Yates S, et al. (2004). [Guidelines for the use of fresh-frozen plasma, cryoprecipitate and cryosupernatant](#). British Journal of Haematology 126 (1): 11–28
7. South Australian Blood Management Committee.[unpublished meeting minutes] Paediatric Cryoprecipitate Dosing; meeting held 2013 December 3

#### Additional Resources

- National Blood Authority [Patient blood management guidelines: Module 2 – Perioperative](#). Australia, 2012.
- Tran HA, Chunilal SD, Harper PL, Tran H, Wood, EM et al. [An update of consensus guidelines for warfarin reversal](#). On behalf of the Australasian Society of Thrombosis and Haemostasis. Med J Aust 2013;198:198-199

