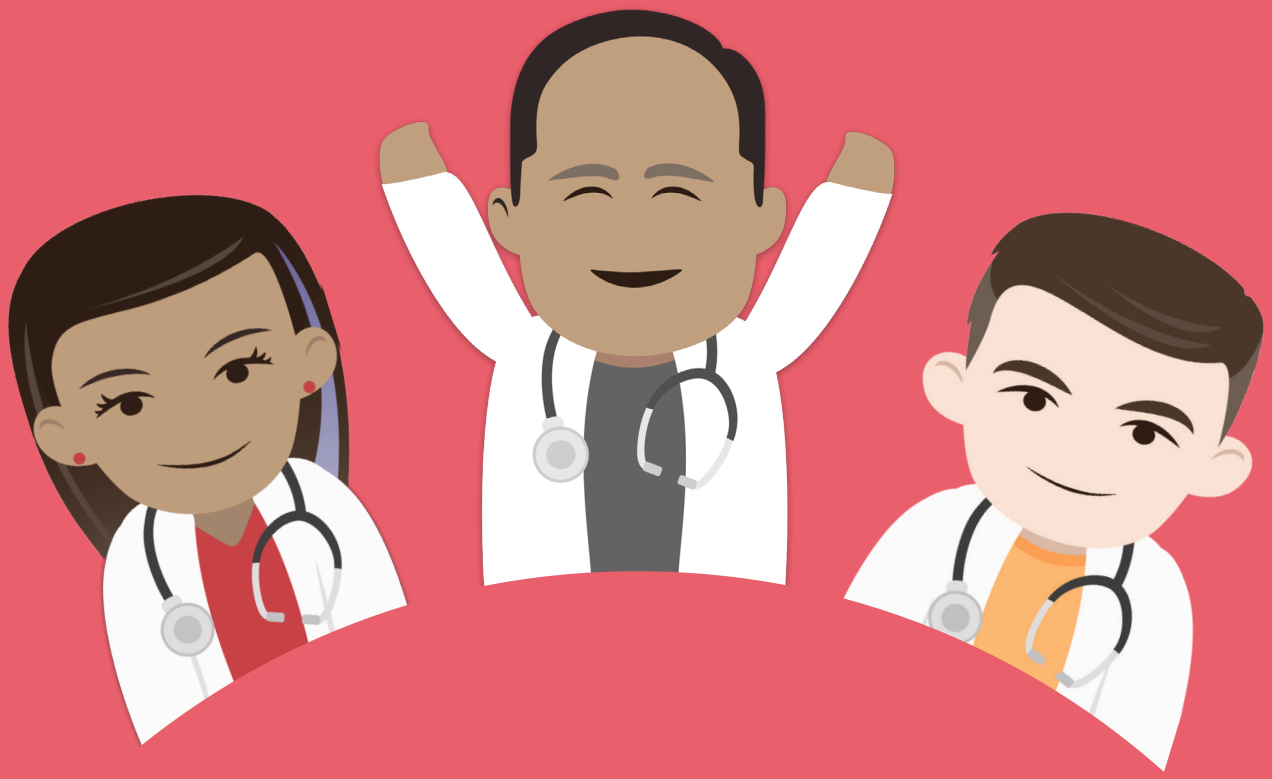
Hematology and Coagulation Essentials
Chapter 5

MANAGING BLEEDING IN COAGULOPATHIC PATIENTS



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Managing bleeding in coagulopathic patients

ORDERING TESTS FOR BLEEDING COAGULOPATHIC PATIENTS

When we are asked to manage the bleeding of a coagulopathic patient we can gather the evidence of coagulopathy from three tests.

- Thromboelastograph (TEG)
- Disseminated intravascular coagulation (DIC) panel
- Complete blood count (CBC)

A DIC panel consists of

- Prothrombin time (PT)
- Partial thromboplastin time (PTT)
- Thrombin time (TT)
- Fibrinogen
- Fibrin split product (FSP) / fibrin degradation (FDP) / D-dimer

Management of bleeding in coagulopathic patients

CHOOSING THE RIGHT BLOOD COMPONENTS

The blood products that are available for a bleeding patient are

- RBC
- fresh frozen platelets (FFP)
- platelets
- cryoprecipitate

RBC transfusion

RBC transfusion depends on the hemoglobin (Hb) and hematocrit (Hct) of the patient. This is obtained from the CBC values.

RBC transfusion is not dependent on the results of a TEG and DIC panel. One unit of RBC should increase the Hb by 1g / dL or increase the Hct by 3%.

FFP transfusion

FFP is given when there is deficiency of clotting factor.

With deficiency of clotting factors we expect to see

- Prolonged TEG R time
- Prolonged PT and / or PTT

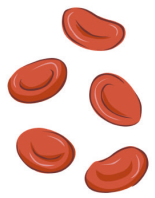
One adult dose of FFP is two units or one jumbo FFP.

Platelet transfusion

Platelet transfusion may be given when there is thrombocytopenia. This is determined by the CBC values. Thrombocytopathia may be evident when the TEG MA values are low. One adult dose of platelets is six units or one apheresis unit. One dose of platelets should increase the platelet count by 30–60,000.

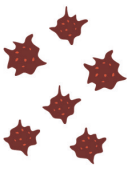
Cryoprecipitate transfusion

Cryoprecipitate can be given when there are low levels of fibrinogen, as determined from the DIC panel. The TEG angle alpha should also be low. Cryoprecipitate is also sometimes administered to patients with uremic thrombocytopathia. Lastly, cryoprecipitate is also indicated when there is factor XIII deficiency. One adult dose of cryoprecipitate is ten units.



Red blood cells

FFP



Platelets

Cryoprecipitate

Management of bleeding in coagulopathic patients

SELECTING APPROPRIATE PHARMACEUTICALS

In addition to blood products, from time to time we need to administer therapeutic agents to bleeding coagulopathic patients.

We will consider five such agents

- Protamine
- Antifibrinolytic agents
- Desmopressin (DDAVP)
- Prothrombin complex concentrate (PCC)
- Recombinant factor VII (rFVII)

Protamine

Protamine is an antidote for heparin. It should be given to a bleeding patient when there is evidence of heparin in the circulation. This evidence can come from the results of either a TEG or DIC panel. On TEG, the R time is prolonged in the presence of heparin. If the TEG is repeated with heparinase, the R time is reduced significantly, ideally by at least 50%. In the presence of heparin, a DIC panel will show prolonged PTT. However, PTT can be prolonged due to clotting factor deficiency; therefore, we should also measure at the TT. Prolonged TT is most often due to one of two causes: the presence of heparin or low levels of fibrinogen. Fibrinogen levels are also measured as part of a DIC panel. If fibrinogen levels are normal, then prolonged TT is due to heparin. Protamine can be given at doses from 25 mg to 50 mg.

Antifibrinolytic agents

Antifibrinolytic agents are indicated if a patient is bleeding due to primary fibrinolysis.

Evidence of primary fibrinolysis from the TEG

- High Ly30
- Low MA
- Low CI

Evidence of primary fibrinolysis from the DIC panel

- High D-dimer, high FSP, or high FDP
- Low fibrinogen

An example of an antifibrinolytic agent is tranexamic acid.

DDAVP

DDAVP is synthetic desmopressin. It is indicated for the treatment of uremic thrombocytopathia.

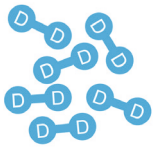
Prothrombin complex concentrate (PCC)

Prothrombin complex concentrate has the same indications as fresh frozen plasma (FFP), but is usually administered in situations where the volume of FFP cannot be tolerated by the patient. An example of this is RV strain.

Recombinant factor VII (rFVII)

rFVII is given to bleeding patients when all else has failed and patients have excessive bleeding that is not responding to management. Prior to administration of rFVII, a patient should have adequate platelet and fibrinogen levels in order to maximize the effects of rFVII.

Protamine



Antifibrinolytic agents

DDAVP

DDAVP

Recombinant factor VII