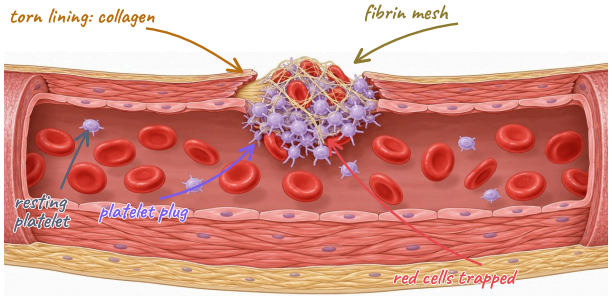
ER BASICS · ONE-PAGER

Bleeding, Reversal, HIT and DIC

Anticoagulant reversal, the 4Ts and HIT care, DIC and TTP for critical care exams

7 sources + more detail
erbasics.com/sheets/coagulation.html
checked Oct 2026

MODEL How a clot forms (cell-based)



1 Reversing anticoagulants in major bleeding

DRUG	REVERSE WITH	NOTES
Warfarin	4F-PCC plus vitamin K 10 mg IV (slow)	PCC 25–50 units/kg by INR; FFP only if no PCC
Dabigatran	Idarucizumab 5 g IV	Also removed by dialysis
Apixaban, rivaroxaban	4F-PCC 50 units/kg (or 2,000 units fixed)	Andexanet off US market Dec 2025; NCS/SCCM 2026 prefers PCC
Unfractionated heparin	Protamine 1 mg per 100 units given in last 2–3 h (max 50 mg)	Fast; watch for hypotension, anaphylaxis
Enoxaparin	Protamine 1 mg per 1 mg enoxaparin within 8 h	Only partial (about 60%)
Alteplase, tenecteplase	Cryoprecipitate; tranexamic or aminocaproic acid	Check fibrinogen
Antiplatelets	No platelets unless aspirin and going to surgery	Platelets harmed in ICH (PATCH); desmopressin unproven

Typical adult values for exam study. Follow your institution's protocols.

EXAM TIP Exams pair warfarin with PCC plus vitamin K (PCC is fast, vitamin K keeps the INR down) and dabigatran with idarucizumab.

2 Heparin-induced thrombocytopenia (HIT)

An antibody to PF4–heparin activates platelets: platelets fall and clots form. Thrombosis, not bleeding, is the danger.

Score 0–3 low (HIT unlikely, no testing); 4–5 intermediate; 6–8 high.

4TS ITEM	2 POINTS
Thrombocytopenia	Fall over 50% and nadir 20,000 or more
Timing	Fall on day 5–10, or day 1 with heparin in the past 30 days
Thrombosis	New clot, skin necrosis or reaction to a heparin bolus
Other cause	None apparent

- Intermediate or high score: stop ALL heparin (flushes, locks, LMWH, coated catheters)
- Start a non-heparin anticoagulant at once: argatroban (liver-cleared; good in kidney failure) or bivalirudin; fondaparinux or a DOAC when stable
- Send a PF4–heparin immunoassay; a functional test (serotonin release assay) confirms
- No routine platelet transfusion
- No warfarin until platelets recover (150,000 or more); then overlap 5 days or more

SAFETY Never use heparin flushes or heparin-coated lines after HIT. Document it as an allergy.

3 DIC and TTP

	DIC	TTP
Cause	Sepsis, trauma, obstetric, malignancy	ADAMTS13 deficiency
Platelets	Low	Very low
PT and aPTT	Prolonged	Usually normal
Fibrinogen	Low (late)	Normal
Smear	May show schistocytes	Schistocytes (hemolysis)
Treatment	Treat the cause; replace if bleeding	Urgent plasma exchange; avoid platelets unless life-threatening bleeding

- DIC with bleeding: platelets if under 50,000; cryoprecipitate if fibrinogen under 150 mg/dL; plasma for a long PT/aPTT
- ISTH overt DIC score 5 or more: platelets, D-dimer, PT and fibrinogen

EXAM TIP Long PT/aPTT and low fibrinogen point to DIC; normal clotting times with hemolysis and neuro or kidney signs point to TTP.

MORE Hemostasis: the cell-based model

The classic cascade describes a test tube; in vessels, coagulation runs on cell surfaces in overlapping phases (Hoffman and Monroe, 2001). This explains why a normal PT and aPTT do not exclude bleeding (low platelets or fibrinogen, hyperfibrinolysis, hypothermia) and why factor XII deficiency prolongs the aPTT without bleeding.

PHASE	WHERE	WHAT HAPPENS
Initiation	Tissue factor-bearing cells (fibroblasts, monocytes)	TF–VIIa activates X and IX; Xa–Va makes a little thrombin
Amplification	Platelets at the injury	Thrombin activates platelets and factors V, VIII and XI
Propagation	Activated platelet surface	Tenase (IXa–VIIIa), prothrombinase (Xa–Va): thrombin burst

Platelets adhere to collagen through von Willebrand factor (GPIb), aggregate on fibrinogen bridges (GPIIb/IIIa) and expose phosphatidylserine, where the vitamin K-dependent factors assemble with calcium. Antithrombin (inactivates thrombin, Xa and IXa; heparin speeds it about 1,000-fold), TFPI, and activated protein C with protein S (destroys Va and VIIIa) confine the clot.

For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ER Basics is an independent study aid not affiliated with any certifying body.