How to interpret abnormal coagulation studies in critically ill?

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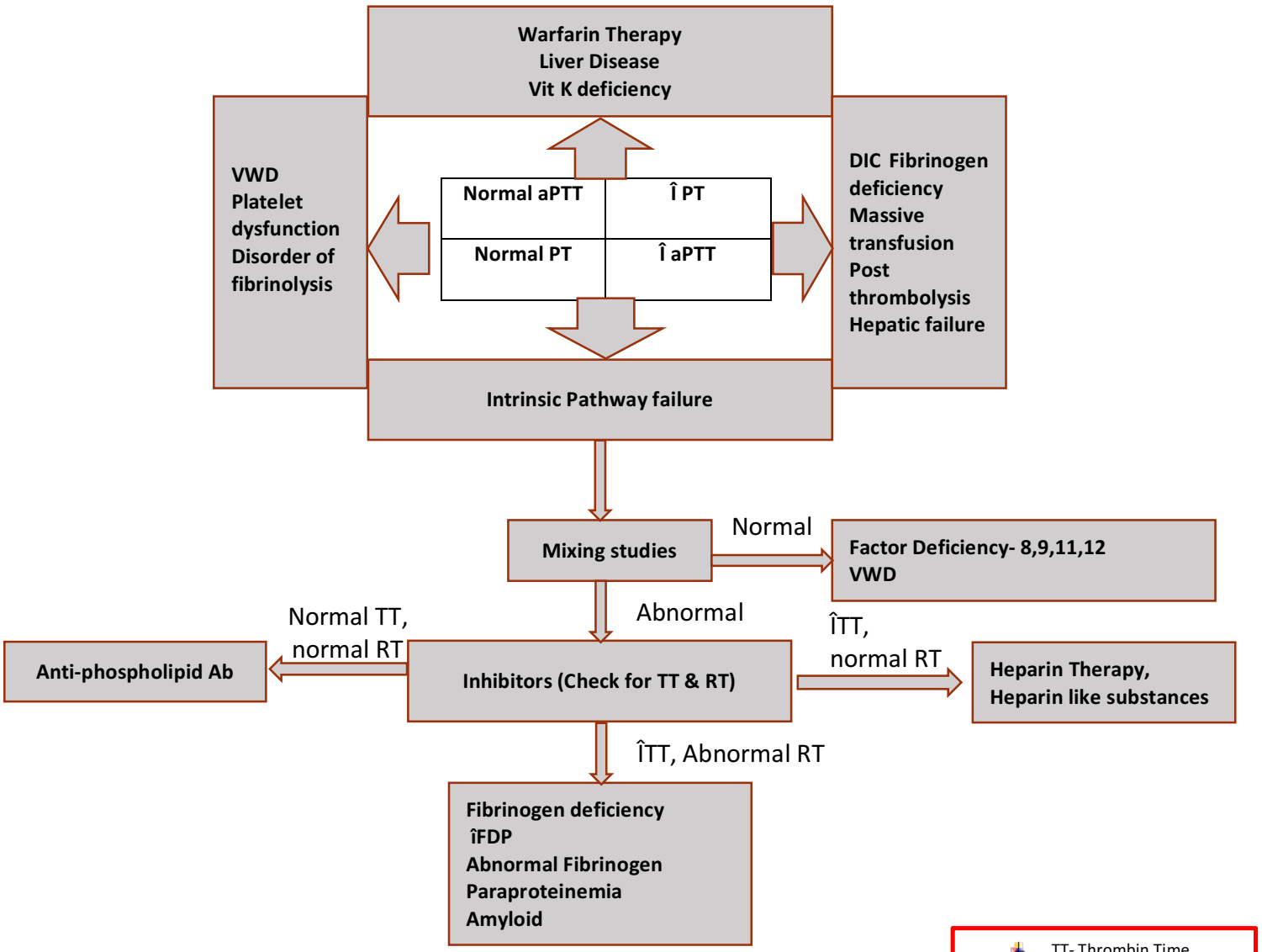
Interpretation of Abnormal Coagulation studies



Coagulation Tests:-

Sl No	Test	How is it measured	Significance	Interpretation
1	TT (Thrombin Time)	• Addition of thrombin to patient's platelet poor plasma. • Thrombin converts Fibrinogen to Fibrin • Very rapid (TT= 13-15 sec)	• It is a measure of final step of coagulation cascade - Fibrinogen to Fibrin • AT-III is the natural antagonist of this step. • Heparin causes a prolonged TT (as it potentiates AT-iii by 1000 times) • Warfarin- does not affect TT.	• Low Fibrinogen level • Abnormal Fibrinogen • Paraproteinemia • Amylodosis • Drugs- ◊ Heparin ◊ Direct Thrombin inhibitors- ◊ Argatroban, Dabigatran, Hirudin
2	PT (Prothrombin Time)	• External "Tissue factor or Thromboplastin and Calcium" are added to plasma and time to clot is measured. • This initiates the extrinsic pathway, which proceeds to common pathway	• Represents the Extrinsic and common pathway function. • It tests the function of Vit K dependent factors- II, VII & X (Not IX though Vit K dependent)	• Warfarin therapy • Vit K deficiency • Liver failure • Deficiency of factors (VII, II, X, Fibrinogen,V) • Presence of inhibitors of the factors • Fibrinogen abnormalities (Hypo/Dys/Afibrinogenemia) • Dilutional coagulopathy
3	aPTT (Activated partial Thromboplastin Time)	• Phospholipid (cephalin), contact activator (Kaolin/silica/ellagic acid) & calcium (all pre-warmed to 37°C) are added to platelet poor plasma. Time taken from the addition of calcium to the formation of clot is measured as aPTT.	• Represents the intrinsic or common pathway function. • It is increased with either factor deficiency or presence of factors inhibitors or both • The distinction can be made by "Mixing studies"	• Deficiency of factors ◊ VIII,IX,XI,XII ◊ VWD (Factor VII deficiency) ◊ Dilutional coagulopathy • Inhibition of factors ◊ Heparin ◊ Antiphospholipid syndrome
4	Mixing studies	• Patient's plasma & normal plasma are mixed with 1:1 ratio.		If the aPTT is not corrected with in a stipulated time (usually 3-4 sec) then- • An inhibitor of the coagulation factor • Antiphospholipid Ab
5	PTT (Partial Thromboplastin Time)	• No activator is added to speed up the clotting	• Same as aPTT but reported to be less sensitive	
6	ECT (Ecrine Time)	• "Ecarin" activates prothrombin bypassing intrinsic or extrinsic pathway. • It differentiates the cause for	• Used to measure activity of direct thrombin inhibitors i.e Argatroban, Dabigatran	If abnormal along with a î aPTT- direct thrombin inhibitor present. If normal with an abnormal aPTT- Heparin or heparin like substances present.

		• î aPTT (factor deficiency Vs presence of inhibitors of coagulation factor)		
7	RT (Reptilase Time)	• "Reptilase" converts fibrinogen to fibrin	• It is not affected by any human haemostatic mechanism which includes activity of AT-III, direct thrombin inhibitors i.e Argaroban, Hirudin.	Î only in disorders related to • fibrin function ◊ Dysfunctional fibrin ◊ Paraproteinemia ◊ Amyloidosis • Fibrin concentration ◊ Hypofibrinogenemia

References-

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