

Thromboelastography (TEG) and Its “Off Label Uses”

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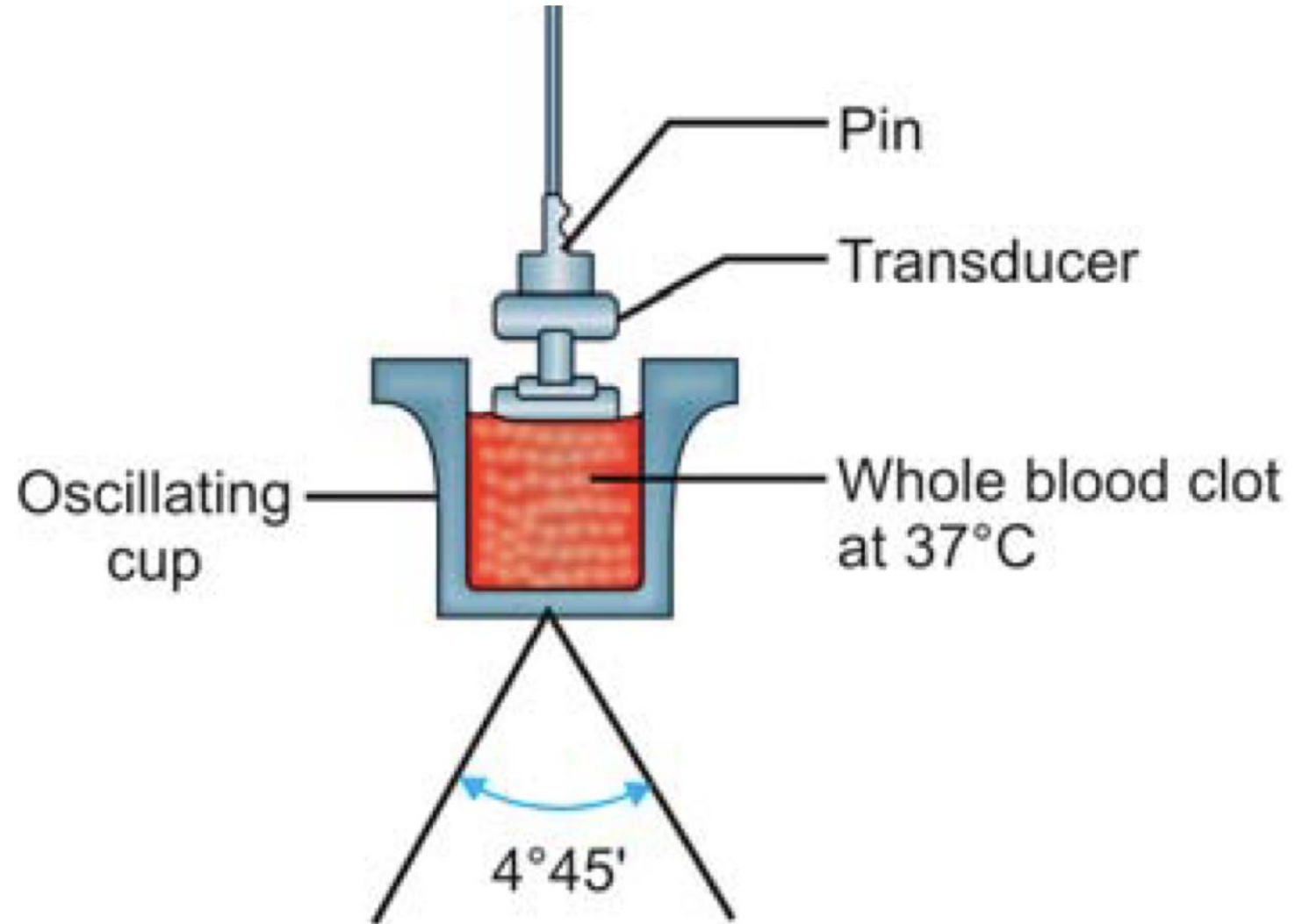
ICEP Spring Symposium

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What is TEG?



Coagulation

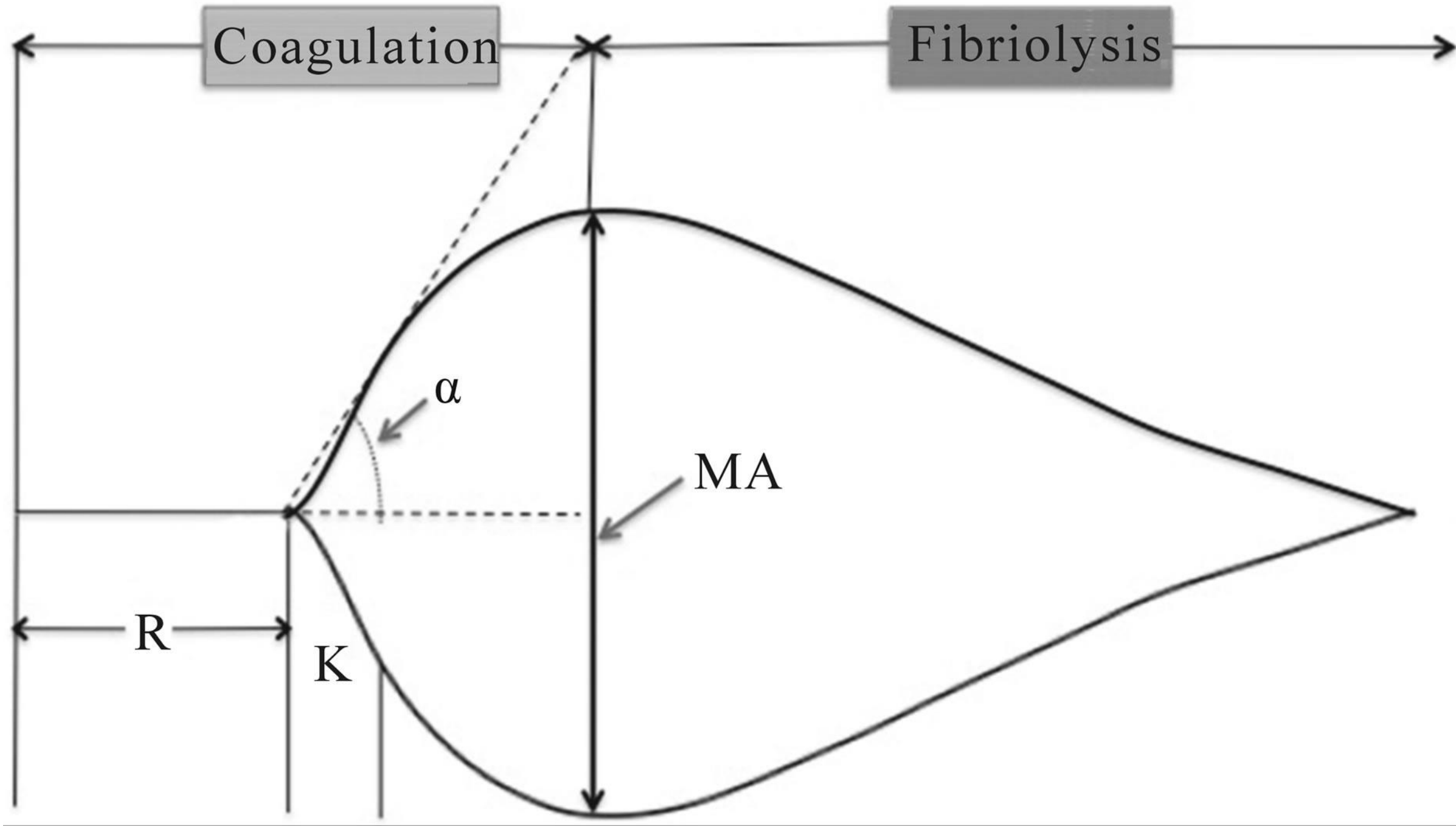
Fibrinolysis

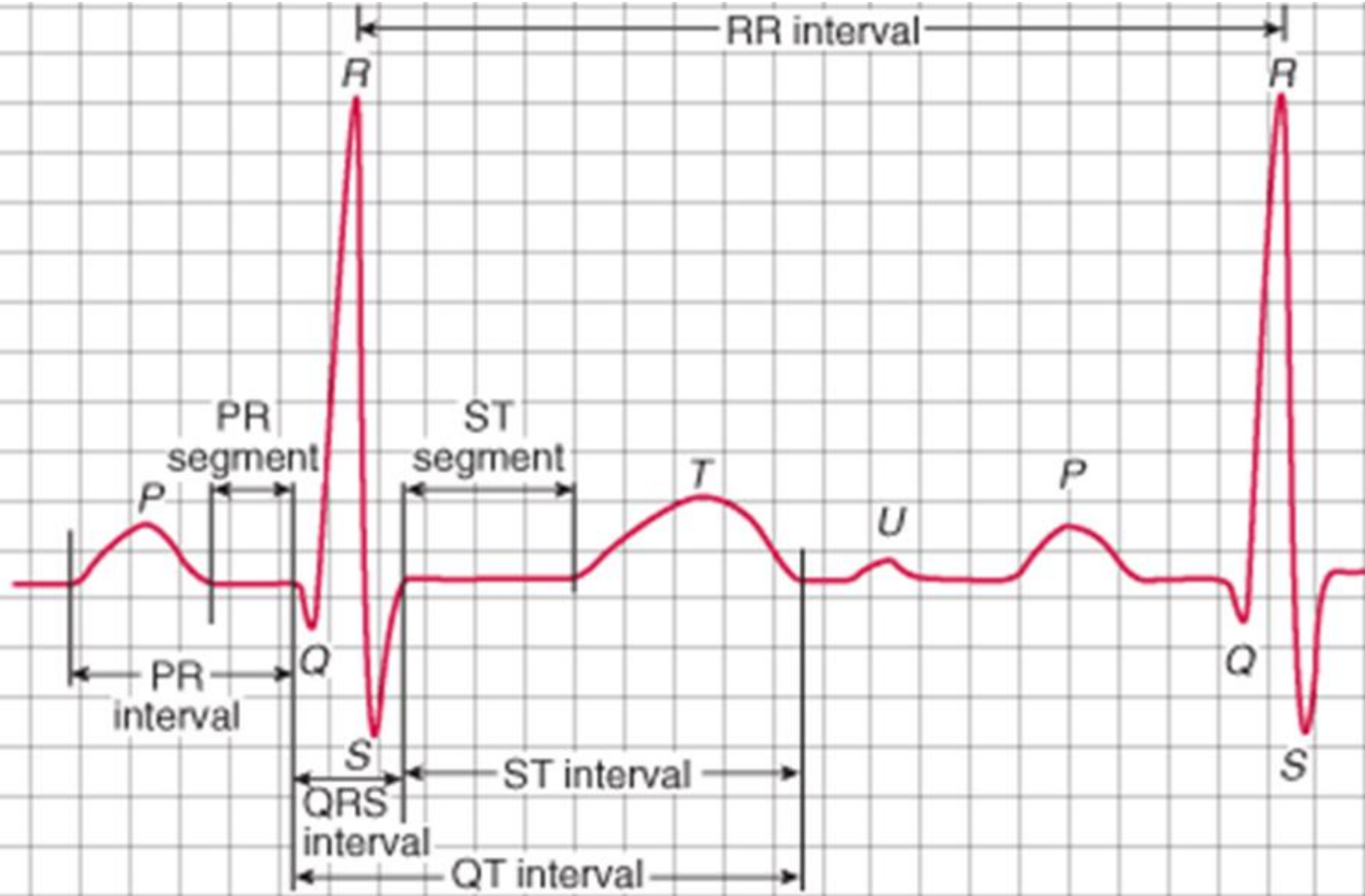
α

MA

R

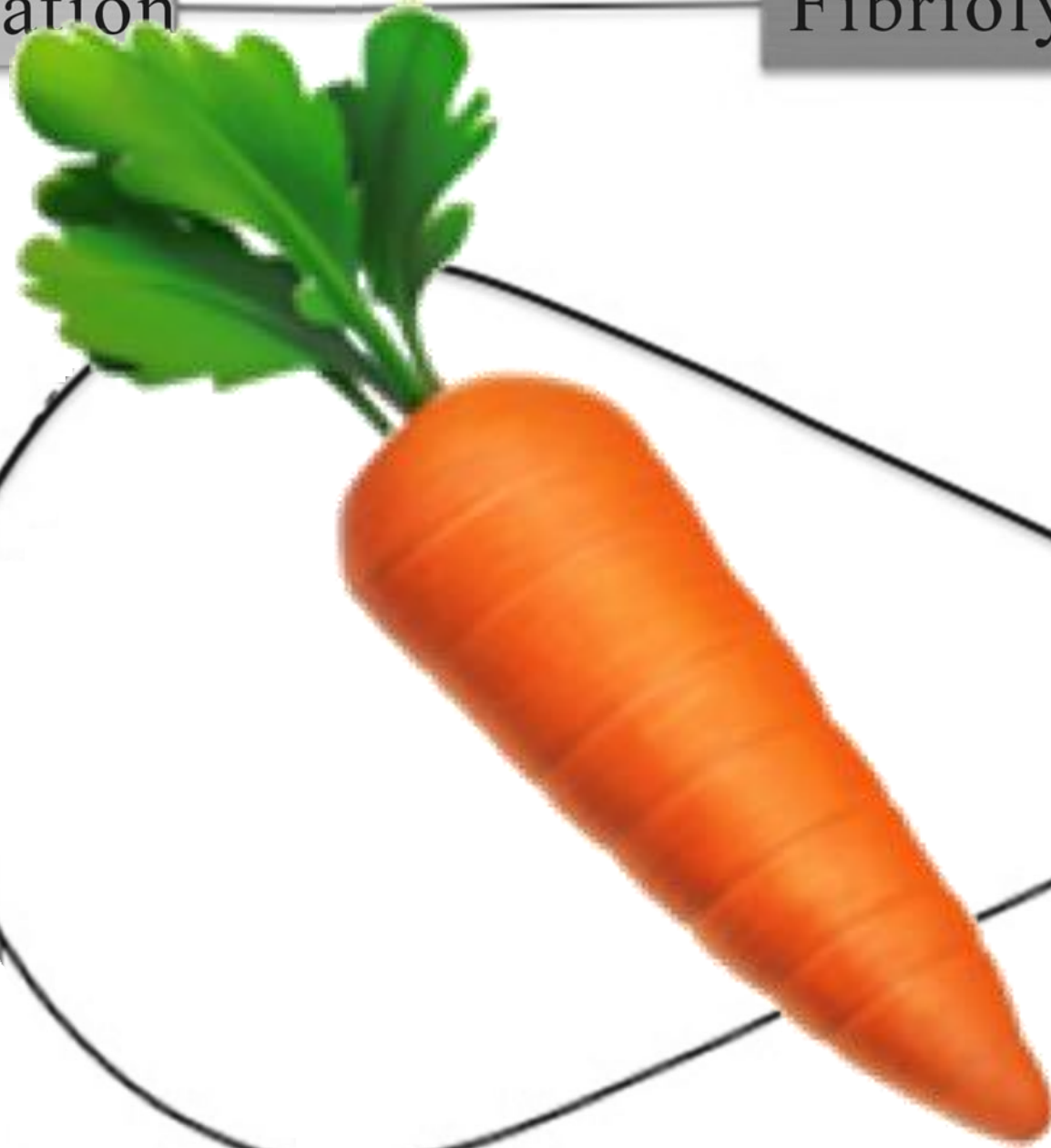
K





Coagulation

Fibrinolysis

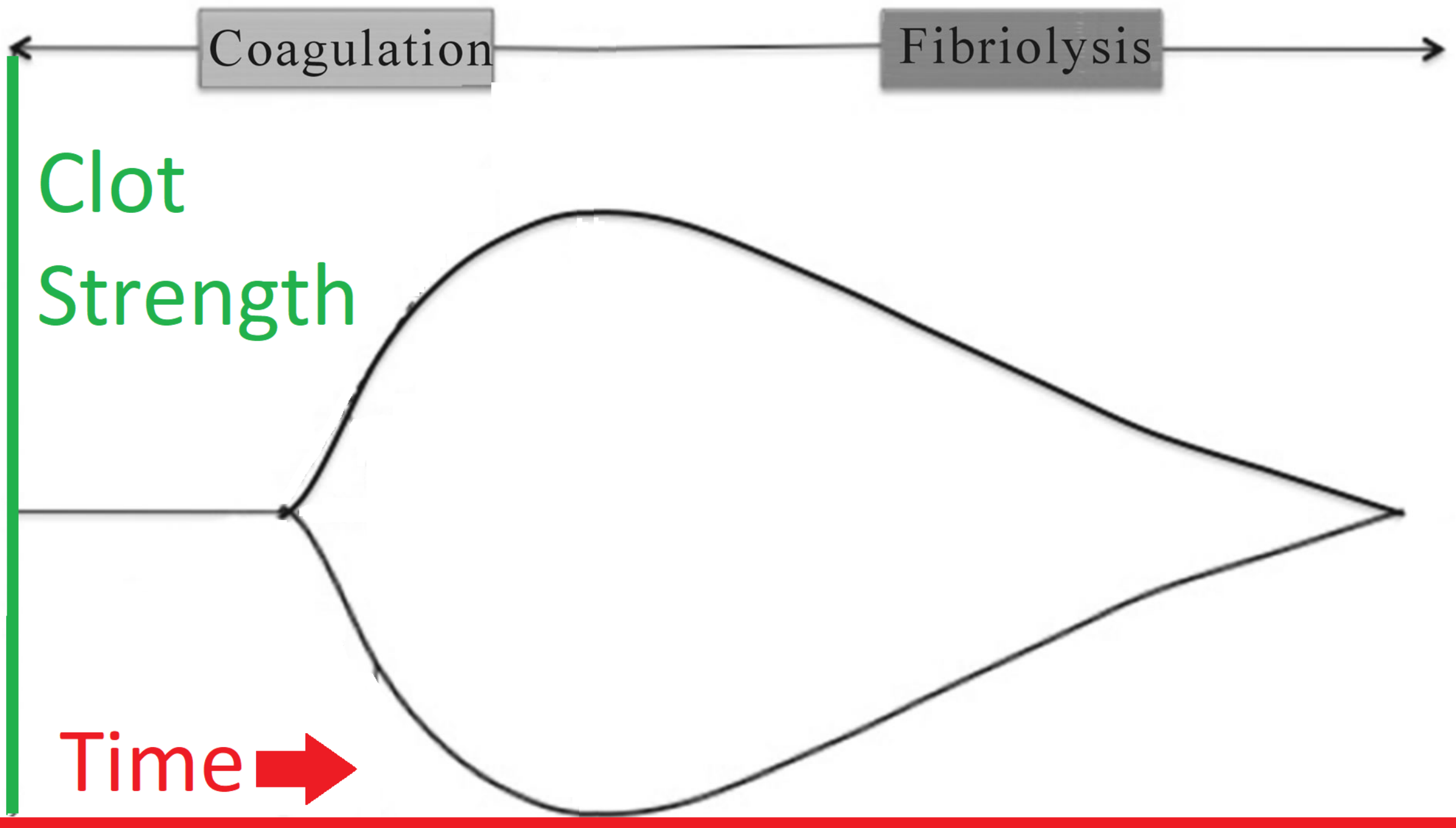


← Coagulation

Fibrinolysis →

Clot
Strength

Time →



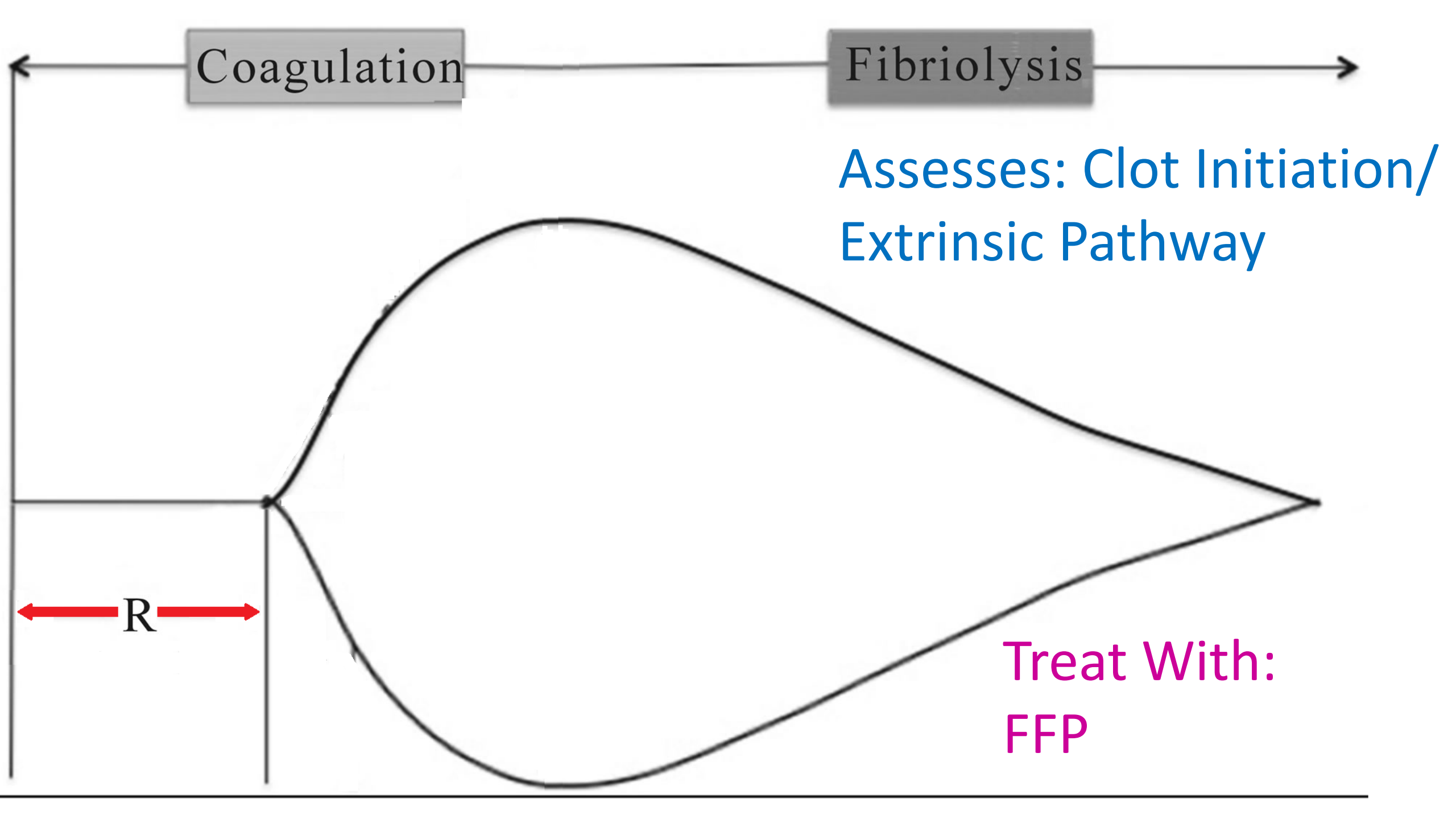
Coagulation

Fibrinolysis

Assesses: Clot Initiation/
Extrinsic Pathway

R

Treat With:
FFP



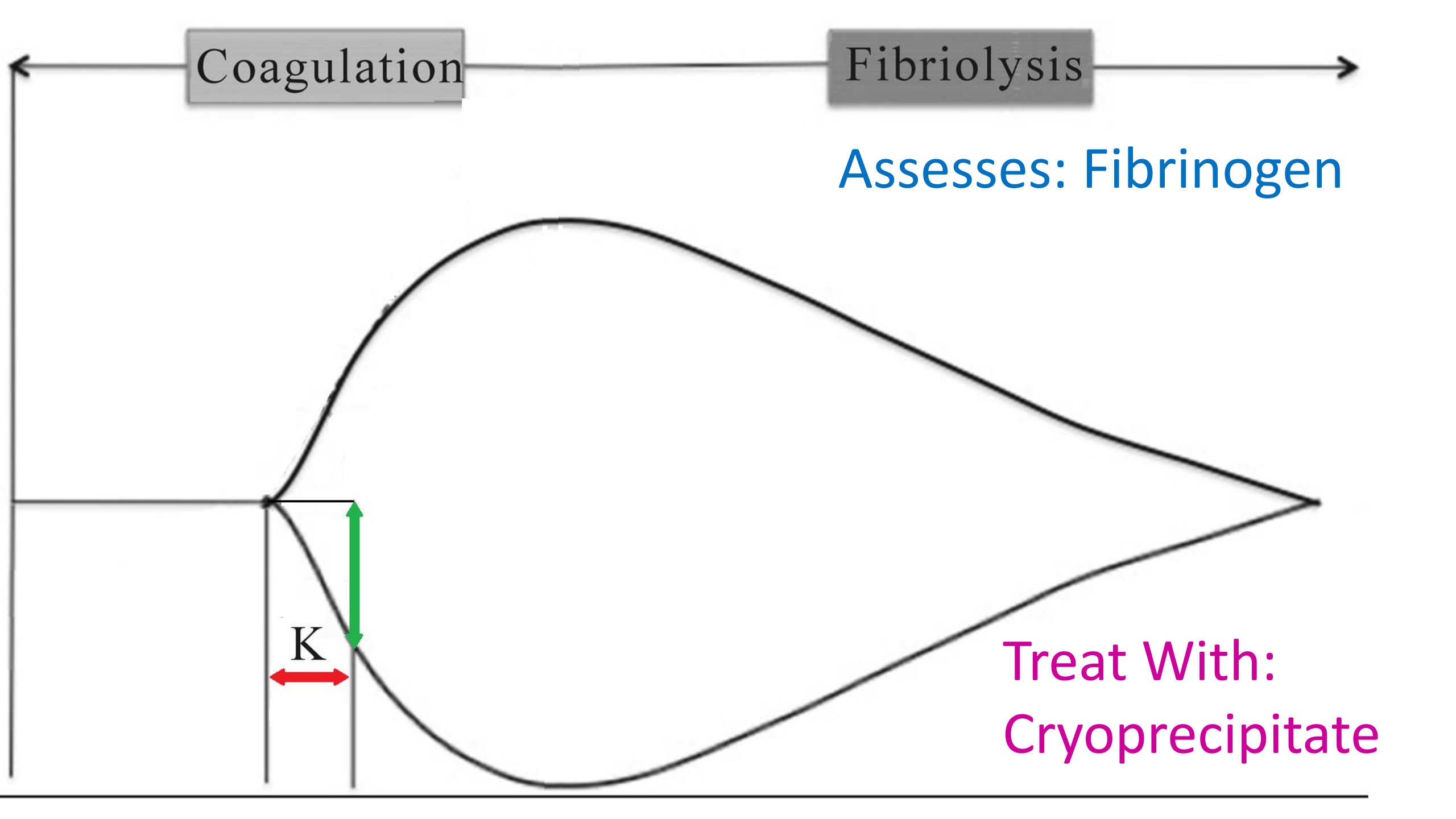
Coagulation

Fibrinolysis

Assesses: Fibrinogen

K

Treat With:
Cryoprecipitate



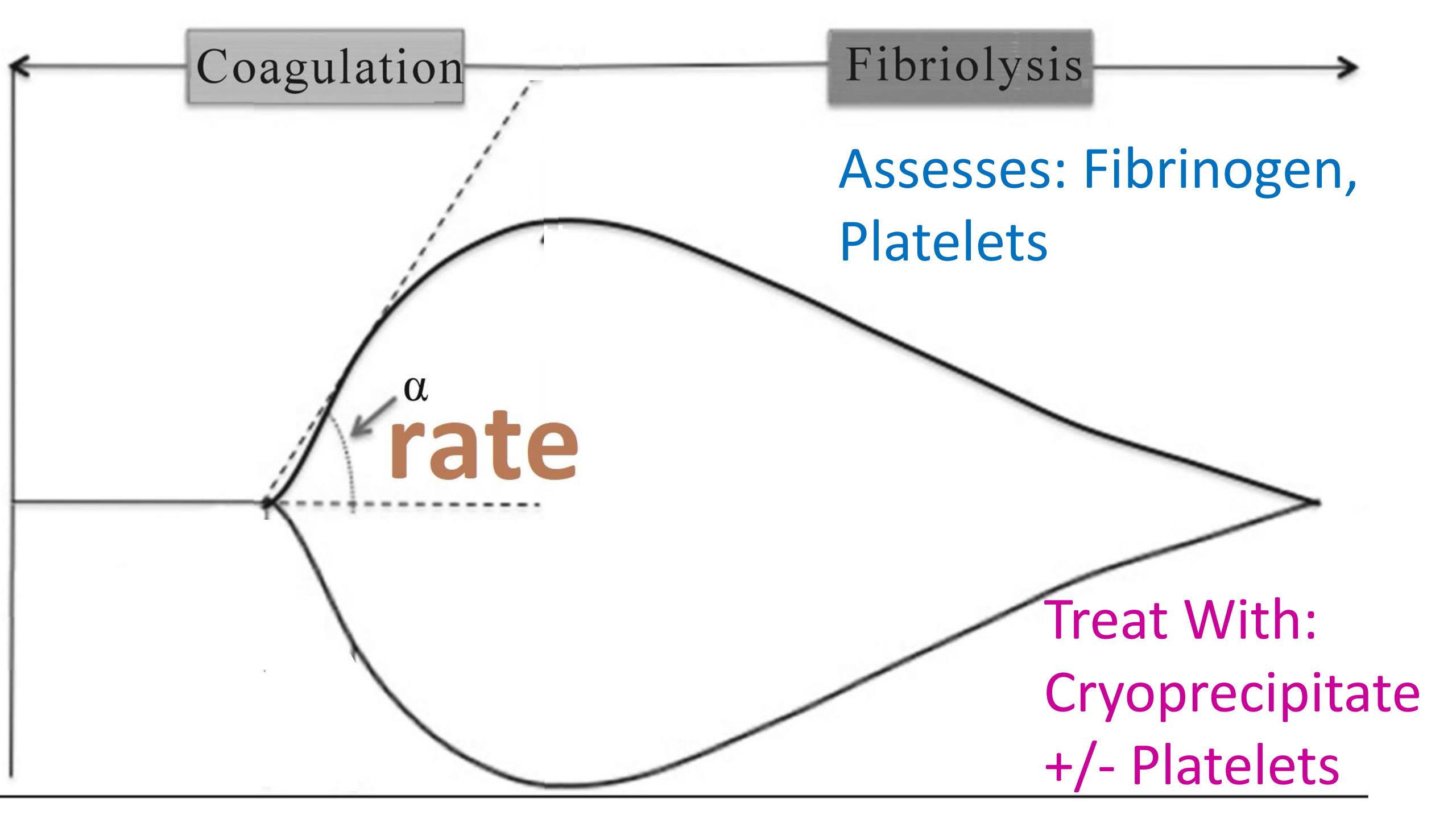
Coagulation

Fibrinolysis

Assesses: Fibrinogen,
Platelets

α
rate

Treat With:
Cryoprecipitate
+/- Platelets



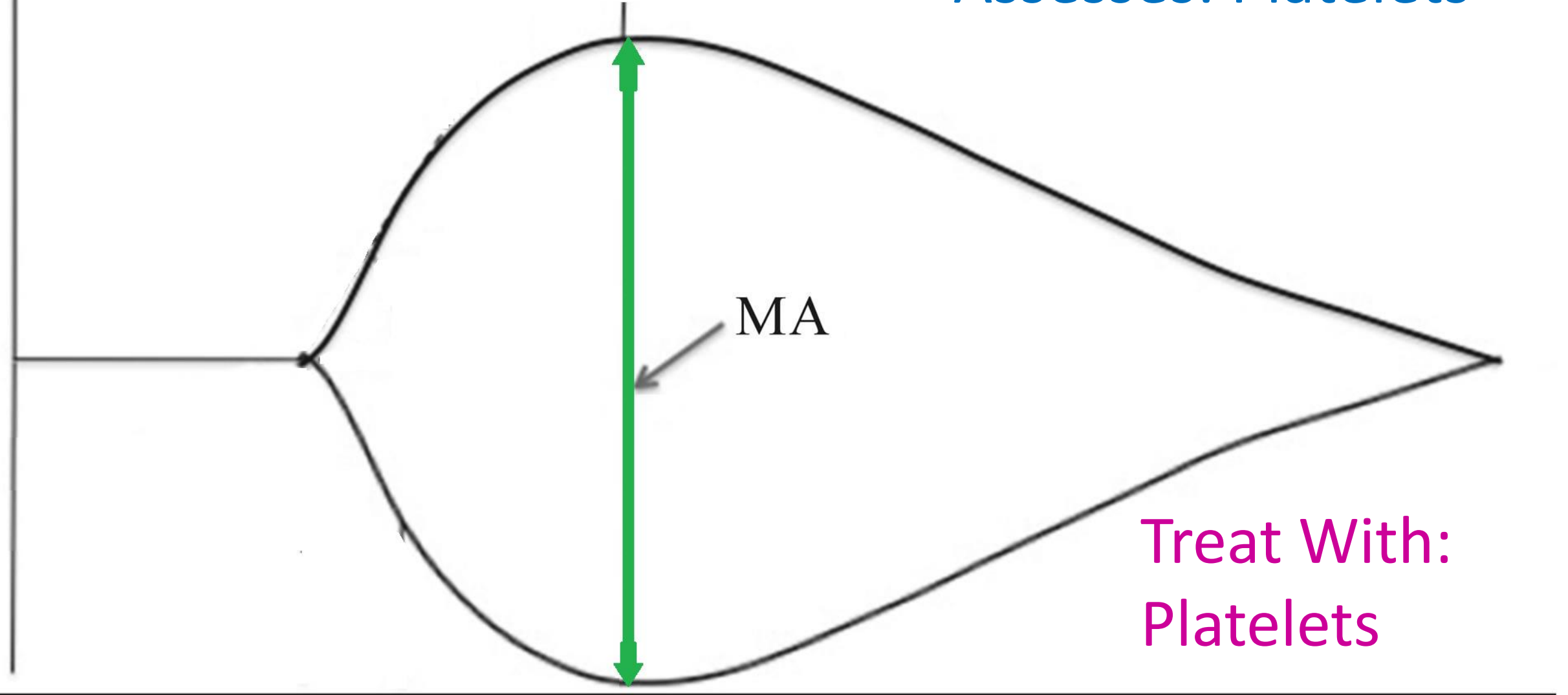
← Coagulation

Fibrinolysis →

Assesses: Platelets

MA

Treat With:
Platelets



Coagulation

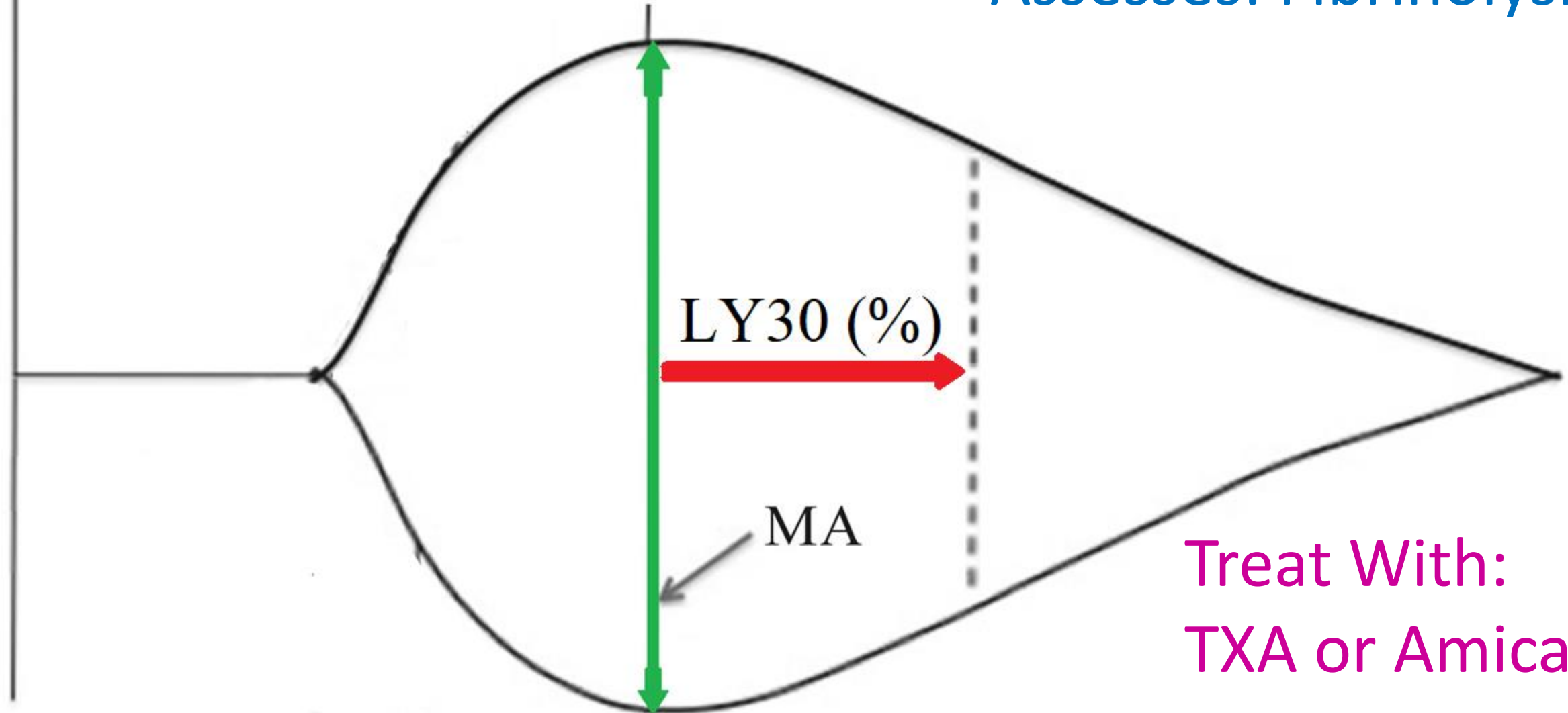
Fibrinolysis

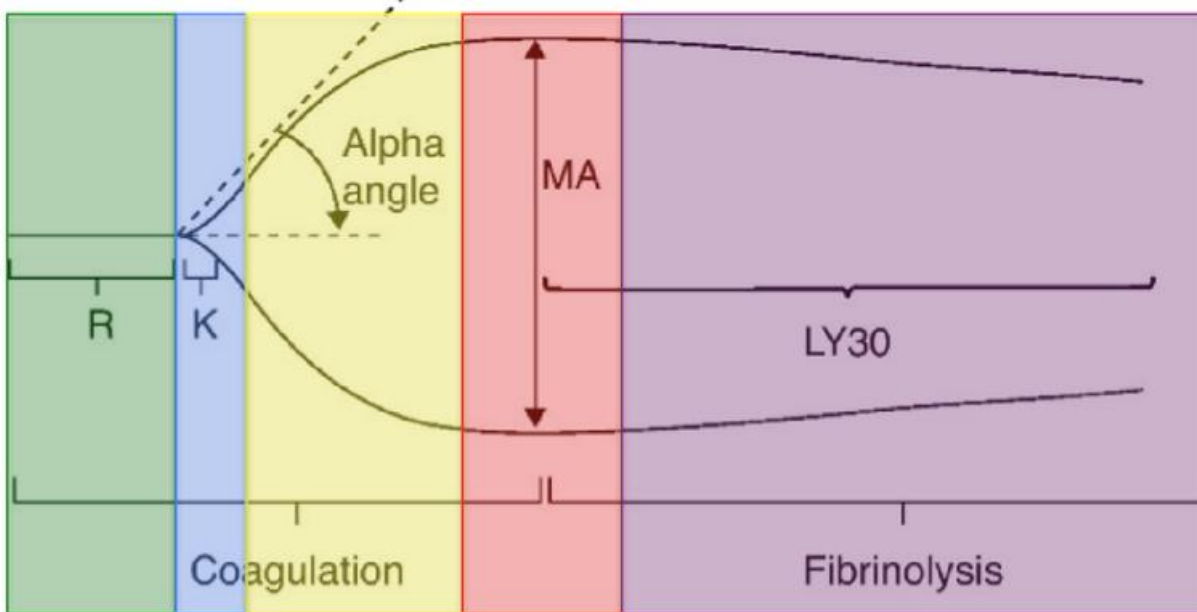
Assesses: Fibrinolysis

LY30 (%)

MA

Treat With:
TXA or Amicar





rebelem.com

Thromboelastogram (TEG)

Components	Definition	Normal Values	Problem with...	Treatment
R Time	Time to start forming clot	5 – 10 minutes	Coagulation Factors	FFP
K Time	Time until clot reaches a fixed strength	1 – 3 minutes	Fibrinogen	Cryoprecipitate
Alpha angle	Speed of fibrin accumulation	53 – 72 degrees	Fibrinogen	Cryoprecipitate
Maximum Amplitude (MA)	Highest vertical amplitude of the TEG	50 – 70 mm	Platelets	Platelets and/or DDAVP
Lysis at 30 Minutes (LY30)	Percentage of amplitude reduction 30 minutes after maximum amplitude	0 – 8%	Excess Fibrinolysis	Tranexemic Acid and/or Aminocaproic Acid





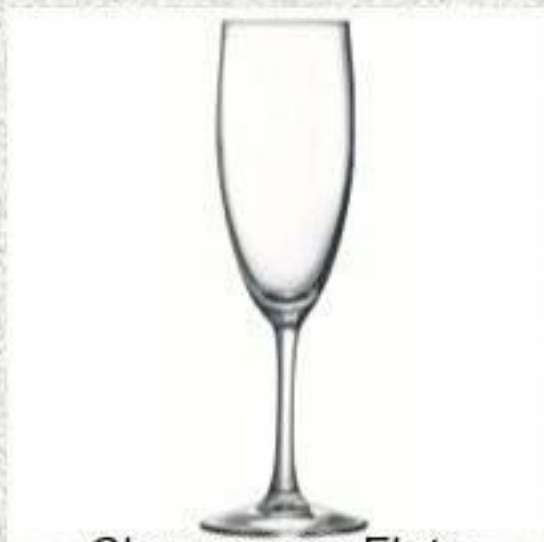
Brandy Tumbler
Do Nothing



Red Wine Glass
Give FFP



Test Tube
Give Platelets



Champagne Flute
Give Cryo



Upside Down Martini Glass
Give TXA

Thromboelastography
in Trauma



Goal-directed Hemostatic Resuscitation of Trauma-induced Coagulopathy:

A Pragmatic Randomized Clinical Trial Comparing a Viscoelastic Assay to Conventional Coagulation Assays

Eduardo Gonzalez, MD*, Ernest E. Moore, MD*,†, Hunter B. Moore, MD*, Michael P. et. al.
Ann Surg. 2016 June ; 263(6): 1051–1059. doi:10.1097/SLA.0000000000001608.

Randomized Control Trial, intention to treat (111 patients)

TEG guided MTP vs. Traditional Guided MTP

IMPROVED Mortality (@28 days)

DECREASED Blood Products (but ↑ platelets)

DECREASED ICU days and “vented” days

On the Horizon....

Implementing Treatment Algorithms for the Correction of Trauma Induced Coagulopathy (iTACTIC)

Randomized Control Trial, 400 patients

24-hour, 28-day and 90-day mortalities

Total Time to Hemostasis

Transfusion related complications (TACO, TRALI etc)

Results 2019....



Bleeding Cirrhotic

“Rebalanced Hemostasis”

Traditional Measures Don't Help

TEG = real time guidance

Already in use for liver transplants

RIPE FOR EM STUDY!!

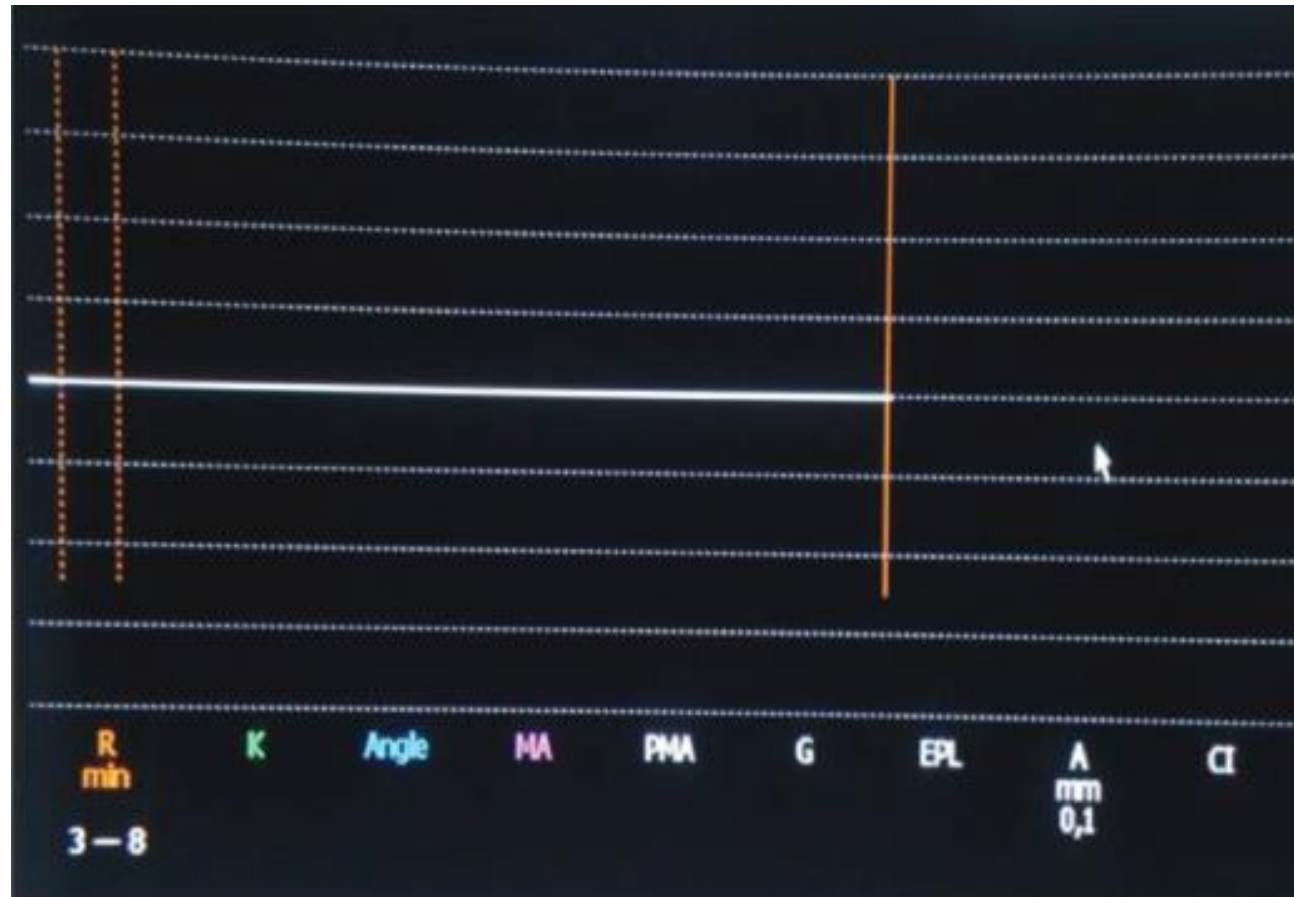


Bleeding from Unknown Cause?

Thromboelastographic Evaluation of Coagulation in a Dog with Anticoagulant Rodenticide Intoxication

Oya ERALP İNAN ¹  Meriç KOCATÜRK ² Zafer MECİTOĞLU ² Zeki YILMAZ ²

Kafkas Univ Vet Fak Derg. 22 (3): 477-478, 2016. DOI: 10.9775/kvfd.2015.14666



- Treated with Vitamin K!
- Improved hemostasis!
- Also left hospital AMA...



ANY QUESTIONS?

FOAMed Resources

- emDocs:

<http://www.emdocs.net/thromboelastogram-teg-five-minute-primer-emergency-physician/>

- Life in the Fastlane:

<https://lifeinthefastlane.com/ccr/thromboelastogram-teg/>

- Taming the Sru:

<http://www.tamingthesru.com/blog/grand-rounds/teg>

- PulmCrit:

<https://emcrit.org/pulmcrit/coagulopathy-bleeding-cirrhotic-inr/>

References

(Slide 5) Gonzalez E, Moore EE, Moore HB. Management of Trauma Induced Coagulopathy with Thrombelastography. *Critical care clinics*. 2017;33(1):119-134. doi:10.1016/j.ccc.2016.09.002.

(slide 6) Sourced from: <http://nursingpub.com/12-lead-ekg-explained-part-1/>

(Slide 7-13) Presenter modifications to image from Gonzalez E, Moore EE, Moore HB. Management of Trauma Induced Coagulopathy with Thrombelastography. *Critical care clinics*. 2017;33(1):119-134. doi:10.1016/j.ccc.2016.09.002.

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(Slide 16) <https://only4medical.files.wordpress.com/2017/05/img-20170520-wa0032-1.jpg>

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