

Can bleeding be predicted?

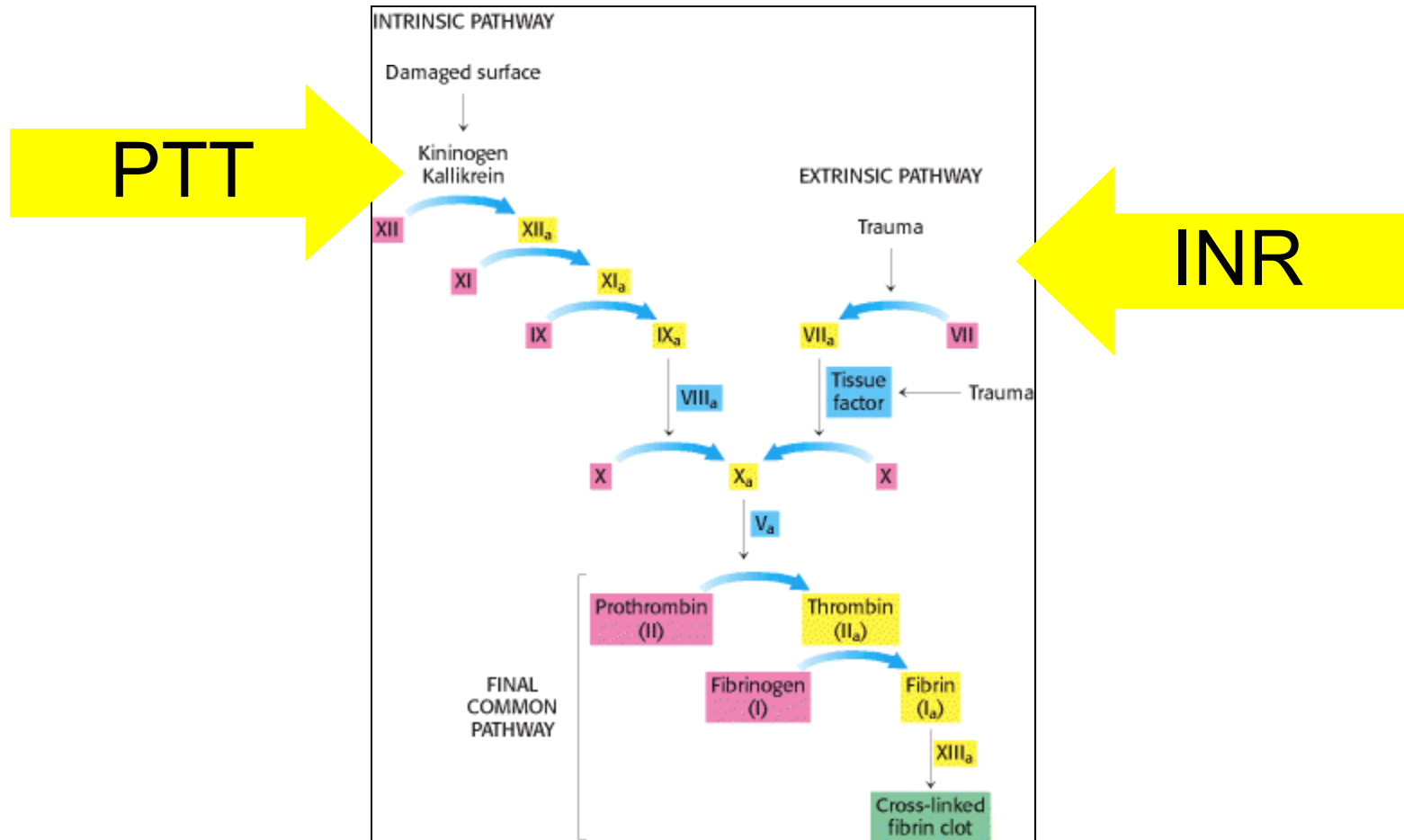


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Objectives

- Review role of clotting time tests in predicting bleeding
- Review role of history in predicting bleeding

What I learned about coagulation in medical school



What I learned about taking a
bleeding history in medical school

What I learned about predicting bleeding when I started practice

Will my patient with abnormal coag tests bleed?

Will this patient bleed again like she did last time?

Is my patient bleeding because of abnormal coag tests?



Then I learned about structured bleeding assessment tools...

- Multiple bleeding assessment tools (BAT) available
 - Sensitivity and positive predictive value of all of them vary depend on the setting and patient population enrolled
 - But, there is data to indicate that the severity of bleeding symptoms correlates with the risk of future bleeding
 - Negative predictive value of all BATs in all setting is very high
 - **NEGATIVE BLEEDING SCORE NEARLY EXCLUDES A CLINICALLY SIGNIFICANT BLEEDING DISORDER**

Table 1. Alignment of bleeding assessment instruments and their major goal(s)

Instruments	Goals
Vicenza bleeding questionnaire and modifications [8–11] ISTH/SSC bleeding assessment tool [12**] Rockefeller bleeding history questionnaire [13**]	To diagnose inherited or acquired bleeding disorders and to predict the risk of future bleeding
Buchanan grading system [14] UK clinical severity classification system [15] ITP bleeding scale [16] WHO bleeding scale [17] ISTH ITP working group bleeding assessment tool (publication in preparation)	To assess bleeding associated with immune thrombocytopenia and thrombopoietic stimulating agents in preventing bleeding
Thrombolysis In Myocardial Infarction (TIMI) criteria Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO) scale Bleeding Academic Research Consortium (BARC) CURE criteria ACUITY, HORIZONS criteria CURRENT-OASIS7 STEEPLE criteria PLATO criteria GRACE criteria REPLACE-2/ISAR-REACT-3 criteria ESSENCE criteria	To assess bleeding associated with percutaneous coronary interventions [Reviewed in reference [18**]]
Amiani <i>et al.</i> criteria mOBRI RIETE HAS-BLED CHA ₂ DS ₂ -VASc HEMORR2HAGES	To predict the risk of bleeding associated with chronic oral anticoagulant therapy [Reviewed in reference [19*]]
Papworth Bleeding Risk Score (BriSC) [13**,20]	To predict the risk of bleeding with cardiac bypass surgery [21*]
Rockefeller bleeding history questionnaire [13**]	To correlate phenotypic, genotypic, and environment information

Example: HAS-BLED score

- Derived from a real-world cohort of 3,978 with AF
- Assesses the 1-year risk for major bleeding in patients on oral anticoagulation
 - Major bleeding =intracranial, requiring hospitalization, hemoglobin decrease > 20 g/L, and/or requiring transfusion
- HAS-BLED score ≥ 3 indicates a high risk of bleeding

“HAS-BLED” is an acronym for

- **Hypertension** (Systolic BP >160 mmHg)
- **Abnormal Liver/Renal Function**
 - Chronic dialysis, renal transplant, or serum creatinine > 200 mmol/L
 - Known hepatic disease or biochemical evidence of significant hepatic derangement
- **Stroke History**
- **Bleeding Predisposition**
 - Prior history of major bleeding
- **Labile INRs**
 - Time in therapeutic < 60%
- **“Elderly”**
 - Age > 65
- **Drugs/Alcohol Usage**
 - Drugs= antiplatelet agents

Table 5—The Risk of Major Bleeding Within 1 Year in Patients With Atrial Fibrillation Enrolled in the Euro Heart Survey

Risk Factors/Score	Derivation Cohort ^a			HAS-BLED		
	No.	No. of Bleeds	Bleeds Per 100 Patient-Years	No.	No. of Bleeds	Bleeds Per 100 Patient-Years
0	1,517	9	0.59	798	9	1.13
1	1,589	24	1.51	1,286	13	1.02
2	219	7	3.20	744	14	1.88
3	41	8	19.51	187	7	3.74
4	14	3	21.43	46	4	8.70
5	1	0	...	8	1	12.50
6	...	...	...	2	0	0.0
7	...	...	...	0	...	...
8	...	...	...	0	...	...
9	...	...	...	0	...	...
Any score	3,281	51	1.51	3,071	48	1.56
P value for trend			<0.001			0.007

See Table 2 for expansion of abbreviations.

^aDerivation cohort risk factors in multivariate analysis: bleeding history (given 2 points), age > 65 y, clopidogrel use, and kidney failure (maximum score 5).

How would / use it?

- In combination with the CHADS2 score
 - Risk of stroke in AF
- Make a decision about which risk is greater, stroke or bleeding
- Follow anticoagulation very closely in patients with higher scores

What about other patients?

- Does my patient with menorrhagia/ easy bruising/ previous bleeding have a congenital or acquired bleeding disorder?
 - Condensed MCMDM-1 bleeding questionnaire
 - Gyne-specific score
- Pre-operative assessment
 - No BAT available yet

TABLE 1

Screening tool

Q1. How many days did your period usually last, from the time bleeding began until it completely stopped?

Q2. How often did you experience a sensation of “flooding” or “gushing” during your period?

Q3. During your period did you ever have bleeding where you would bleed through a tampon or napkin in ≤ 2 hours?

Q4. Have you ever been treated for anemia?

Q5. Has anyone in your family ever been diagnosed with a bleeding disorder?

Q6. Have you ever had a tooth extracted or had dental surgery?

Q6a. Did you have problem with bleeding after tooth extraction or dental surgery?

Q7. Have you ever had surgery other than dental surgery?

Q7a. Did you have bleeding problem after surgery?

Q8. Have you ever been pregnant?

Q8a. Have you ever had bleeding problem after delivery or after a miscarriage?

Philipp. Menorrhagia screening tool for bleeding disorders. Am J Obstet Gynecol 2011.

TABLE 4

Sensitivity, specificity, positive predictive value, and negative predictive value for screening tools

Variable	Sensitivity ^a	Specificity ^a	Positive predictive value ^a	Negative predictive value ^a
Screening tool				
Bleeding disorder ^b	89 (83–93)	16 (8–27)	72 (65–78)	37 (19–58)
Low von Willebrand factor	73 (39–94)	12 (8–17)	4 (2–8)	89 (71–98)
Platelet function defects	89 (82–94)	14 (8–23)	56 (49–63)	52 (32–71)
Screening tool combined with pictorial blood assessment score >185				
Bleeding disorder ^b	95 (90–98)	6 (2–15)	71 (65–77)	33 (10–65)
Low von Willebrand factor	91 (59–100)	5 (3–9)	5 (2–9)	92 (62–100)
Platelet function defects	94 (88–98)	5 (2–12)	55 (48–62)	42 (15–72)
Screening tool combined with ferritin ≤20 ng/mL				
Bleeding disorder ^b	93 (89–97)	11 (3–19)	72 (66–78)	39 (16–61)
Low von Willebrand factor	91 (59–100)	8 (4–12)	5 (2–8)	94 (84–100)
Platelet function defects	92 (87–97)	8 (3–14)	55 (48–62)	44 (21–67)
Screening tool combined with platelet function analyzer–100				
Bleeding disorder ^b	89 (84–94)	16 (7–25)	72 (66–78)	37 (19–55)
Low von Willebrand factor	73 (46–99)	12 (7–16)	4 (1–7)	89 (77–100)
Platelet function defects	89 (84–95)	14 (7–21)	56 (49–63)	52 (33–71)

^a Data are given as percentage (95% confidence interval); ^b Platelet function defects, von Willebrand factor antigen, or von Willebrand factor ristocetin cofactor <50, coagulation defects, or prolonged platelet function analyzer–100 time.

Philipp. Menorrhagia screening tool for bleeding disorders. *Am J Obstet Gynecol* 2011.

What / would do pre-op

- History of bleeding challenges (surgery, dental extraction, L&D)
 - Any bleeding complications?
 - If yes, quantify
 - Consistent or inconsistent history?
- Family history of bleeding disorders?
- If based on above questions a bleeding disorder is suspected refer to hematology for complete assessment

Are there guidelines to guide us?

- British Committee for Standards in Haematology: Guidelines on the assessment of bleeding risk prior to surgery or invasive procedures
 - Indiscriminate coagulation screening to predict postoperative bleeding is not recommended
 - A bleeding history including family history, previous bleeding problems and use of medications should be taken
 - If the bleeding history is negative no further coagulation testing is needed
 - If the bleeding history is positive, a comprehensive assessment guided by the clinical features is required

DOs and DON'Ts

- DO Have a look at a few BATs and see if there is one that works for you
- DO Learn how to use that BAT properly
- DO Determine the appropriate follow up coagulation tests
- DON'T Order a whack of labs before taking a history
- DO Refer patients with positive bleeding history to hematologist
- DON'T Refer them at the last hour



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