
بسم الله الرحمن الرحیم

OUTPATIENT DIAGNOSTIC APPROACH TO BLEEDING EVENTS :

WHEN IS IT SIGNIFICANT?

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Refferences


CLINICAL GUIDELINES

blood advances

Check for updates

ASH ISTH NHF WFH 2021 guidelines on the diagnosis of von Willebrand disease

Paula D. James,[1] Nathan T. Connell,[2] Barbara Ameer,[3,4] Jorge Di Paola,[5] Jeroen Eikenboom,[6] Nicolas Giraud,[7] Sandra Haberichter,[8] Vicki Jacobs-Pratt,[9] Barbara Konkle,[10,11] Claire McLintock,[12] Simon McRae,[13] Robert R. Montgomery,[14] James S. O'Donnell,[15] Nikole Scappe,[16] Robert Sidonio Jr,[17] Veronica H. Flood,[14,18] Nedaa Husainat,[19] Mohamad A. Kalot,[19] and Reem A. Mustafa[19]

- **SickKids Handbook of Pediatric Thrombosis and Hemostasis** 2nd, revised and extended edition
- http://www1.wfh.org/docs/en/Resources/Assessment_Tools_ISTHBAT.pdf
- Will Thomas,et al., Bleeding of unknown cause and unclassified bleeding disorders; diagnosis, pathophysiology and management. Haemophilia. 2020;26:946–957.

Case-1

- 6 years old boy with recurrent epistaxis, about twice monthly, lasts around 15 minutes, comes to your clinic in Zabol.
- PMH: No URI; No allergy,No trauma or local problem ,Not related to seasons and climate conditions ,exercise, etc.
- Normal BP
- Family history: same history in her mother; no consanguinity in her parents.
- Laboratory evaluation ,3 times :
  - Normal CBC & Platelet
  - BT=5`
  - PT=13`` PTT=40``

Case-2

- A 25-year-old female has presented to you due to suspicious bleeding episodes, starting in 13 Y old, and after some Unexplainable bleeding events due to concerns about a potential bleeding disorder, she has been referred to you.

- Her first bleeding episode occurred following a **tooth extraction** at a clinic, which lasted about **2 hour** and was controlled with **hemostatic dressings.**
- Her **menstrual bleedings** began that same year and, although they last approximately **9 to 10 days**, they are not heavy, with **only 2 to 4 pads being changed daily during the first 2 to 3 days.**
- At the age of 19, she **underwent rhinoplasty**, which was performed **without significant bleeding**, and she was discharged. However, she experienced mild **bloody oozing** from the suture site for a few days, which was controlled with an vitamin K administration.
- Upon further history-taking, it was noted that bleeding from **skin cuts** typically lasts around **15 minutes**.
- At the age of 24, she **underwent cholecystectomy** .Due to previous suspicious history, **initial coagulation screening tests (PT,aPTT,BTand platelet counts**)were performed, all of which were normal. However, during the surgery, significant bleeding occurred, necessitating the use of tranexamic acid and hemostatic dressings.
- Family history: same history in her aunt; no consanguinity in her parents.

Hematology

Test	Result	Unit	Normal Range	Differential	
Complete Blood Count	-		-		
W.B.C.	8.74	10*3/µL	4.4-11	Neutrophil	62%
R.B.C.	5.43	10*6/µL	3.8-5.5	Lymphocytes	29%
HGB	15	g/dL	12-16	Monocyte	8%
HCT	44.8	%	36-56	Eosinophil	1%
M.C.V.	82.5	fL	80-100		
M.C.H.	27.6	pg	25-34		
M.C.H.C.	33.5	g/dL	31-37		
Platelet	286	10*3/µL	150-450		
RDW-CV	13.3	%	11.6-14.5		
PDW	11.7	fL	9.4-18.1		
MPV	10.3	fL	8.1-12.4		

Checked By : 0

Coagolation Laboratory(Screening Test)

Test	Result	Unit	Normal Range
BT (IVY Method)	5	Min	3 - 7
PT Patient	10	Sec	10 - 13
PT control	10	Sec	10 - 13
PT activity	100	%	70 - 100
PT INR	1	-	1 - 1.3
APTT Patient	30	Sec	28 - 38
APTT Control	31	Sec	28 - 38

Coagolation Laboratory(Factor Assay)

Test	Result	Unit	Normal Range
F VII Activity (1-Stage method)	113	%	49 - 160
F VIII Activity (1- Stage method)	108	%	50 - 150
vWF Activity (RiCof method)	87	%	50 - 162
vWF Antigen (Turbidimetric method)	99	%	50 - 155
F XI Activity (1-Stage method)	98	%	54 - 154

M.Jazebi MSc.

Dr. Hamidreza Jamali

Coagulation

Test	Result	Unit	Method	Normal Range
PT patient	11.5	Sec	Clotting time	10-13
PT control.	11	Sec	Clotting time	-
aPTT patient	33	Sec	Clotting time	28-35
aPTT control	35	Sec	Clotting time	-
Bleeding Time (IVY)	2	min	Ivy method	2-7
Clotting Time	5	min	Clotting time	3-6
Reptilase Time Patient	16.3	Sec	Clotting time	14-20
Reptilase Time control	18		Clotting time	-
Fibrinogen Activity	296	mg/dL	Clauss technique	200-450
Fibrinogen Antigen	326	mg/dL	Immunoassay	194-417
Factor II *	109	%	One stage assay	67-139
Factor V *	110	%	One stage assay	62-139
Factor VII *	92	%	One stage assay	50-129
Factor VIII:C *	123	%	One stage assay	50-150
VWF Antigen (VWF:Ag)*	102	%	Immunoassay	50-150
Factor IX *	112	%	One stage assay	65-150
Factor X	97	%	One stage assay	68-124
Factor XI *	112	%	One stage assay	65-150
Factor XIII (Screen)	Normal		Clot solubility test	Normal
Factor XIII activity *	99	%	Photometric assayXbr	70-140
Platelet Aggregation Test	-		LTA	-
ADP 5	63	%		57-83
ADP 10	72	%		57-83
Arachidonic Acid 0.5	68	%		63-100
Collagen 2	80	%		57-80
Epinephrine 10uM	63	%		61-77
Ristocetin 1.5	66	%		66-86
Ristocetin 0.7	4	%		0-4
PRP count	359	10*3/µL		-
PLT count	286	10*3/µL		150-450

Comment

See the lab results of the patient (Lab No:2-303 , date:1401/2/12) for her previous coagulation tests.
Platelet aggregation and secretion (ATP release) test showing no pathological chan

Checked By : 0

در بررسی مجدد این داده‌ها، هیچ واریانت بیماری‌زای شناخته شده ای که بطور قطعی بتواند علائم بیمار را توجیه نماید، یافت نگردید. با این وجود، یک واریانت missense احتمالاً به صورت سوماتیک (*c.1270T>C, p.S424P*) در ژن ***RUNX1*** در بیمار شناسایی گردید. این ژن به عنوان عامل بیماری ***Familial platelet disorder with associated myeloid malignancy*** با توارث اتوزومی غالب و همچنین عامل ایتلا به فرم غالب و سوماتیک ***Acute myeloid leukemia*** گزارش شده است. بنابر بررسی‌های صورت گرفته (شامل فراوانی جمعیتی و آنالیزهای بیوانفورماتیک) و بر اساس دستورالعمل‌های ACMG، این تغییر را می‌توان در گروه ***Variant of Uncertain Significance (VUS)*** طبقه‌بندی نمود. با توجه به فراوانی بالای این واریانت در دیتابیس لوکال آزمایشگاه (احتمالا به صورت سوماتیک)، و طبقه بندی VUS واریانت، نمی‌توان آن را با اطمینان عامل ایجاد فنوتیپ بیمار دانست. با این حال، در صورتیکه پزشک محترم، فنوتیپ بیمار را منطبق با بیماری مرتبط با این واریانت تشخیص دهند، بررسی بیشتر این واریانت در بیمار و اعضای خانواده، جهت رسیدن به طبقه‌بندی/تفسیر دقیقتر این واریانت توصیه می گردد.

- خواهشمند است در صورت وجود هر گونه ابهام در گزارش حاضر با آزمایشگاه تماس حاصل گردد.

با تقدیم احترام

Main Problem

Prevalent challenging complaint

- Easy bruising or bleeding ,especially in children remains a challenge for the consulting hematologist to define a "significant bleeding history" :
  - mild underlying defects such as type 1 VWD or platelet function defects,RBDs,etc.

    OR
  - Normal population

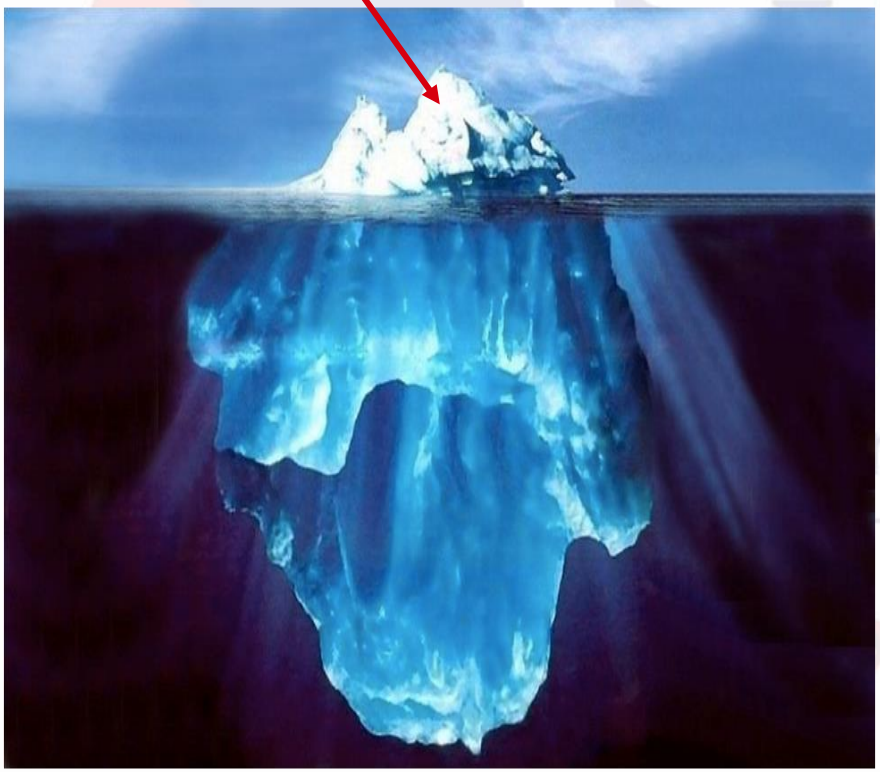
Limited Diagnostin tools

- the diagnostic limitations of available laboratory testing for mild bleeding disorders

Iceberg of VWD

Expected incidence in IRAN for :

- all types of VWD is about1/100
- bleeders is about 1/10000
- Sever bleeders is about 1/100000



Normal population

- Adults: (http://ds9.rockefeller.edu/RUBHPSR/; accessed May 1,2012)
  - 25% epistaxis,
  - 18% easy bruising,
  - 18% prolonged bleeding after a tooth extraction
  - 47% of women reported heavy menstrual bleeding.
- Children: (Nosek-Cenkowska B, et al.. *Thromb Haemost*. 1991;65(3):237-241).
  - 24% easy bruising
  - 39% epistaxis,

blood

2003 101: 2089-2093
Prepublished online October 31, 2002;
doi:10.1182/blood-2002-09-2892

Von Willebrand disease type 1: a diagnosis in search of a disease

J. Evan Sadler

cause of symptoms is overlooked and untreated. Many of us have seen patients for whom the diagnosis of VWD type 1 has changed their self-image and caused them to limit activities for fear of bleeding or concern about transmitting a genetic disease. They may have received desmopressin (DDAVP) or blood products for dental

OVER-DIAGNOSIS vs UNDERDIAGNOSIS

NO ASSESMENT vs FULL ASSESMENT

factor and sometimes a disease

J. Evan Sadler[1]

Hematology 2009

Many Diagnoses of VWD Type 1 Are False Positives

The European VWD type 1 study suggests that past bleeding is a better guide to future bleeding than is laboratory testing for VWF. However, this study population

Other Questions

- To distinguish carriers in family members
- To select the type of requested special tests(VWD types ;Platelet function tests; other RBDs ;etc.)
- Treatment decision: the cases who need prophylaxis, intensified treatment, etc.

The development of Bleeding Scores(BS):
Asked about a multitude of bleeding symptoms

- Original **Vicenza bleeding scores** :
  - study population included 42 type 1 VWD obligatory carriers and 215 control subjects
  - Scoring from 0 to 3

Rodeghiero F, Castaman G, Tosetto A, et al. The discriminant power of bleeding history for the diagnosis of type 1 von Willebrand disease: an international, multicenter study. J Thromb Haemost. 2005;3(12):2619-2626

- Molecular and Clinical Markers for the Diagnosis and Management of Type 1 (MCMDM-1) VWD :
  - 154 families with at least 2 family members affected by type 1 VWD vs control peoples (checked by PFA-100 and VWF:Ag;VWF:Rco)
  - Scoring from -1 to 4

Tosetto A, Rodeghiero F, Castaman G, et al. A quantitative analysis of bleeding symptoms in type 1 von Willebrand disease: results from a multicenter European study (MCMDM- 1 VWD). J Thromb Haemost. 2006;4(4):766-773..

- **CONDENSED MCMDM-1 VWD BAT:**
  - 6-page questionnaire that requires 5-10 minutes (in comparaison with 40 minutes for 17 pages)

Bowman M, et al . J Thromb Haemost. 2008;6(12):2062-2066

The Pediatric Bleeding Questionnaire (PBQ) of MCMDM-1 VWD BAT

Bowman M,et al. *J Thromb Haemost*. 2009;7(8):1418-1421.

- Shorter life experience, children have fewer or no exposures to bleeding challenges
- Added "other" category,which has pediatric-specific bleeding symptoms toMCMDM-1 (such as umbilical stump bleeding, cephalohematoma, post-circumcision bleeding etc.)
  - Circumcision (with cutting methods) and ear ring replacement as a haemostatic challenge ?
- A "positive" bleeding score was therefore defined as ≥ 2 with high negative predictive value (99%) for VWD

Likelihood ratio for VWD using Vicensa BATs

Table 4. Diagnosis of von Willebrand's Disease Using the Bleeding Score

Bleeding score	*Likelihood ratio**	*Post-test probability (%)*
-3	0.00	0.0
-2	0.04	0.2
-1	0.10	0.5
0	0.13	0.7
1	1.60	8.0
2	2.20	10.0
3	3.00	13.0
4	16.00	43.0

NOTE: *This table is based on a 5 percent pretest probability.*

**—Likelihood ratio with a 95% confidence interval.*

Adapted with permission from Tosetto A, Rodeghiero F, Castaman G, et al. A quantitative analysis of bleeding symptoms in type 1 von Willebrand disease: results for a multicenter European study (MCMDM-1 VWD). J Thromb Haemost. *2006;4(4):771.*

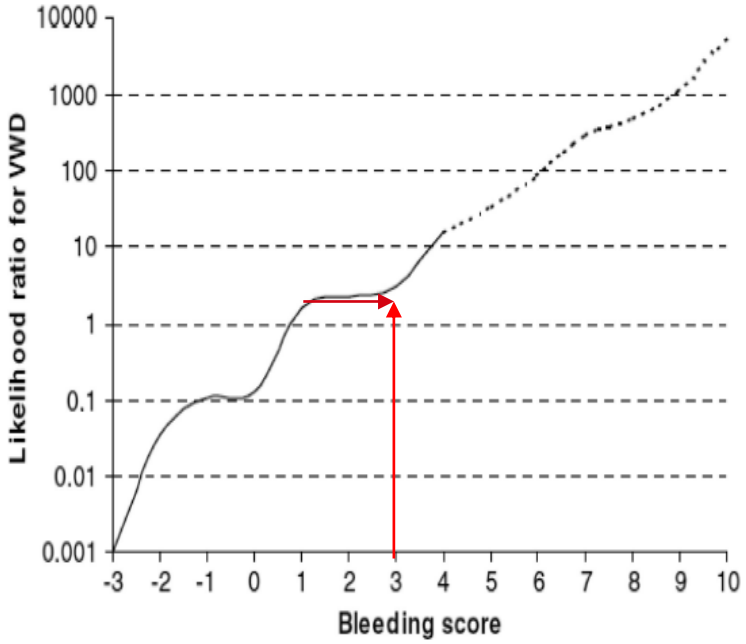


Figure 1. Likelihood ratios for VWD based on the Vicenza bleeding assessment tool (−1 version) and on data from the MCMDM-1 study. (Reprinted with permission from Tosetto et al.[15] Copyright 2007, Elsevier.)

The ISTH/SSC Bleeding Assessment Tool

Rodeghiero F et al. , . *J Thromb Haemost* 2010; 8: 2063-2065 (plus supplementary material).

- In 2010, the ISTH/SSC Joint Working Group agreed to establish a single bleeding assessment tool (the BAT) to standardize the reporting of bleeding symptoms heavily based on the 0-3 Vicenza score
- **Used in children and adults to diagnose mild bleeding disorders** in patients who are being evaluated for a bleeding disorder **for the first time**
- **Overall utility: R/O VWD , Possible Platelet dysfunction**
- **Limitations:** few validation studies, Requires a skilled professional to administer and **20 minutes**

| Everyday Bleeding Disorders |

Bleeding scores: are they really useful?

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- In the primary care setting, and even in the hematology setting, the **greatest clinical utility of bleeding scores lies in their high negative predictive value,** and perhaps their greatest value is in the **identification of patients for whom testing for VWD is not necessary**

- **If the bleeding score is elevated and VWF levels are normal,** this should be a sign for the hematologist **to actively pursue alternate bleeding disorder diagnoses**

- In **a young patient** with a **positive family history** of a bleeding disorder , some laboratory work-up will always be required to exclude a bleeding disorder

Summary recommendations on BAT scores considered significant

- Commonly used BAT tools validated for the diagnosis of vWD and platelet function disorders include :
  - ISTH BAT : female score 6+, male score 4 +
  - Vicenza BAT : female score 5+, male score 3 +
  - MCMDM-1 VWD BAT :score of 4 + for adults and 2+ for pediatric age group for the condensed version

Tosetto A, Castaman G, Plug I, Rodeghiero F, Eikenboom J. Prospective evaluation of the clinical utility of quantitative bleeding severity assessment in patients referred for hemostatic evaluation. *J Thromb Haemost*. 2011;9:1143-1148.

Gresele P, Orsini S, Noris P, et al. BAT-VAL study investigators. Validation of the ISTH/SSC bleeding assessment tool for inherited platelet disorders: a communication from the Platelet Physiology SSC. *J Thromb Haemost*. 2020;18:732-739.

Symptom	0[1]	1[1]	2	3	4
Epistaxis	No/trivial	>5/year	Consultation	Packing, cauterization, or	Blood transfusion or replacement
Oral cavity	No/trivial	Present	Consultation	Surgical hemostasis or	Blood transfusion, replacement
	done	intervention	procedures, no intervention[3]		

✓R/O other local or systemic causes: seasonal occurrence , URI, Dusty dry air, High BP , etc.

- Consultation only: the patient sought medical evaluation and was either referred to a specialist or offered detailed laboratory investigation

✓ petechiae when adequately described by the patient or relatives; or
✓hematomas when occurring without trauma.

➢ **tooth eruption : when requires assistance** or supervision by a physician, or lasts at least **10 minutes**
➢**bites to lip and tongue,:** at least **10 minutes** or causes a **swollen tongue or mouth**.

➢Permanent teeth
➢occurring after leaving the dentist's office and requiring a new, unscheduled visit

PBQ:

➢Any report of bleeding stopped
  ➢without consultation : 1
  ➢With consultaion only:2

Pediatric Bleeding Questionnaire (PBQ)

Score / Symptom	-1	0	1	2	3	4
Epistaxis	-	No or trivial (≤5 per year)	>5 per year OR >10 minutes duration	Consultation only	Packing, cauterization or antifibrinolytics	Blood transfusion, replacement therapy or desmopressin
Cutaneous	-	No or trivial (≤1cm)	>1cm AND no trauma	Consultation only	-	-
Minor wounds	-	No or trivial (≤5 per year)	>5 per year OR >5 minutes duration	Consultation only or Steri-strips	Surgical hemostasis or antifibrinolytics	Blood transfusion, replacement therapy or desmopressin
Oral cavity	-	No	Reported at least once	Consultation only	Surgical hemostasis or antifibrinolytics	Blood transfusion, replacement therapy or desmopressin
Gastrointestinal tract	-	No	Identified cause	Consultation or spontaneous	Surgical hemostasis, antifibrinolytics, blood transfusion, replacement therapy or desmopressin	-
Tooth extraction	No bleeding in at least 2 extractions	None done or no bleeding in 1 extraction	Reported, no consultation	Consultation only	Resuturing, repacking or antifibrinolytics	Blood transfusion, replacement therapy or desmopressin
Surgery	No bleeding in at least 2 surgeries	None done or no bleeding in 1	Reported, no consultation	Consultation only	Surgical hemostasis or antifibrinolytics	Blood transfusion, replacement therapy or desmopressin
Menorrhagia	-	No	Reported or consultation only	Antifibrinolytics or contraceptive pill use	D&C or iron therapy	Blood transfusion, replacement therapy, desmopressin or hysterectomy
Post-partum	No bleeding in at least 2 deliveries	No deliveries or no bleeding in 1 delivery	Reported or consultation only	D&C, iron therapy or antifibrinolytics	Blood transfusion, replacement therapy or desmopressin	-
Muscle hematoma	-	Never	Post-trauma, no therapy	Spontaneous, no therapy	Spontaneous or traumatic, requiring replacement therapy or desmopressin	Spontaneous or traumatic, requiring surgical intervention or blood transfusion
Hemarthrosis	-	Never	Post-trauma, no therapy	Spontaneous, no therapy	Spontaneous or traumatic, requiring replacement therapy or desmopressin	Spontaneous or traumatic, requiring surgical intervention or blood transfusion
Central nervous system	-	Never	-	-	Subdural, any intervention	Intracerebral, any intervention
Other *	-	No	Reported	Consultation only	Surgical hemostasis, antifibrinolytics or iron therapy	Blood transfusion, replacement therapy or desmopressin

Symptom	0[1]	1[1]	2	3	4
Muscle hematomas	Never	Post-trauma, no therapy	Spontaneous, no therapy	Spontaneous or traumatic, requiring desmopressin or replacement therapy	Spontaneous or traumatic, requiring surgical intervention or blood transfusion
Hemarthrosis	Never	Post-trauma, no therapy	Spontaneous, no therapy	Spontaneous or traumatic, requiring desmopressin or replacement therapy	Spontaneous or traumatic, requiring surgical intervention or blood transfusion
CNS bleeding	Never	–	–	Subdural, any intervention	Intracerebral, any intervention
Other bleedings[5]	No/trivial	Present	Consultation only[2]	Surgical hemostasis, antifibrinolytics	Blood transfusion, replacement therapy, or desmopressin

- Spontanous or Repeated abortion(?)
- Delayed wound healing (?)
- Their presence in infancy requires detailed investigation independently from the overall score.Include:
- **Umbilical stump bleeding, cephalohematoma, cheek hematoma caused by sucking during breast/bottle feeding, conjunctival hemorrhage, or excessive bleeding following circumcision or venipuncture.**

Menorrhagia	No/trivial	Consultation only[2] or Changing pads more frequently than every 2 h or Clot and flooding or PBAC score >100[4]	Time off work/ school >2/year or Requiring antifibrinolytics or hormonal or iron therapy	Requiring combined treatment with antifibrinolytics and hormonal therapy or Present since menarche and >12 months	Acute menorrhagia requiring hospital admission and emergency treatment or Requiring blood transfusion, replacement therapy, desmopressin or Requiring dilatation and curettage or endometrial ablation or hysterectomy
Postpartum hemorrhage	No/trivial or no deliveries	Consultation only[2] or Use of syntocin or Lochia >6 weeks	Iron therapy or Antifibrinolytics	Requiring blood transfusion, replacement therapy, desmopressin or Requiring examination under anesthesia and/or the use of uterine balloon/package to tamponade the uterus	Any procedure requiring critical care or surgical intervention (e.g. hysterectomy, internal iliac artery legation, uterine artery embolization, uterine brace sutures)

Menorrhagia points(ISTH-BAT)

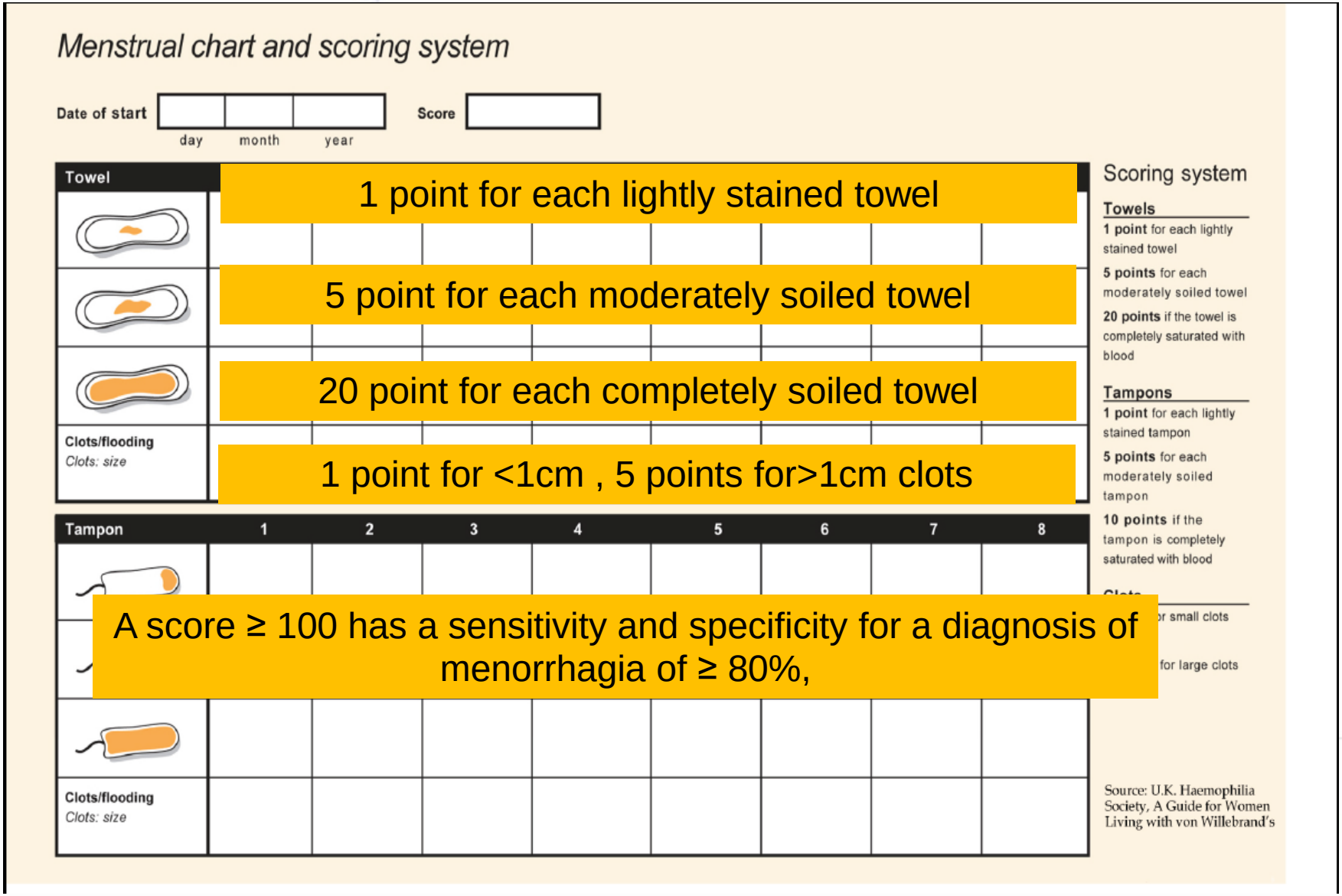
- Severity : more than 80 ml/period
  - More than 30 of tampons/pads used for a typical menstrual cycle
  - Hourly (0.5–2.0 h) change of tampon/pad on the heaviest day of menstrual period
  - use a tampon and a pad at the same time OR a super-absorbent tampon or pad
  - Clot >1 cm or flooding
  - frequently stain through clothes during menses
  - pictorial blood loss assessment chart (PBAC) >100
- Duration: More than 7 days ; Present since menarche and > 12 months
- Needs to treatment : OCP; Antifibrinolytics;DDAVP; anaemic or low in iron;Transfusion;surgical intervention
- lost time from work or school ≥ 2 times in the past year because of heavy periods (

Postpartum hemorrhage

- ✓ uterine discharge (lochia) that lasts for more than 6 weeks
- ✓ judged by the obstetrician as abnormally heavy or prolonged
- ✓ Frequency
- ✓ Needs to treatment

Symptom-specific bleeding scores for menorrhagia (Pictorial Blood Loss Assessment Chart) and epistaxis are useful for describing the severity of the specific bleeding symptom

Pictorial Blood loss Assessment Chart (PBAC)



Menstrual chart and scoring system

Date of start: day | month | year

Score

Towel	
	1 point for each lightly stained towel
	5 point for each moderately soiled towel
	20 point for each completely soiled towel
Clots/flooding *Clots: size*	1 point for <1cm , 5 points for>1cm clots

Tampon	1	2	3	4	5	6	7	8
Clots/flooding *Clots: size*								

A score ≥ 100 has a sensitivity and specificity for a diagnosis of menorrhagia of ≥ 80%,

Scoring system

Towels

1 point for each lightly stained towel

5 points for each moderately soiled towel

20 points if the towel is completely saturated with blood

Tampons

1 point for each lightly stained tampon

5 points for each moderately soiled tampon

10 points if the tampon is completely saturated with blood

Clots

…r small clots

…for large clots

Source: U.K. Haemophilia Society, A Guide for Women Living with von Willebrand's

Table 2. Epistaxis scoring system [9]

Component	Score[1]
Frequency	
5–15/year	0
16–25/year	1
>25/year	2
Duration	
<5 min	0
<15 ml	0
15–30 ml	1
>30 ml	2
Epistaxis history/age[3]	
<33%	0
33–67%	1
>67%	2
Site	
Unilateral	0
Bilateral	2

- Sum of scores for all components: mild = 0–6; severe = 7–10
- Estimation of average blood loss per episode, based on fractions or multiples of teaspoons, tablespoons, or cups.

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journal homepage: www.elsevier.com/locate/thromres

Full Length Article

Establishment of a bleeding score as a diagnostic tool for patients with rare bleeding disorders

Roberta Palla [a,*], Simona M. Siboni [b], Marzia Menegatti [a], Khaled M Musallam [b], Flora Peyvandi [a,b], on behalf of the European Network of Rare Bleeding Disorders (EN-RBD) group

[a] Department of Pathophysiology and Transplantation, Università degli Studi di Milano, and Luigi Villa Foundation, Milan, Italy
[b] Angelo Bianchi Bonomi Hemophilia and Thrombosis Centre, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

- A large group of patients with RBDs enrolled in the EN-RBD database include fibrinogen, factor (F) II, FV, combined FV and FVIII (FV + VIII), FVII, FX, FXI, and FXIII deficiencies
- The predictive power of this BSS was also **compared with the ISTH-BAT** and examined for the **severity of RBDs based on coagulant factor activity**.
- Take **age and sex** as covariates into account their predictive effect on the probability of having a RBD.

$$\text{Bleeding Score (BS)} = 2.510 + (\text{Age in years} \times -0.029) + (-0.305 \text{ if Male}) + (\text{Epi\_In} \times -0.129) + (\text{Oral\_In} \times 0.197) + (\text{Bruis\_In} \times -0.342) + (\text{Hemato\_In} \times -0.040) + (\text{Hemar\_In} \times 0.618) + (\text{GI\_In} \times 0.490) + (\text{CNS\_In} \times 0.876) + (\text{Meno\_In} \times 0.073) + (\text{PPH\_In} \times 0.334) + (\text{Tooth\_In} \times 0.277) + (\text{Minor\_In} \times 0.270) + (\text{Tonsil\_In} \times 0.670) + (\text{Major\_In} \times 0.281).$$

$$\text{Probability of RBD} = 1/\left(1 + e^{-[BS]}\right)$$

- This BSS was able to differentiate patients with RBDs from healthy individuals with a bleeding score value of 1.5 having the highest sum of sensitivity (67.1%) and specificity (73.8%)
- there was a significant negative correlation between BS and coagulant factor activity level, which was strongest for fibrinogen and FXIII deficiencies.

Pre-operative recommendations

- The European Society of Anaesthesiology :
  - Recommends the use of a structured patient interview or questionnaire before surgery or invasive procedures.
- The British Committee for Standards in Haematology :
  - Recommends a bleeding history be taken in **all patients preoperatively and prior to invasive procedures**
  - Bleeding history may be negative in paediatric patients due to lack of haemostatic challenges. Therefore, if a **positive family history** exists, some laboratory workup will be required to confirm or exclude a bleeding disorder

- 1. Chee YL, Crawford JC, Watson HG and Greaves M. Guidelines on the assessment of bleeding risk prior to surgery or invasive procedures. British Committee for Standards in Haematology. British Journal of Haematology, 2008;140:496–504.
- 2. Kozek-Langenecker SA, Afshari A, Albaladejo P, Santullano CA, De Robertis E, et al. Management of severe perioperative bleeding: guidelines from the European Society of Anaesthesiology. Eur J Anaesthesiol. 2013;30:270-382.

Key points

- BUC/ UBD patients with a clear bleeding phenotype are potential candidates for **haemostatic prophylaxis** during invasive procedures or childbirth and **therefore identifying these patients is clinically relevant**
- Around **60%** of the bleeding phenotype with BAT score was indistinguishable in patients W/WO established bleeding disorder.**The BAT has however been used in studies involving BUC/UBD patients**
- **Age and sex is also an important determinan**
- **a positive family history** increases the risk of a bleeding disorder

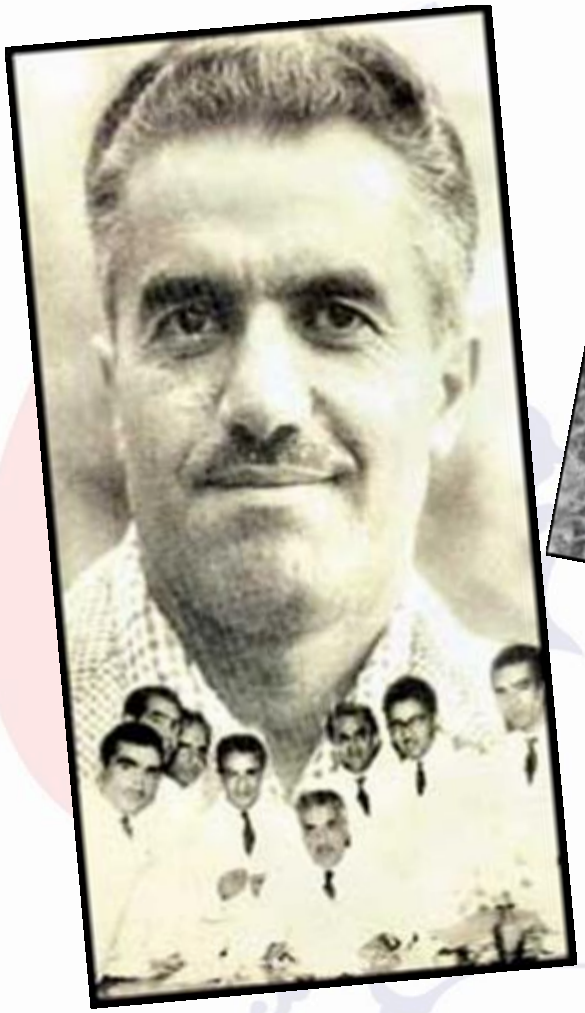
Case-1

- ISTH BAT=2
- VWF=40%
- Probable Diagnosis:

  VWD type-1

Case-2

- ISTH BAT=/> 13
- BUC



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