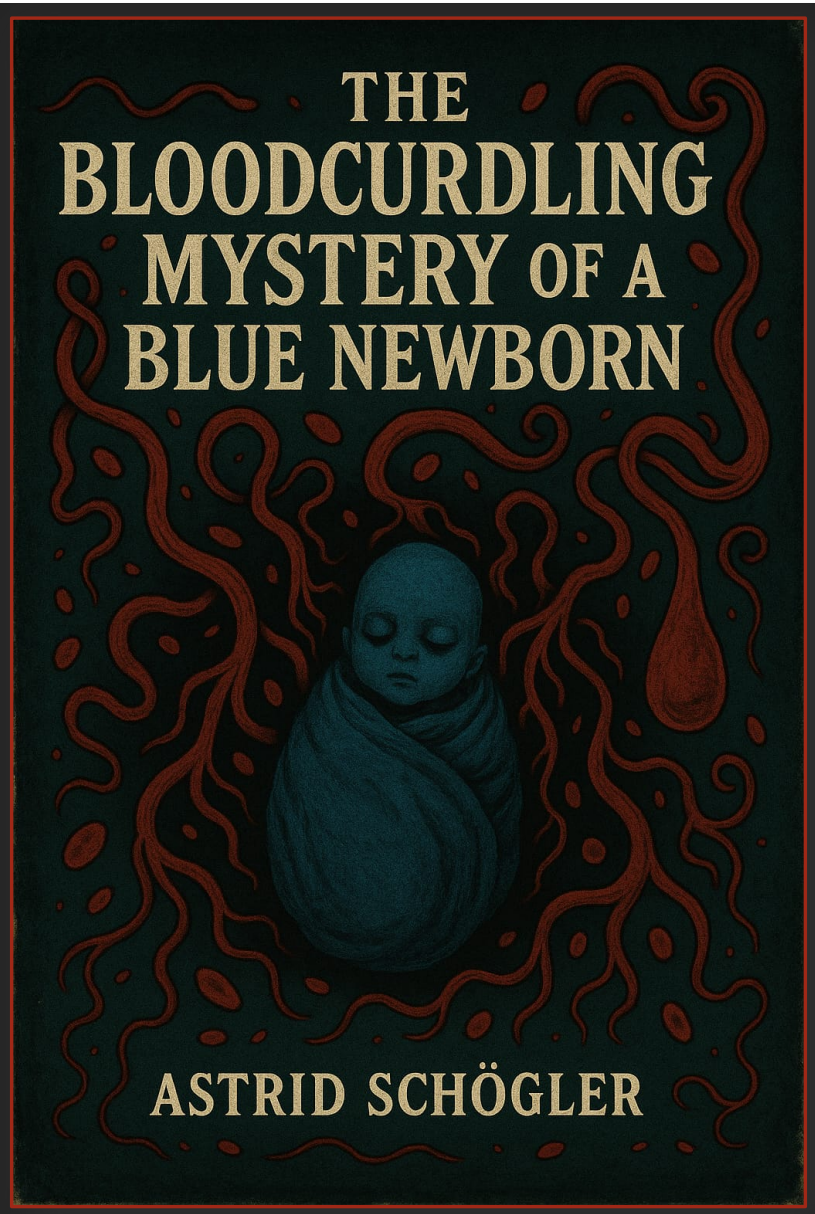

THE
BLOODCURDLING
MYSTERY OF A
BLUE NEWBORN
ASTRID SCHÖGLER

Perinatal information:
Girl – 40w1d – 4270g
G2 P1>2 A0
Uneventfull pregnancy
Spontaneous fast natural birth
Mildly meconial stained amniotid fluid
APGAR 9/9/9

At 5 hours old:
- Blue/grey in bed
- Saturation not measurable at first
- Suboptimal circulation
- T 36,2°C

Clinical examination:
- A: free
- B: RR 60-70/min – Sat 88% R foot - no respiratory distress – normal auscultation
- C: pale - warm extremities – A. fem +/+ - normal auscultation
- D: no abnormalities
- E: petechia and ecchymosa

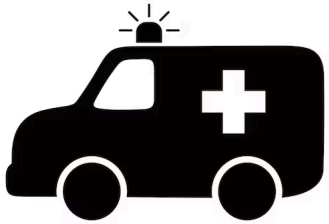
CHD
Infection

Sat 92-94% PRE & POST

Actions:
- Respiratory support NRM+bag 15L/min
- Diagnostic Work-Up
- Antibiotics
- Transfer NICU

First blood results	
Hemoglobin	19,6 g/dL
Hematocrit	55,1%
WBC	25 000/µL
Neutrophils	14 540/µL
Platelets	**25 000/µL**
PT	43%
aPTT	44,3 sec
CRP	<0,6 mg/L
Sodium	139 mmol/L
Potassium	*Too hemolytic*
Creatinine	*Too icteric*

Venous Blood Gas	
pH	7,34
pO2	*32,3 mmHg*
pCO2	43,4 mmHg
Bicarbonate	22,7 mmol/L
Base Excess	-3,1 mmol/L
Lactate	2,8 mmol/L
Blood glucosis	*48 mg/dL*
Hb	19,7 g/dL
Sodium	139 mmol/L
Potassium	5,0 mmol/L



<u>Upon arrival in referring hospital:</u>

Still NRM+bag 100% 15L/min

Fluctuating sats 85-94%

No respiratory distress

Circulatory evaluation normal

ACTIONS?

R/ prostin

nCPAP P6-8 100% ➔ max saturation 94% …

Intubation – invasive ventilation FiO2 100%

Clinical deterioration
Cyanotic
Saturations 60-70% under 100% oxygen
PRE-POST difference

Cardiac ultrasound:

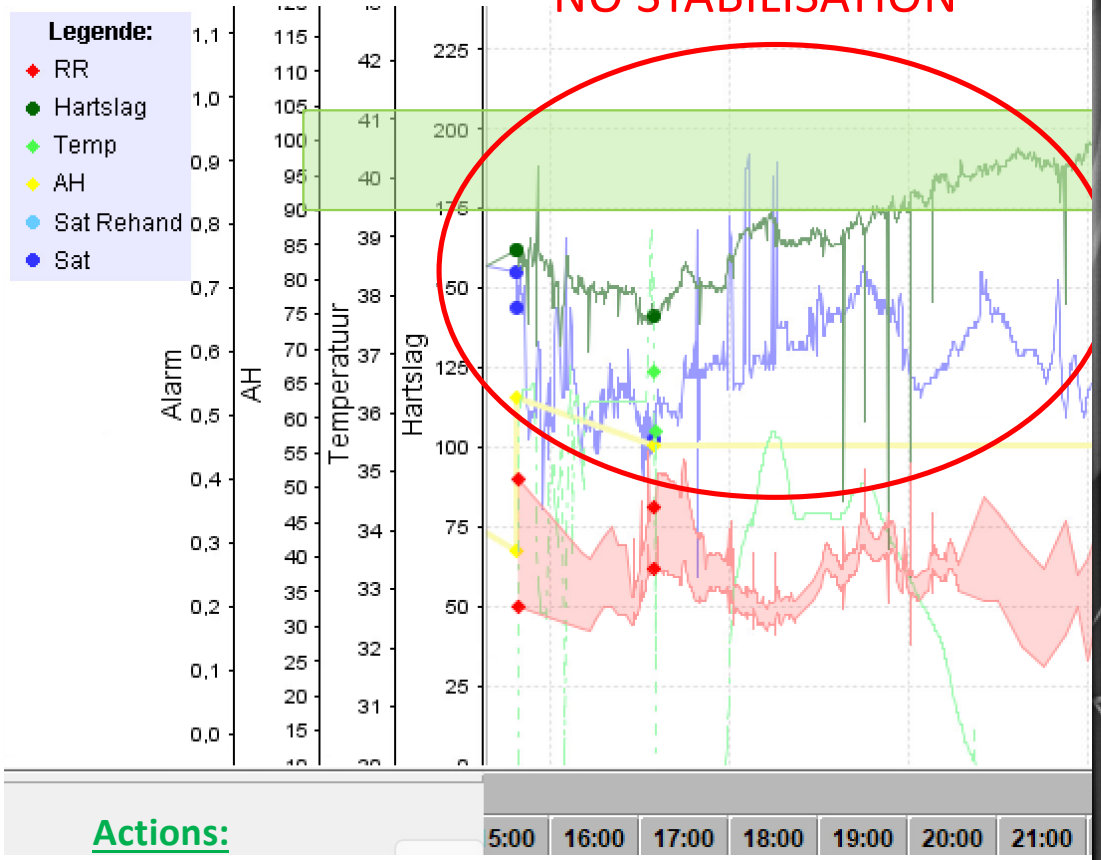
No congenital heart disease
Pulmonary hypertension +++
No need for fluid resuscitation

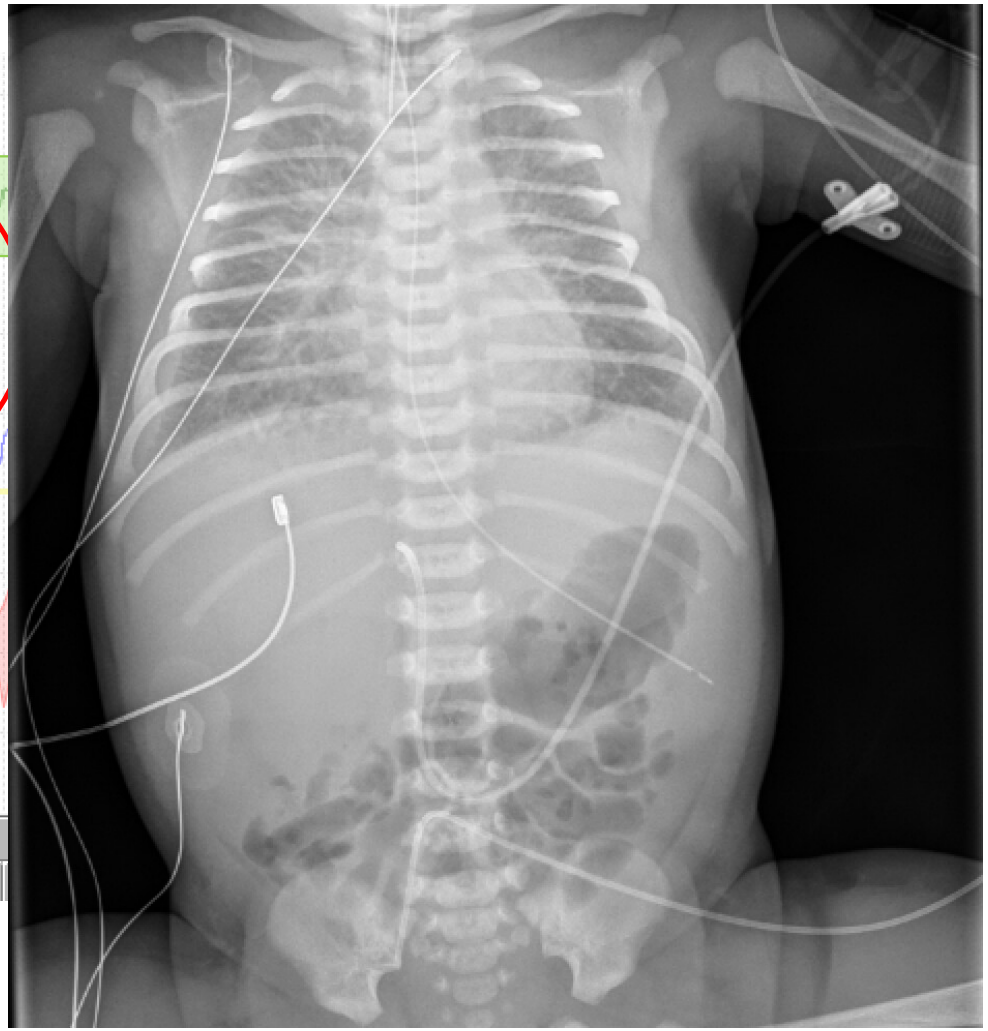
Actions:

iNO 20ppm
Noradrenalin
Dobutamin

NO STABILISATION

NO STABILISATION





Actions:

- Trial HFO
- Deep sedation + Curarization
- Association Corotrope
- Continuation of Prostin (RV function)
- Solu-Cortef
- More broad spectrum antibiotics + zovirax

Blood results (age 12 hours)	
Hemoglobin	17,3 g/dL
Hematocrit	50 %
WBC	31 800/µL
Neutrophils	14 500/µL
Platelets	**27 000/µL**
Blood group	O Rh+
Direct Coombs	negative
PT	37%
aPTT	50 sec
Fibrinogen	130 mg/dL
CRP	<0,5 mg/L
Sodium	139 mmol/L
Potassium	4,78 mmol/L
Creatinine	0,72 mg/dL
Bilirubin (total)	10,2 mg/dL
ALT	37 U/L
LDH	> 4500 U/L

Alternative tests (too hemolytic)

RBC

Polychromasie: +
Acanthocyten: +
Echinocyten: +
Poikilocytose: +
Fragmentocyten: +
Sferocytose: +
Traandruppelcellen: +
Anisocytose: ++

WBC

Witte bloedcellen	↑ 23.6
Blasten	↑ 1
Promyelocyten	↑ 0
Myelocyten	↑ 2
Metamyelocyten	↑ 2
Staven	2
Neutrofielen	50
Eosinofielen	2
Basofielen	↑ 1
Lymfocyten	40
Monocyten	↓ 2

Placement nasogastric tube: bloody gastric residual
Placement urinary catheter: hematuria +++++
Tracheal aspiration: slightly bloody

→ R/ Platelets transfusion
R/ Konakion IV

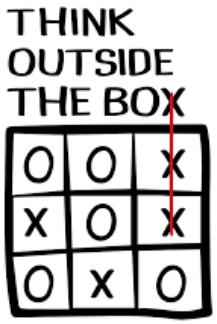
Severe refractory pulmonary hypertension

=> treat the cause …

Thrombopenia with bleeding tendency

Hemolysis with

- normal direct Coombs
- “abnormal” red blood cells in blood smear
- stable hemoglobin



Persistent Pulmonary Hypertension of the Newborn Associated With Severe Congenital Anemia of Various Etiologies

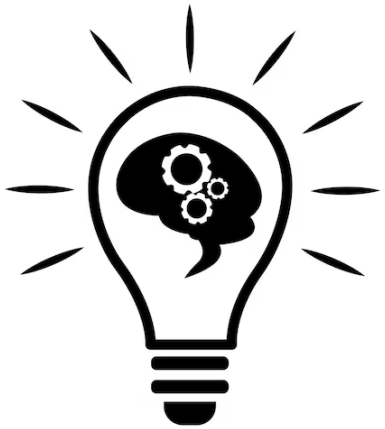
Danielle Landau, MD, Josef Kapelushnik, MD,† Miri B. Harush, MD,† Kyla Marks, MD,* and Hanna Shalev, MD†*

Congenital dyserythropoietic anemia

Homozygous alfa-thalassemia

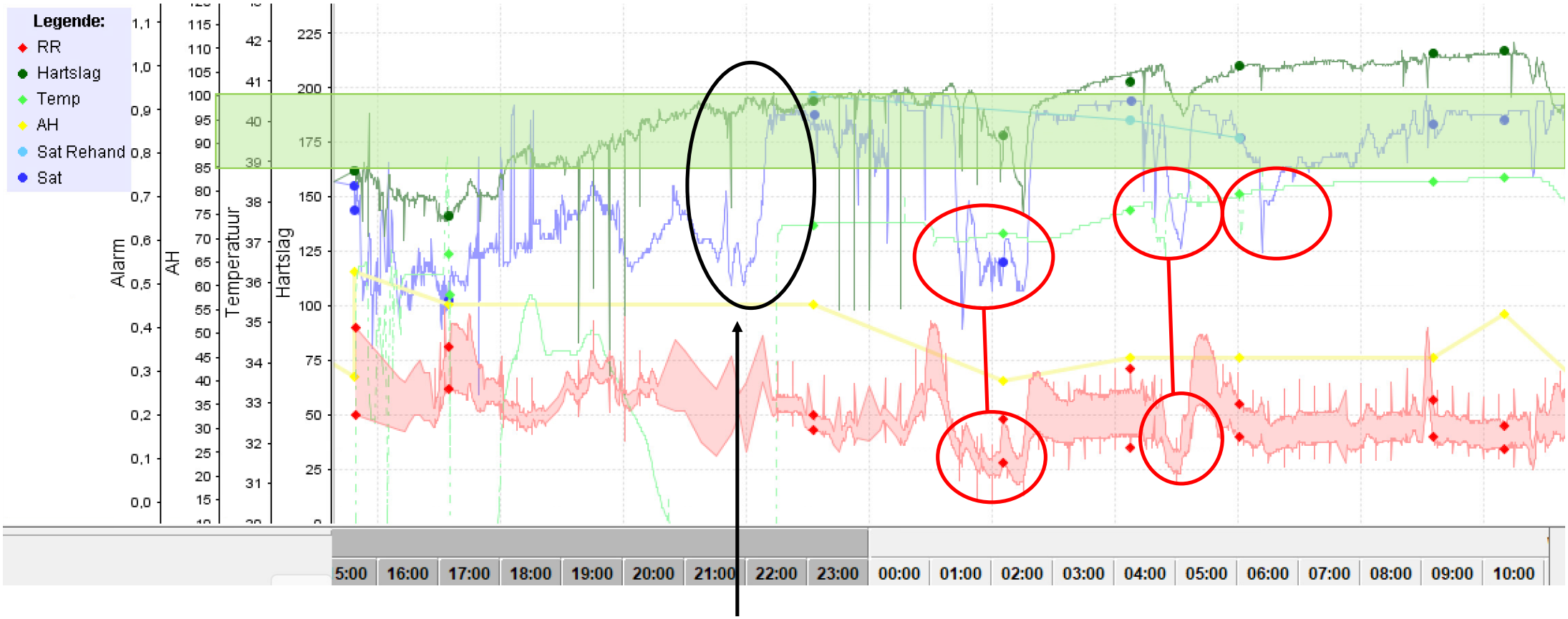
Congenital sferocytosis

Severe anemia
Hemolysis
Thrombocytopenia
PPHN



Problem in RBC / Hemoglobin?

Exchange transfusion

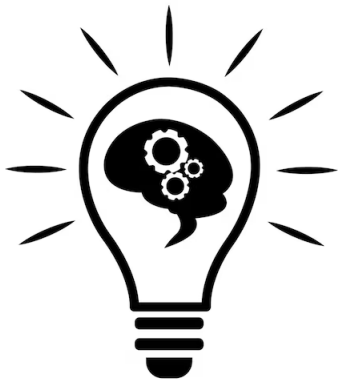


EXCHANGE TRANSFUSION

Fluid resuscitation

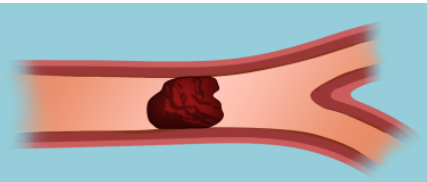
Adaptation Inotropics/Vasopressors

(adrenalin)



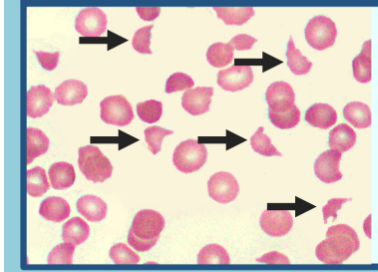
Thrombotic Microangiopathy (TMA)

is an overarching term that encompasses a highly diverse group of disorders with unique pathophysiologies.



• Describes occlusive microvascular or macrovascular disease, often with intraluminal thrombus formation [1,2], characterized by:

Microangiopathic Hemolytic Anemia (MAHA)



Classically characterized by many of the following:

↑ Lactate dehydrogenase
↑ Indirect bilirubin
- Negative direct antiglobulin test
↓ Haptoglobin
↑ Reticulocytes

• **Microangiopathy:** fragmented red blood cells seen on peripheral smear (schistocytes)

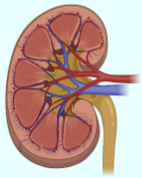
and

Non-Immune Thrombocytopenia

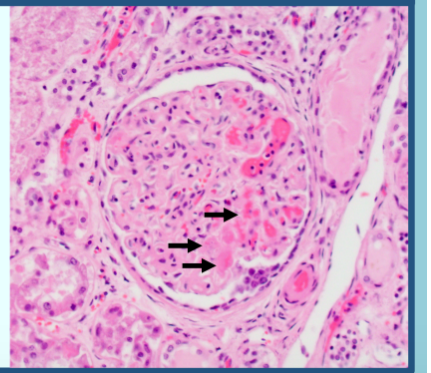
and/or

End-Organ Ischemia

• Varying degrees of organ ischemia/infarction (e.g. brain, heart, kidneys), often associated with high morbidity or mortality



• Focal TMA refers to microvascular thrombosis seen histologicaly, without peripheral MAHA or thrombocytopenia



Abou-Ismail MY, Kapoor S, Citla Sridhar D, Nayak L, Ahuja S. **Thrombotic microangiopathies: An illustrated review.** Res Pract Thromb Haemost. 2022 Apr 22;6(3):e12708

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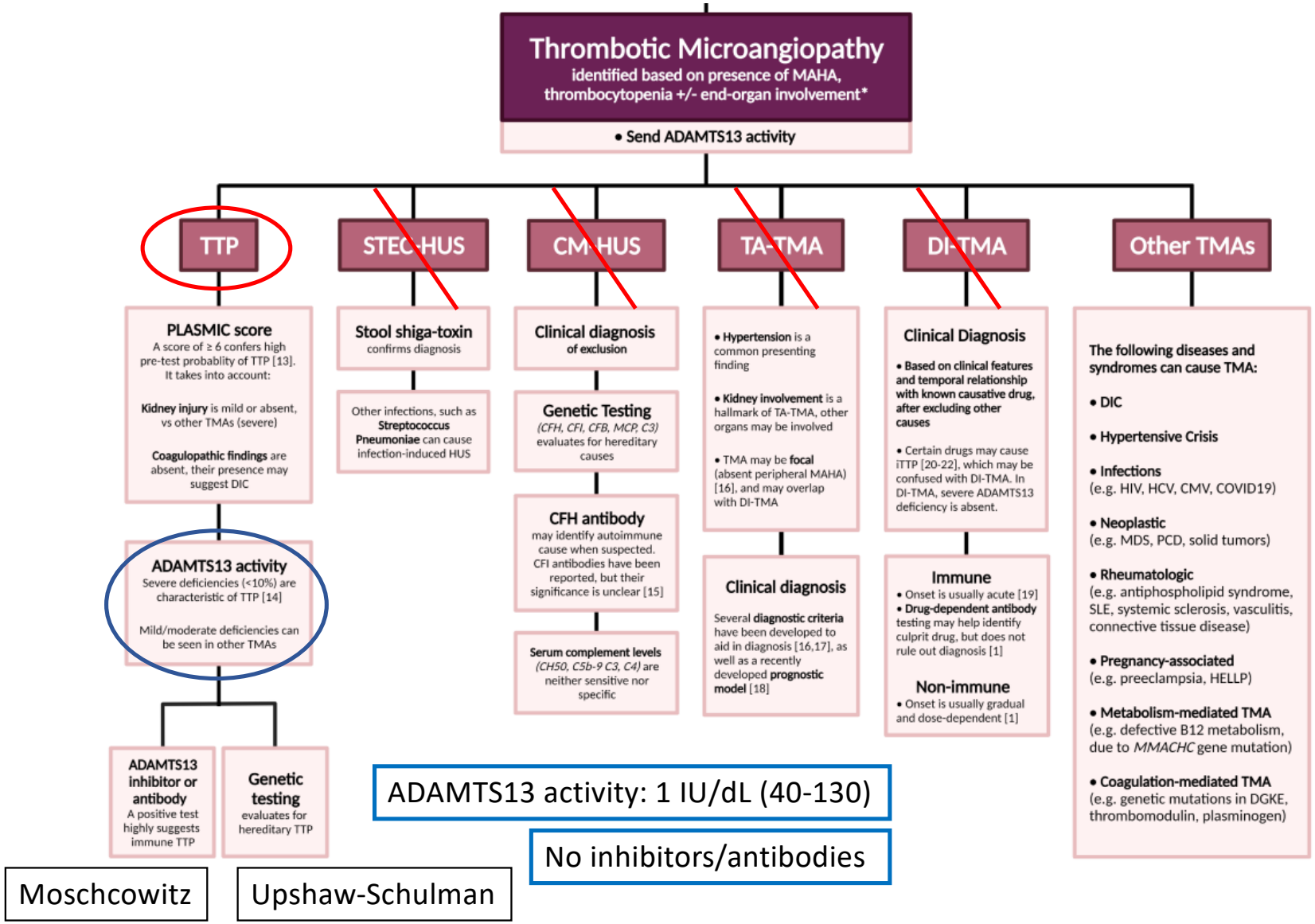

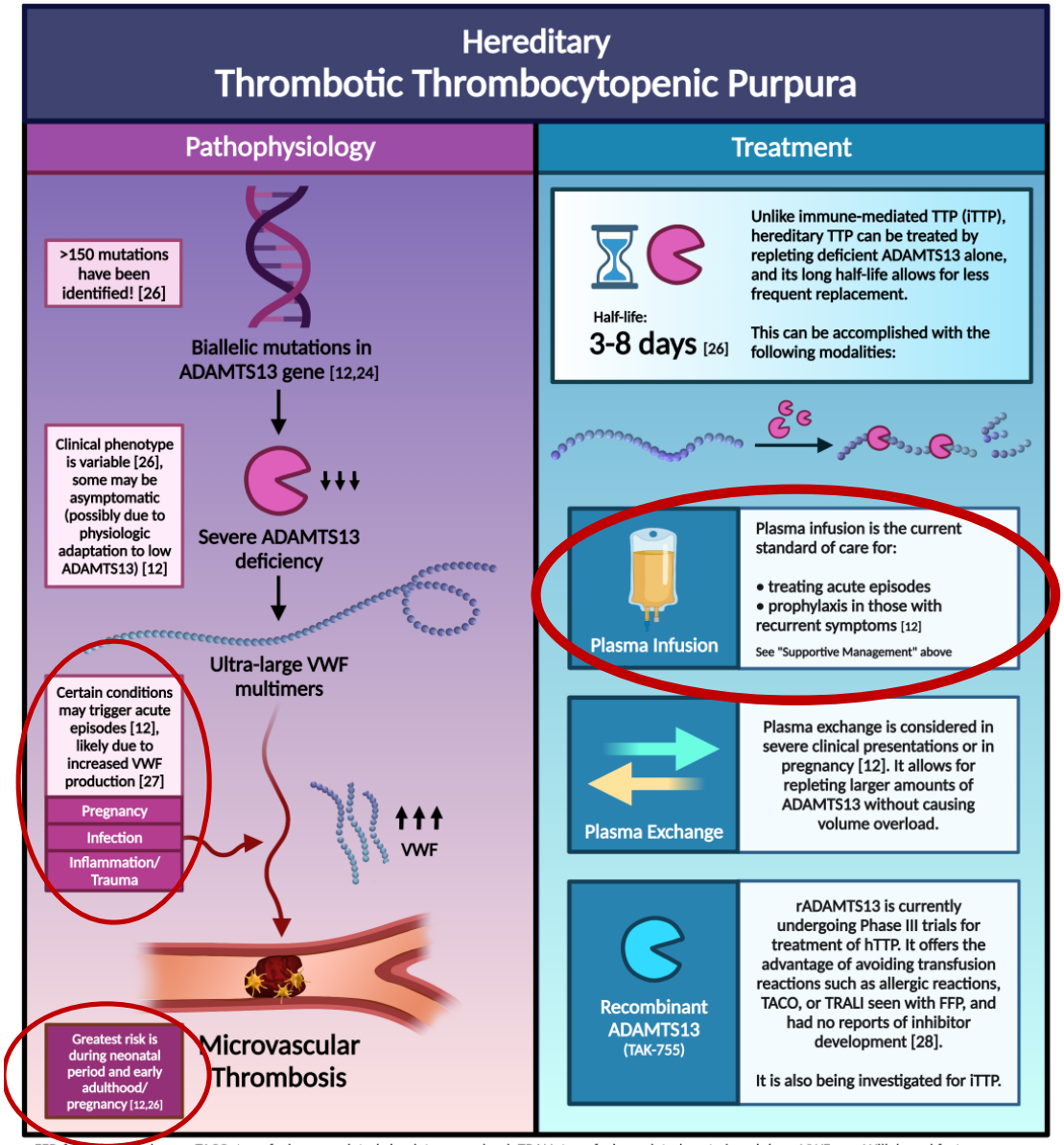

FFP, fresh frozen plasma; TACO, transfusion-associated circulatory overload; TRALI, transfusion-related acute lung injury; VWF, von Willebrand factor

Neonatal period (1/3)

- Severe hemolytic jaundice (DC neg)
  - R/ exchange transfusion
- Thrombopenia
- Fever
- Hematuria
- Neurologic symptoms
- Closure of PDA = high shear stress = TRIGGER?
- *Often without diagnosis at the moment*

Childhood

- *Isolated thombocytopenia*
- *Repeated episodes thrombopenia / MAHA*
  - *Often infection induced*

Adulthood

- *Pregnancy induced exacerbation*

Episodes can be life-threatening! (MOF)

Abou-Ismail MY, Kapoor S, Citla Sridhar D, Nayak L, Ahuja S. **Thrombotic microangiopathies: An illustrated review.** Res Pract Thromb Haemost. 2022 Apr 22;6(3):e12708

Back to our mystery… Pulmonary hypertension?

Case Reports > Pediatrics. 2016 Dec;138(6):e20161565. doi: 10.1542/peds.2016-1565.

Severe Hemolysis and Pulmonary Hypertension in a Neonate With Upshaw–Schulman Syndrome

Nobuyuki Tsujii [1 2], Isao Shiraishi [2], Koichi Kokame [3], Midori Shima [1], Yoshihiro Fujimura [4], Yukihiro Takahashi [5], Masanori Matsumoto [6]

Review > J Matern Fetal Neonatal Med. 2016;29(12):1977-9.
doi: 10.3109/14767058.2015.1071789. Epub 2015 Sep 12.

Congenital thrombotic thrombocytopenic purpura: Upshaw–Schulman syndrome: a cause of neonatal death and review of literature

Deepak Sharma [1], Sweta Shastri [2], Aakash Pandita [3], Pradeep Sharma [4]

Case Reports > Case Rep Perinat Med. 2025 Jul 9;14(1):20240050.
doi: 10.1515/crpm-2024-0050. eCollection 2025 Jan.

Congenital thrombotic thrombocytopenic purpura: a rare cause of severe neonatal jaundice and hypoxic respiratory failure – a case report

Hilal Al Mandhari [1], Fatma Albulushi [2], Nawal Al-Mashaikhi [2]

Rare complication? / Underdiagnosis?

Pathophysiology (idea):

1) Hemolysis > cell-free Hb = NO scavenger
2) Pulmonary thrombosis

Back to our mystery

- Upshaw-Schulman syndrome = hTTP
  - Genetic confirmation
- Stabilisation after exchange transfusion (= also PLASMA)
  - iNO weaned // D3
  - Extubation D4
  - Inotropics / vasopressors // D4
  - Normal TFE and EEG
  - Home D10
- Treatment:
  - Preventive FFP-transfusions every 2 weeks
  - Study medication: Adzynma every 2 weeks
- No new exacerbations / complications

Photo used with parental permission

Take home messages:

- Think about the diagnosis (h)TTP
  - COMBO: Coombs neg hemolytic anemia/severe jaundice + thrombocytopenia
  - ADAMTS13 activity
  - Plasma transfusion
- Multidisciplinary consultation (eg. clinical biologist)

Thank you for your attention!

Questions?