A 3-Year-Old Girl with Frequent Nose Bleeds

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CASE

A 3-year-old girl presented with petechial hemorrhages and repeated nosebleeds. Two weeks earlier she had been admitted to a local hospital with nosebleeds accompanied by 2 episodes of vomiting dark red blood. Results of the laboratory evaluation included: white blood cell count, 8.2 × 10^9/L [reference interval (RI), 4 × 10^9/L to 10 × 10^9/L]; hemoglobin, 10.7 g/dL (RI, 11–15 g/dL); platelet count, 142 × 10^9/L (RI, 100 × 10^9/L to 300 × 10^9/L), prothrombin time, 11.5 s (RI, 9–13 s); activated partial thromboplastin time, 31.2 s (RI, 26–39 s); and fibrinogen, 2.5 g/L (RI, 2.0–4.0 g/L). The patient was discharged in good condition after insertion of nasal packs.

One day before the current admission, the patient had nose bleeds once again, this time accompanied by 4 episodes of hematemesis and tarry stool. At presentation, she had no fever and no diarrhea. She was not on any medications. The patient had a history of easy bruising, repeated gum bleeding, but not hemarthrosis. There was no family history of abnormal bleeding. On examination, she appeared pale, with normal vital signs. Her skin had scattered petechiae. The physical examination was otherwise unremarkable.

At presentation, laboratory findings included the following: hemoglobin, 6.2 g/dL (RI, 11–15 g/dL); reticulocyte count, 6.8% (RI, 0.5%–1.5%). Other laboratory results are shown in Table 1.

In vitro testing showed that the patient's platelets did not aggregate in response to ADP, epinephrine, arachidonic acid, or collagen, but platelets had relatively normal ristocetin-induced aggregation. These findings were confirmed on repeat testing. A smear of peripheral blood showed no clusters of normal platelets. A flow cytometry evaluation revealed marked reduction in glycoprotein IIb/IIIa (GPIIb/IIIa).

Questions to Consider
• What disorders should be considered in the workup of children with repeated nose bleeds?
• What are the potential sources of preanalytical variation in hematologic tests?
• What is the most likely cause of the results seen in this case?
• What are the typical symptoms and laboratory test results associated with various inherited causes of platelet dysfunction?

DOI: 10.1373/clinchem.2012.188409

Table 1. Patient's laboratory results.

Analyte	Day of admission	Day 1	Day 2	Day 3	Reference interval
WBC, $\times 10^9$/L[a]	20.83	10.33	11.57	10.11	4–10
Hemoglobin, g/dL	6.2	5.8	5.5	10.6	11–15
RBC, $\times 10^{12}$/L	2.22	1.93	1.94	3.58	3.5–5
MCV, fL	84.7	85	84.5	84.6	82–95
Hematocrit, %	18.8	16.4	16.4	30.3	34–45
C-reactive protein, mg/L	89	23	33	10	<8
Platelets, $\times 10^9$/L	384	160	117	101	100–300
Reticulocytes, %	6.8				0.5–1.5
Prothrombin time, s		10.3			9–13
Activated partial thromboplastin time, s		25.5			26–39
Fibrinogen, g/L		2.24			2.0–4.0
Factor VIII activity, %		181.8			50–150
Factor IX activity, %		125.1			50–150
VWF antigen, %		212			62–126
Platelet aggregation test, %					44.7–77.8
ADP (2 μmol/L)		5.49			
Epinephrine (2 μmol/L)		3			
Arachidonic acid (0.5 mmol/L)		6			
Collagen (2 μg/mL)		12.3			
Ristocetin (1.5 mg/mL)		45			
Platelet function–related markers, %					50–100
CD41 (GPIIb)		0			
CD61 (GPIIIa)		0			
CD42b		100			

[a] WBC, white blood cells; RBC, red blood cells; MCV, mean corpuscular volume; VWF, von Willebrand factor.

Final Publication and Comments

The final published version with discussion and comments from the experts will appear in the May 2013 issue of *Clinical Chemistry*. To view the case and comments online, go to http://www.clinchem.org/content/vol59/issue5 and follow the link to the Clinical Case Study and Commentaries.

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