

A 5-day-old boy is brought to the emergency department due to easy bruisability. The boy was born at 35 weeks gestation via vaginal delivery at home. There was no certified provider present at the delivery, and the mother did not receive prenatal care. The boy is breastfed exclusively. There is no family history of bleeding disorders or metabolic or liver abnormalities. The infant's vital signs are within normal limits. Periumbilical bleeding is present, and several ecchymotic skin lesions are visible on his extremities. Physical examination is otherwise unremarkable. Laboratory results are as follows:

Platelets	270,000/ $\mu$ L	(150,000-450,000/ $\mu$ L)
Prothrombin time	26 sec	(11-15 sec)
Activated partial thromboplastin time	42 sec	(25-40 sec)

The glucose level is normal. Which of the following is the most likely cause of this infant's current condition?

- ☐ A. Cirrhosis of the liver
- ☐ B. Consumption of coagulation factors
- ☐ C. Excessive destruction of platelets
- ☐ D. Factor VIII deficiency
- ☐ E. Impaired platelet function
- ☐ F. Impaired synthesis of von Willebrand factor
- ☐ G. Vitamin K deficiency



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The glucose level is normal. Which of the following is the most likely cause of this infant's current condition?

- ☐ A. Cirrhosis of the liver [0%]
- ☐ B. Consumption of coagulation factors [2%]
- ☐ C. Excessive destruction of platelets [0%]
- ☐ D. Factor VIII deficiency [3%]
- ☐ E. Impaired platelet function [1%]
- ☐ F. Impaired synthesis of von Willebrand factor [3%]
- ☒ G. Vitamin K deficiency [90%]

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### Explanation:

User Id: XXXXXXXXXX

This 5-day-old boy was born at home, and his mother did not receive consistent prenatal care. She may also not have received complete perinatal care, which includes parenteral injection of vitamin K after delivery. This injection (which in many cases is administered by midwives) is given to prevent **vitamin K-deficient bleeding**, previously hemorrhagic disease of the newborn, which can develop within the **first week of life**. Humans obtain vitamin K from diet and gut flora. Deficiency in newborns is the result of poor placental transfer, absent gut flora, immature liver function, and inadequate levels in breast milk.



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Vitamin K-deficient bleeding results from deficiency of vitamin K-dependent clotting factors (II, VII, IX, and X). Signs include bruising, bloody stools, and, less commonly, **intracranial hemorrhage**. Severe vitamin K deficiency typically causes prolonged prothrombin time (PT) and activated partial thromboplastin time (aPTT), but mild vitamin K deficiency may present with a prolonged PT and a normal aPTT. The diagnosis is confirmed by reversal of symptoms with **vitamin K administration**. Parents who refuse vitamin K injection for their newborn should be counseled regarding the risk of intracranial hemorrhage.

**(Choice A)** Cirrhosis is extremely rare in infancy. Depending on the cause, newborns with liver failure often have multiorgan system manifestations, sometimes with profound coagulopathy. This infant's normal platelet count and glucose level and isolated bleeding in the absence of other physical examination abnormalities (eg, splenomegaly, ascites) are less suggestive of cirrhosis.

**(Choice B)** Disseminated intravascular coagulation results in consumption of all clotting factors. It occurs as a complication of underlying disease and presents with thrombosis and bleeding. The PT and aPTT would be prolonged; however, platelets would typically be low.

**(Choice C)** The normal platelet count makes platelet destruction less likely.

**(Choice D)** Factor VIII deficiency prolongs the aPTT but does not affect the PT.

**(Choice E)** Patients with impaired platelet function present with mucocutaneous bleeding and petechiae in the setting of normal PT, aPTT, and platelet count. Some causes include medications (eg, aspirin, clopidogrel), metabolic problems (eg, uremia, liver disease), and congenital disorders (eg, Glanzmann thrombasthenia).

**(Choice F)** Impaired synthesis of von Willebrand factor is the most common inherited bleeding disorder. Many children with von Willebrand disease are asymptomatic and are



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**(Choice F)** Impaired synthesis of von Willebrand factor is the most common inherited bleeding disorder. Many children with von Willebrand disease are asymptomatic and are diagnosed as a result of a positive family history or during routine preoperative screening (eg, prolonged bleeding time). Affected individuals will have a normal PT interval but may have a prolonged aPTT due to decreased factor VIII activity.

#### Educational objective:

The body derives vitamin K from the diet and from gut flora synthesis. Deficiency in newborns is the result of poor placental transfer, absent gut flora, immature liver function, and inadequate levels in breast milk. All newborns should receive a vitamin K injection to prevent vitamin K-deficient bleeding.

#### References:

1. [Prophylactic vitamin K for vitamin K deficiency bleeding in neonates.](#)