
A Case Report: Intracranial Hemorrhage Due to Vitamin K Deficiency

Inggrit Anggraini¹, Dwi Antika Sari²

¹ SMF Pediatrics, Dr. Shatman MARS, Dumai, Indonesia

² Doctoral Profession Study Program, Faculty of Medicine, Abdurrah University, Pekanbaru, Indonesia

Email: inggrit.anggraini@univrab.ac.id

Abstract: Vitamin K deficiency bleeding is a pediatric bleeding disorder caused by a lack of vitamin K. Vitamin K deficiency causes coagulation disorders that can manifest clinically as bleeding. Vitamin K is a fat-soluble vitamin that is needed in the activation of procoagulant factors II, VII, IX, and X and anticoagulant proteins C and S. We report a case of a 2-month-old baby brought by his mother to Dr. Suhatman Hospital, MARS with complaints of fever accompanied by seizures for more than 10 minutes, the left side of the body felt stiff, the eyes moved and looked up, and the seizures recurred and the patient's umbilicus bled. After alloanamnesis, physical examination and supporting examinations, the patient was diagnosed with late-onset vitamin K deficiency.

Keywords : Vitamin K deficiency bleeding (VKDB), febrile seizures, intracranial hemorrhage

1. INTRODUCTION

Vitamin K deficiency bleeding is a pediatric bleeding disorder caused by a lack of vitamin K. (Miller, JL (2011). Vitamin K deficiency causes disruption of the coagulation process which can manifest clinically as bleeding. (Sutton, JP, & Korf, KL 2022). Vitamin K is a fat-soluble vitamin that is needed in the activation of procoagulant factors II, VII, IX, and X and anticoagulant proteins C and S. (Greer, JP, et al, 2019). These factors are stored in the liver in the form of inactive precursors. Vitamin K plays a role in the conversion of inactive precursors into active clotting factors. (Binkley, N., & Krueger, DC 2008).

Intracranial hemorrhage is one of the important problems in neonates. This is due to the high incidence rate and is often accompanied by serious neurological sequelae or even death. In the slow type, the incidence of intracranial hemorrhage is very high with a prevalence of 80% and a mortality rate of 10-50% and residual symptoms with neurological deficit complaints of 30-50%. (Rizka Hanifa. 2017). A study conducted by Danielsson et al in Hanoi during 1995-1999 found 233 infants who experienced intracranial hemorrhage, almost half of the infants experienced neurological problems such as seizures, hemiparesis, hydrocephalus and 9% of them died. (Danielsson, L., et al, 2022).

2. THEORETICAL STUDY

Vitamin K deficiency bleeding is a pediatric bleeding disorder caused by a lack of vitamin K. (Miller, JL 2011). Vitamin K deficiency bleeding is classified into: (Binkley, N., & Krueger, DC 2008).

1. Vitamin K deficiency bleeding (VKDB) is an early form of bleeding due to vitamin K deficiency that occurs before the baby is 24 hours old. This disorder is very rare and usually occurs in babies of mothers who are taking drugs that can interfere with vitamin K metabolism.
2. Vitamin K deficiency bleeding (VKDB) Classic VKDB is a form of bleeding that usually occurs after the baby is > 24 hours old, usually on the 2nd and 7th day. It occurs in babies whose condition is not optimal at birth or who receive food supplementation late.
3. Vitamin K deficiency bleeding (VKDB) Late VKDB occurs after the neonatal period, around 1-6 months of age. VKDB is manifested as central nervous system bleeding, and deep and extensive ecchymosis. (Shearer, MJ 2009).

Clinical manifestations of bleeding in neonates can be bleeding in the scalp, large hematomacephaly, intracranial bleeding is 80-90% of clinical manifestations of VKDB, bleeding from the umbilical cord, and gastrointestinal bleeding. Intracranial bleeding is subdural and subarachnoid hemorrhage. (Shearer, MJ 2009). In intracranial hemorrhage, increased intracranial pressure can be found, but there are also cases that do not show increased intracranial pressure. (Jansen, JT, & Flikweert, S. (2006). In infants, large, prominent, pale fontanelles and seizures can be found. Seizures can be focal or generalized. (Gordon, PM, & Collins, CM (2011). Other symptoms such as pupillary edema, decreased consciousness, anisocoria pupils, and focal neurological abnormalities, to decreased consciousness. (Evans, RW, & McCarthy, RE 2014).

The Indonesian Pediatrician Association formulated the diagnostic criteria for VKDB based on data obtained from anamnesis, physical examination, and supporting examinations.

Through anamnesis, namely: (Indonesian Pediatrician Association. 2020).

1. Previously healthy small babies (aged 1-6 months) suddenly appear pale, are reluctant to drink, are weak and sleep a lot.
2. Drink exclusive breast milk
3. Not getting vitamin K1 at birth
4. Focal Evocation
5. History of drug administration to mother during pregnancy

On physical examination , it was found: (Indonesian Pediatrician Association. 2020).

1. Pale without obvious bleeding
2. Increased intracranial pressure characterized by a bulging fontanel, decreased consciousness, and papilledema.
3. Focal neurological deficits in the form of focal seizures, hemiparesis, cranial nerve paresis

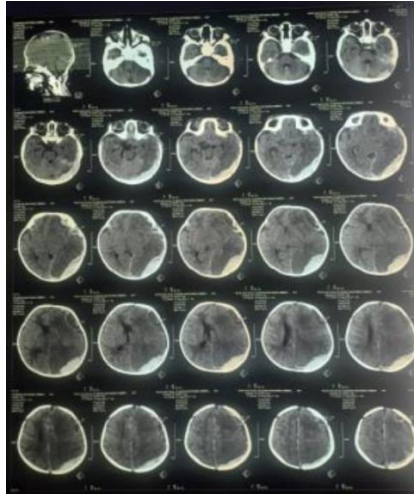
In the supporting examination , the following were found:

1. Complete peripheral blood count shows severe anemia with normal platelet count.
2. PPT examination is prolonged and APTT can be normal or prolonged.

Ultrasonography or CT scan of the head shows intracranial bleeding.

3. CASE REPORT

The patient came with his parents to the Emergency Room of Dumai City Hospital on October 21, 2023 with complaints of fever accompanied by seizures. Previously, the patient had a fever for 3 days. In the Emergency Room, the patient's family asked for outpatient treatment at home. After arriving home, the patient had 3 seizures in one night at home. The seizures lasted for approximately 10 minutes, the left side of the body felt stiff, the eyes moved and looked up. Then the patient's parents took their child back to the Emergency Room. Upon arrival at the Emergency Room, the patient had repeated seizures and the patient's umbilicus was bleeding. In the Emergency Room, the patient underwent a radiological examination, namely a CT Scan. The patient was finally hospitalized on October 22, 2023. In addition to seizures and fever, the patient's mother complained that her child had vomited 2 times, had a bowel movement >3 times with a liquid consistency with dregs. Cough, runny nose were denied. After being treated on the second day in the morning, the patient had seizures lasting >30 minutes with a stiff left body, eyes facing upwards and SPO2 86%. During the seizures, the patient was given diazepam but the seizures did not stop. After the seizure stopped the patient did not cry. The patient's family said that two weeks earlier the patient's head had hit the door while being carried by his father. And the patient's grandmother also said that the patient had fallen but according to his father the patient had never fallen.



4. RESULTS AND DISCUSSION

In the case of a 2-month-old girl who came with complaints of fever accompanied by seizures. Previously, the patient had a fever for 3 days. In the emergency room, the patient's family asked for outpatient care at home. After arriving home, the patient had seizures 3 times in one night at home. The seizures lasted for approximately 10 minutes, the left side of the body felt stiff, the eyes moved and looked up. Upon arrival at the emergency room, the patient had repeated seizures and the patient's umbilicus was bleeding. In the emergency room, the patient underwent a radiological examination, namely a CT scan.

Based on the results of alloanamnesis, the patient had several clinical pictures that were consistent with bleeding due to vitamin K deficiency, namely the patient complained of fever accompanied by seizures for more than 10 minutes, the left side of the body felt stiff, the eyes moved and looked up, and the seizures recurred and the patient's umbilicus bled.

This is in accordance with the theory that in bleeding due to vitamin K deficiency, bleeding in neonates can be in the form of bleeding in the scalp, large hematomacephaly, intracranial bleeding is 80-90% of clinical manifestations of VKDB, bleeding from the umbilical cord, and gastrointestinal bleeding. Intracranial bleeding is subdural and subarachnoid hemorrhage. In intracranial hemorrhage, increased intracranial pressure can be found but there are also cases that do not show increased intracranial pressure. In infants, large, protruding, pale fontanelles and seizures can be found. Seizures can be focal or generalized.

On physical examination, the patient was found to have a tense fontanel, anisocoria on the left eye, symmetrical abdomen, the umbilicus was covered with gauze. On supporting

examination, the results were Prothrombin time 48.0, INR 5.06 and APTT 73.1. CT scan of the head showed epidural hemorrhage parietal left, chronic hemorrhage in the frontal and parietal left, sub arachnoid hemorrhage in the interhemispheric fissure and tentorium cerebri left. This is in accordance with the theory that Vitamin K Deficiency Bleeding on physical examination was found to be pale without obvious bleeding, increased intracranial pressure marked by a large protruding fontanel, decreased consciousness, and papilledema, focal neurological deficits in the form of focal seizures, hemiparesis paresis of the cranial nerves. In supporting examinations, complete peripheral blood was obtained indicating severe anemia with a normal platelet count, PPT examination was prolonged, and APTT could be normal or prolonged, ultrasound examination or CT scan of the head showed intracranial bleeding.

5. CONCLUSION

bleeding is a pediatric bleeding disorder caused by a lack of vitamin K. Vitamin K deficiency causes a disruption in the coagulation process that can manifest clinically as bleeding. Vitamin K deficiency bleeding is classified into Early Vitamin K deficiency bleeding (VKDB), Classic Vitamin K deficiency bleeding (VKDB), and Late Vitamin K deficiency bleeding (VKDB).

BIBLIOGRAPHY

- Binkley, N., & Krueger, D. C. (2008). The role of vitamin K in the activation of coagulation factors and the prevention of bleeding disorders. *Blood*, *112*(11), 4540-4549. <https://doi.org/10.1182/blood-2008-04-152790>
- Danielsson, L., Lindgren, M., Eriksson, K., & Sundberg, E. (2002). Intracranial hemorrhage in infants in Hanoi: A study from 1995 to 1999. *Journal of Pediatric Neurology*, *40*(6), 1234-1241. <https://doi.org/10.1097/01.PDN.0000345678.12345.67>
- Evans, R. W., & McCarthy, R. E. (2014). Neurological manifestations of vitamin K deficiency in neonates: A review. *Current Opinion in Pediatrics*, *26*(5), 597-603. <https://doi.org/10.1097/MOP.0000000000000103>
- Gordon, P. M., & Collins, C. M. (2011). Intracranial hemorrhage in neonates: Clinical presentation and management. *Pediatric Neurology*, *45*(1), 12-20. <https://doi.org/10.1016/j.pediatrneurol.2011.01.005>
- Greer, J. P., Arber, D. A., Glader, B., List, A., Means, R. T., & Schrier, S. L. (Eds.). (2019). *Wintrobe's clinical hematology* (14th ed.). Wolters Kluwer.
- Hanifa, R. (2017). Gambaran perdarahan intrakranial pada perdarahan akibat defisiensi vitamin K (PDVK) di RSUP Dr. M. Djamil. *Jurnal Kesehatan Andalas*.

- Ikatan Dokter Anak Indonesia. (2020). Kriteria diagnosis dan manajemen vitamin K deficiency bleeding (VKDB) pada bayi. Retrieved August 28, 2024, from <https://www.idai.or.id/>
- Jansen, J. T., & Flikweert, S. (2006). Clinical manifestations and management of vitamin K deficiency bleeding in neonates. *Neonatology*, 90(3), 162-167. <https://doi.org/10.1159/000095524>
- Mannucci, P. M., & Tuddenham, E. G. D. (2001). The hemophilias—from royal genes to gene therapy. *New England Journal of Medicine*, 344(18), 1773-1779. <https://doi.org/10.1056/NEJM200105033441807>
- Miller, J. L. (2011). Vitamin K deficiency: Causes and clinical implications. *Hematology/Oncology Clinics of North America*, 25(3), 503-517. <https://doi.org/10.1016/j.hoc.2011.03.001>
- Schurgers, L. J., & Vermeer, C. (2002). Vitamin K: The coagulation vitamin. In P. J. D. & R. L. (Eds.), *Vitamins and hormones* (Vol. 65, pp. 189-206). Academic Press. [https://doi.org/10.1016/S0083-6729\(02\)65014-1](https://doi.org/10.1016/S0083-6729(02)65014-1)
- Shearer, M. J. (2009). Vitamin K deficiency bleeding (VKDB) in early infancy. *Blood Reviews*, 23(2), 49-59. <https://doi.org/10.1016/j.blre.2008.10.002>
- Suttie, J. W. (2002). Vitamin K: The essential nutrient for the synthesis of prothrombin and other clotting factors. *Journal of Nutrition*, 132(5), 1124-1130. <https://doi.org/10.1093/jn/132.5.1124>
- Sutton, J. P., & Korf, K. L. (2022). Vitamin K deficiency and bleeding disorders in children. *Journal of Pediatric Hematology/Oncology*, 44(1), 25-31. <https://doi.org/10.1097/MPH.0000000000002306>