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Case Report

Massive gastrointestinal bleeding due to vitamin K deficiency in a newborn

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Abstract. Early hemorrhagic disease of the newborn is a disease resulting from vitamin K deficiency, developing within the first 24 hours after birth. The disease may develop in babies born to mothers treated with anticonvulsants and antituberculous drugs, and sometimes as an idiopathic state despite prophylaxis with vitamin K. In this article, a case of early hemorrhagic disease in a newborn, presenting with a course of abundant gastrointestinal bleeding, has been discussed, who was born to mother with no risk factors and no history of drug use during pregnancy, with the disease onset in the first 24 hrs after birth despite administration of 1 mg vitamin K. With this article, we intended to point out that idiopathic early hemorrhagic disease may develop in newborns.

Key words: Vitamin K, gastrointestinal bleeding, newborn

1. Introduction

Vitamin K is a fat-soluble vitamin that is essential for the synthesis of factors II, VII, IX, and X in the liver. Placental transfer of this vitamin is very poor and it is found in very low concentrations in human milk. Newborns and breast-fed infants do take the recommended vitamin K intake via breast milk. The intestinal flora of these infants may produce lower amounts of vitamin K compared to the flora of formula-fed infants (1).

Hemorrhagic disease of the newborn (HDN) can also be determined as vitamin K deficiency-related bleeding. HDN due to vitamin K deficiency is known as a significant cause of morbidity and mortality. HDN is one of the most common bleeding disorders in early infancy. It is classified as early- (0-24 h), classical- (1-7 days), and late- (one week to six months) onset disease according to the time the bleeding occurs. Early HDN is diagnosed when the bleeding starts in the first 24 hours of the postnatal period. It is frequently seen in babies of mothers treated with isoniazid and/or rifampicin for treatment of tuberculosis, and with antiepileptic drugs (phenytoin and phenobarbital). Infrequent cases of idiopathic early HDN have also been reported (2). The incidence of HDN is 1/200-400. The etiology is specific for the different types. The disease causes mucosal, subcutaneous, and gastrointestinal hemorrhage in all types, but only the early-onset type induces umbilical hemorrhage; furthermore, the late-onset type causes intracranial hemorrhages.

In this case report, a patient with idiopathic early onset hemorrhagic disease is discussed under the light of the literature. We present here a newborn case of a mother with no history of use of drugs with a potential of increasing the risk of early HDN during pregnancy (antituberculous, antiepileptic, warfarin), and with an early onset during the first 24 hrs after birth despite prophylaxis with vitamin K, presenting with a course of abundant gastrointestinal hemorrhage.

2. Case report

The patient was born in our hospital through normal spontaneous vaginal delivery, as the 8th live child of a 38-year-old mother in the 10th pregnancy. The APGAR scores at the 1st and the 5th minutes were 8 and 10, respectively. The weight of the newborn was measured as 2670 gr (3-10% percentile), height as 48 cm (25–50% percentile) and head circumference as 33,5 cm (25–50% percentile). No history of drug use was found in the mother during pregnancy. Upon normal findings on the physical examination, the newborn was placed next to the mother at the department of obstetrics and gynaecology. Vitamin K_1 1 mg (phytomenadione, konakion,

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Roche© pharmaceuticals) was administered via intramuscular route. After 2 hours, vomiting resembling hematemesis was observed in the patient and the baby was admitted to the newborn division with a pre-diagnosis of newborn hemorrhagic disease. On physical examination, the general health status was good, newborn reflexes were active and there was no rash on skin, with normal findings on examination of other systems. Apex heart beat (HAB) was measured as: 127 beats/min, number of respirations per minute as: 52/min, arterial blood pressure (BP): 66/36 mmHg and Temperature: 36.2°C. While laboratory investigations were pursued, abundant lower gastrointestinal hemorrhage in the form of hematochezia developed in the patient. The preliminary laboratory findings were as follows; WBC: 16.000/mm^3, hemoglobin (Hb): 16,3 gr/dL, platelet count: 309.000/mm^3, blood glucose: 87 mg/dl, C-reactive protein (CRP): 0,13 mg/dL (Normal:0-0,8 mg/dL), prothrombin time (PT): 19 sec, active partial thromboplastin time (aPTT): 37,8 sec and fibrinogen: 3.2 g/dL. Protein S and protein C at this stage were determined as normal. A second dose of vitamin K 1 mg i.v. was administered, along with 10cc/kg fresh frozen plasma (FFP). Hemorrhage was partially controlled following administration of fresh frozen plasma. Laboratory findings at 12 hours after treatment revealed the following: PT: 26 sec, aPTT: 65.3 sec and Hb: 12.8 gr/dL. A third dose of vitamin K 1 mg and a second dose of FFP were administered. While hemorrhage was under control, a second but mild lower gastrointestinal hemorrhage was observed. Having observed the laboratory findings of: PT: 17.9 sec, aPTT: 38.6 sec and Hb: 11.4 gr/dL, a 4^{th} dose of vitamin K 1 mg and a 3^{rd} dose of FFP (10 cc/kg) were administered. Complete control of hemorrhage was achieved with normal laboratory results (PT:16 sec, aPTT: 36 sec, Hb: 11.6 gr/dl). A negative blood culture and the CRP value of 0,13 mg/dL (Normal:0-0,8 mg/dL) excluded the diagnosis of sepsis. Since the infection markers were negative, no antibacterial agents were used. No additional foci of hemorrhage were determined on cranial and abdominal ultrasonography. The physical and laboratory examinations performed a week later revealed normal findings.

3. Discussion

Vitamin K (VK) deficiency is more common in newborns, especially among premature babies. Since Factor II levels and VK stores are low at birth, the risk is greater among unnourished babies. Apart from breast milk, intestinal bacterial activity is the only source of VK in newborn until a second source is initiated. The risk is increased in babies born to mothers using drugs affecting the VK metabolism (antituberculous, anticonvulsant, warfarin) during pregnancy (3).

Early hemorrhages are often life-threatening and usually not prevented by vitamin K prophylaxis at birth. The reported incidence (without vitamin K supplementation during pregnancy) is 6–12%. The incidence is lower when compared to the other two forms. The extent of hemorrhage varies from mild bruising to severe intracranial hemorrhage. Common bleeding sites are cephal hematoma, intracranial, intrathoracic, umbilical and intra-abdominal (4).

Early HDN is common in babies of mothers using anticonvulsant drugs during pregnancy. Anticonvulsant drugs lead to destruction of vitamin K via induction of microsomal enzymes in the liver and cause hemorrhages in the first 24 hours. Antituberculous agents such as isoniazid and rifampicin increase the bleeding tendency by disrupting the vitamin K oxidation process (5).

Due to the potential exposure to serious trauma at birth, the rate of mortality in early HDN is higher than in other types (classical, late), although it is less commonly encountered (2-5). In general, in trials and case reports found in the literature, a significant cause has been attributed to in early HDN (use of anticonvulsant and antituberculous agents in the mother). In our case, the use of drugs and risk factors in the medical history were negative in the mother, which led us to assess the case as idiopathic early HDN.

Independent from administration of the prophylactic dose, development of early type newborn hemorrhagic disease due to VK deficiency in a baby requires treatment with VK (though not effective) and prothrombin-rich complexes (6). VK should not be administered via the intramuscular route. Vitamin K 1 mg/kg should be administered by slow intravenous (IV) or subcutaneous (SC) administration. Absorption of VK via the SC route is more rapid. In the current case, immediate administration of intravenous vitamin K was performed; upon persistent abundant hemorrhage, prothrombin-rich fresh frozen plasma 10cc/kg was administered for 3 days, since the prothrombin concentrate was not available.

The main target in the management of newborn hemorrhagic disease should be prevention. The recommendation of the American Academy of Pediatrics is to administer vitamin K 0.5-1 mg to

all newborns as a single intramuscular dose. Accordingly, vitamin K 1 mg i.m. is administered to all newborns in Turkey. It is well known that routine administration of vitamin K 2.5-5 mg/day to mothers, starting at 3 days prior to delivery increases the amount of vitamin K in breast milk. However, mothers presenting to the hospital in the last 24 hours of pregnancy should receive 10-20 mg vitamin K. This prophylactic approach has been reported to provide sufficient levels of vitamin K in breast milk (2,5mg/day). Another recommendation is use of oral vitamin K 20 mg/day during the last 1-2 weeks of pregnancy and this has been indicated to prevent early HDN (7).

In conclusion, we agree that the classical and the late onset type of newborn hemorrhagic disease can be prevented to a great extent by administration of vitamin K as per recommendations of the American Academy of Pediatrics and local authorities. However, we believe that such an approach is insufficient to prevent the development of early type HDN. For prevention of early type HDN, vitamin K may be administered to all pregnant women at least 2-3 days prior to delivery, regardless of whether they carry a risk (use of anticonvulsant and antituberculous drugs) or not. We suggest that this approach is adequate in the prevention of all types of HDN. Delivery of pregnant women in the risk group should be performed without causing any trauma to the newborn. The newborn should be closely monitored following birth; in cases of life-threatening hemorrhage, prothrombin concentrate, and if not available, fresh frozen plasma should be administered along with intravenous vitamin K.

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