Case Report

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Diffuse Miliaria Cristalina due to Severe Hypernatremic Dehydration: A Neonatal Case Report with a Current Literature Review

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Abstract

Miliaria is a common, transient cutaneous disease caused by obstruction of the eccrine sweat duct. A female patient who was admitted with the complaint of decreased sucking on the postnatal 15th day learned that after the postnatal 10th day, the sucking reflex decreased, the amount of urine decreased, and the number of stools per day decreased. We observed that the patient's general condition was poor and that his weight loss was 31%. Fluid therapy was adjusted for the patient, whose serum sodium level was 192 mEq/L. On the 5th day, while the serum sodium level was 156 mEq/L and the body temperature was within normal limits, vesicles and bullae were detected in the body, especially in the trunk, and relatively few in the extremities. Although miliaria crystallina is a common skin problem in newborns, our case is the second documented case of miliaria crystallina due to hypernatremia in the literature. Physicians; It should be kept in mind that miliaria crystallina may be seen in the newborn during the treatment of severe hypernatremic dehydration.

Keywords: Miliaria cristalina, severe dehydration, neonatal

Introduction

Miliaria is a common, transient cutaneous disease caused by obstruction of the eccrine sweat duct. There are three main types of miliaria: miliaria crystallina, miliaria rubra, and miliaria profunda, which are distinguished by their clinical appearance and histological findings. Miliaria rubra is the most common type, observed in 4% of newborns (1). Miliaria crystallina, also known as Sudamina, is very common in newborns; it peaks at approximately one week of age, and its frequency has been reported to be between 4.5 and 9% (2).

The reason for this is that bacteria such as *Staphylococcus epidermidis* form cutaneous residues or biofilm formation (3). This blockage causes sweat to leak into the epidermis or dermis, resulting in cellular overhydration, swelling, and further blockage of the ducts. The reason for the frequent occurrence of miliaria crystallina in newborns is the underdevelopment of the eccrine sweat duct. It is usually seen as 1-2 mm superficial vesicles in newborns younger than 2 weeks of age (4).

Here, a newborn case who was treated for severe hypernatremic dehydration and who developed widespread and extensive miliaria crystallina during treatment is presented.

Case Report

From the history of the girl who was brought in with the complaint of decreased sucking on the postnatal 15th day, it was determined that the 1st and 5th minute APGAR 8/9 of the patient, who was born by cesarean section at 39 weeks and 3200 g from a 30-year-old mother. It was learned that the sucking reflex of the patient decreased after the postnatal 10th day, and there was a decrease in the amount of urine and the number of daily stools. The patient was admitted to the neonatal intensive care unit (NICU) with the diagnosis of severe dehydration.

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On arrival, the general condition was poor during the physical examination: body weight of 2200 grams, body temperature of 38 °C, respiratory rate of 56 beats per minute, heart rate of 145 beats per minute, saturation of 98%, arterial blood pressure of 100/71 (mean: 82 mmHg), and weight loss observed in 31% of the patient. The patient had severely decreased skin turgor, dry skin, was conscious and hyperalert, had increased muscle tone, threw his head back, and had strabismus. Peripheral vascular access was established for the patient. Due to the lack of urine output, a saline loading of 10 cc/kg was used once more. The blood gas pH was 7.32, the pO_2 was 35, the pCO_2 was 31.5, the BE was 8.4 and the HCO3 was 16.1. C-reactive protein: 0.27 mg/L, phosphorous: 5.13 mg/dL, creatinine: 1.42 mg/dL, blood urea nitrogen (BUN): 124.39 mg/dL, sodium: 192 mEq/L, potassium: 4.82 mEq/L, chlorine: 150.9 mEq/L, calcium: 11 mg/dL, hematocrit: 52.7%, platelet count: 179.00/mm^3, leukocyte count: 10.530/mm^3. The patient's fluid was given at a rate of 180 cc/kg/day (130 cc/kg maintenance, 150 cc/kg deficit, divided by 3). In the control blood tests taken at the second hour of the fluid treatment, BUN was 104.67 mg/dL, creatinine was 0.99 mg/dL, sodium was 192 mEq/L, and potassium was 4.8 mEq/L. On the 4th day, the sodium value of the patient was 156 mEq/L, and the sodium decrease in 72 hours was 36 mEq/L (12 mEq/day), and the fluid was continued in the same way. On the 5th day, while the serum sodium level was 156 mEq/L and the body temperature was within normal limits, vesicles and bullae were detected in the body, especially in the trunk, and relatively few in the extremities (Figure 1).

The patient's viral serology and varicella immunoglobulins were negative. A moisturizing cream was recommended to a patient who was evaluated by a pediatric dermatologist. On the 6th day, the bullae began to erode (Figure 2).

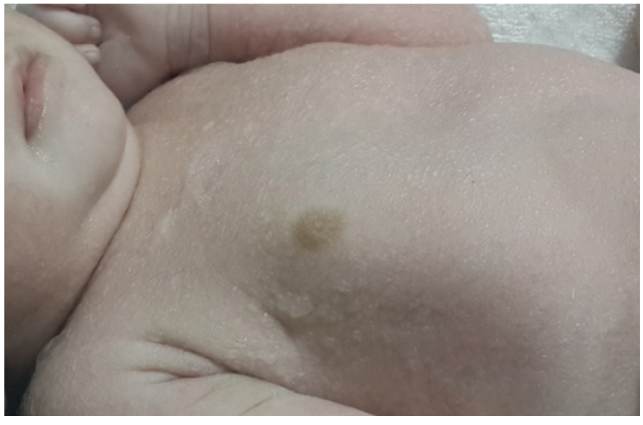

Figure 1. Diffuse vesicles and bullae on the trunk and upper extremities on the 5th day of hospitalization

On the 7th day, the patient's sodium levels returned to normal, kidney functions and urine output were good, the patient's fluid was stopped, and full oral nutrition was started. A daily bath was taken for the skin lesions, then she was laid on a sterile cover, and the whole body was treated with a moisturizing cream containing avocado perseose. In the follow-ups, the skin lesions completely resolved (Figure 3).

On the 12th day of his hospitalization, the patient, whose body weight was 3330 grams, was fed orally by his mother, and weight gain was regular. The patient was discharged with no further recommendations.

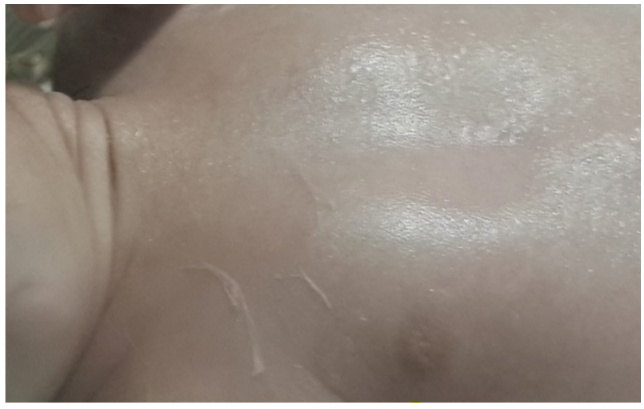

Figure 2. Eroded vesicles and bullae in the trunk area on the 6th day of hospitalization

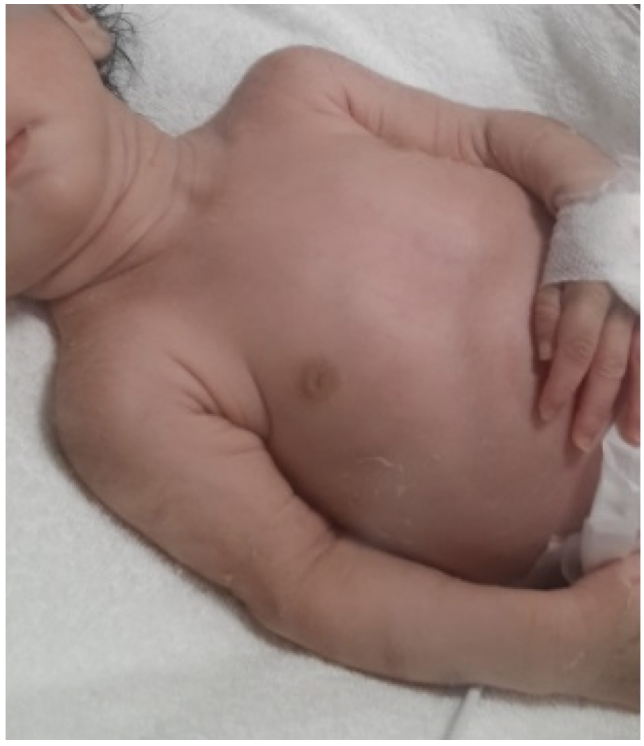

Figure 3. The patient is healed of all lesions

Discussion

Anything that causes sweating can cause miliaria crystallina in infants, children, and adults. The common causes are hot and humid environments, strenuous physical activity, febrile illness, occlusion of the skin by non-porous clothing or bandage dressings, and transdermal drugs (5).

Miliaria crystallina is widely considered in the differential diagnosis of bullous diseases in newborns. Miliaria is caused by sweat retention in clogged eccrine ducts because of keratin plugs. Retrograde pressure causes the duct to rupture and leak sweat into the epidermis and/or dermis. In Miliaria crystallina, the occlusion of the eccrine duct is very superficial, i.e., in the stratum corneum, and may contain neutrophils (6). The upper body, neck, and head are the most commonly affected areas. The rash usually appears a few days after exposure to risk factors and resolves within a day after the superficial layer of skin is removed (7).

The differential diagnosis of miliaria crystalina includes herpes simplex, chickenpox, erythema toxicum neonatorum, staphylococcal scalded syndrome, neonatal pustular melanosis, and neonatal acropustulosis. In Miliaria crystallina, the vesicle content is as clear as water. Therefore, the color and shape of the blisters allow for a definitive clinical diagnosis (7). In this study, the location of the lesions and content of the lesions clinically suggested miliaria crystallina. However, its difference from the classical miliaria crystallina is that it is more common and takes the form of rather large bullae.

Miliaria crystalina is quite common in newborns and children. Studies report an incidence of 1.3% in newborns who develop skin lesions within the first 48 hours of life. In a retrospective study involving 5387 infants in Japan, it was reported that miliaria crystallina peaked on the postnatal 6th and 7th days, and its frequency was 4.5% (8). Although it usually does not occur at birth and the main cause is canal disruption, a few congenital miliaria crystalina cases have been reported (7).

Skin lesions, mostly in the form of vesicles in the miliaria crystallina, were observed as bullous lesions in this study. It has been reported that disorders associated with increased salt in sweat may cause miliaria crystallina. To the best of our knowledge, there are two cases of hypernatremia in the literature. Chao (9) reported miliaria crystallina in a hypernatremic adult patient without fever, and they suggested that this situation may have arisen because of direct drying of the corneocytes with excessive sodium. Engür et al. (10) detected diffuse miliaria crystalline a few days after admission to the NICU in a 16-day-old term newborn with a serum sodium level of 186 mEq/L who was followed up for hypernatremic dehydration, and they suggested that this is related to high serum sodium levels in sweat (11). In this study, as in the cases of Engür et al. (10), there was no history of fever, thick clothing, or any previous medication. In this study, while there were no skin findings on admission to the NICU, lesions began to appear on the 5th day of fluid therapy, which is the process in which the serum sodium level is in the decline phase. The increase in the amount of sodium excreted in sweat while serum sodium decreased may have caused diffuse miliaria crystallina in this study.

The general approach to treating miliaria is to reduce sweating and eccrine duct obstruction. Miliaria crystallina is usually untreated as it is self-limited and usually resolves within 24 hours (6). In this study, a daily bath was taken for the skin lesions, then he was laid on a sterile cover, and the whole body was treated with a moisturizing cream containing avocado perseose. In the follow-ups, the skin lesions resolved completely.

In conclusion, although miliaria crystallina is a common skin problem in newborns, our case is the second documented case of miliaria crystallina due to hypernatremia in the literature. It should be kept in mind that miliaria crystallina may be observed during severe hypernatremic dehydration treatment.

Ethics

Informed Consent: Consent information was obtained from the patient's family.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: B.A., Data Collection or Processing: B.A., E.B., Analysis or Interpretation: E.B., Funding Acquisition: B.A., Methodology: B.A., E.B., Project Administration: B.A., Visualization: B.A., E.B., Writing - Review & Editing: E.B., B.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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