

Iatrogenic calcinosis cutis at upper eyelid following extravasation of calcium gluconate from inappropriate intravenous cannula

Uygun olmayan intravenöz kanülden kalsiyum glukonatın damar dışına sızması sonucu üst göz kapağında kalsinozis

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ABSTRACT

Purpose: To report a case of iatrogenic calcinosis at the upper eyelid region due to inappropriate placement of intravenous cannula and extravasation of calcium gluconate.

Case report: A 3970-g female neonate with edema and erythema and a firm mass on the temple, forehead and right upper eyelid was evaluated. Subcutaneous calcium deposition was only seen on the upper eyelid. With the diagnosis of neonatal hypocalcemia, she was treated with intravenous calcium gluconate injected into the superficial temporal vein on the right temple.

Results: Calcium gluconate was discontinued, the cannula was removed and warm compresses were applied. At 13 th day of her life the size of the firm lesion had markedly resolved however subcutaneous calcium deposits remained. At the second month after delivery, routine control examination revealed no sequela.

Key words: Calcinosis, extravasation, eyelid

ÖZET

Amaç: Uygun biçimde yerleştirilmeyen intravenöz kanülden kalsiyum glukonatın damar dışına sızması sonucu üst göz kapağında kalsinozis saptanan bir olgunun sunulması amaçlanmıştır.

Olgu sunumu: Üst göz kapağı, şakak ve alın bölgesinde hiperemi ve ödem saptanan 3970 g yenidoğan olgu değerlendirilmiştir. Cilt altı kalsiyum birikimi yalnızca sağ üst göz kapağında izlenmekteydi. Olguya neonatal hipokalsemi nedeni ile süperfisiyal temporal venden intravenöz kalsiyum glukonat verilmişti.

Sonuç: Kalsiyum glukonat tedavisi kesilip, kanül çıkarıldı ve sıcak baskı uygulandı. On üçüncü günde sert lezyon geriledi fakat cilt altı kalsiyum birikimi devam etmekteydi. İki ay sonra yapılan kontrolde hiçbir sekel kalmadığı görüldü.

Anahtar kelimeler: Damar dışına sızıntı, göz kapağı, kalsinozis

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INTRODUCTION

Extravasation is a non-intentional leakage of infused fluid into surrounding tissue, which may cause damage. Age is a risk factor for extravasation pos-

sibly due to the need for smaller catheters and inability to communicate pain as an early warning sign. The prevalence of extravasation injuries resulting in skin necrosis recorded as 38 per 1000 neonates ⁽¹⁾. About 4% of the infants leave neonatal intensive care

units with cosmetically or functionally significant scar caused by extravasation injuries ⁽²⁾. Several factors play a role in extravasation injuries including solution osmolality, tissue toxicity, vasoconstrictor properties, infusion pressure and regional anatomical peculiarities ^(3,4). Peripheral catheters are widely used in sick neonates and children. Intravenous fluids such as antibiotics, chemotherapeutic agents, potassium, sodium bicarbonate, anticonvulsants and calcium have been shown to cause significant tissue damage ^(1,5). Parenteral alimentation fluids containing calcium are widely used to treat sick neonates and children. Calcium gluconate is commonly used in parenteral alimentation fluids and may cause local swelling, erythema blistering and progressing to skin necrosis and skin loss ⁽⁶⁾. We hereby report a case in whom extravasation of calcium gluconate resulted in ocular and skin abnormalities.

CASE REPORT

A 3970-g female neonate was consulted to ophthalmology department and examined at the 7th day of life. Ophthalmologic examination revealed edema and erythema with firm mass on the temple, forehead and right upper eyelid. The skin and subcutaneous tissue were fairly indurated and erythematous (Fig. 1-A). Subcutaneous calcium deposition was mainly

seen on the upper eyelid (Fig. 1-B). From her medical history, we have learned that she was born at 39+4 weeks of gestation with spontaneous induction of labor by vaginal birth. Her mother was 31 years old and had not used any medication during pregnancy and had not any systemic disease. The neonate required resuscitation due to left brachial plexus injury from difficult labor and delivery. Also she had cephalic haematom, diffuse ecchymosis and petechiae on her face and subconjunctival hemorrhage in her right eye. Her general condition was apathetic and hypoactive and she was immediately transferred to the neonatal intensive care unit. Her serum ionized calcium level was 0.78 mmol/L as detected on routine clinical analysis performed on the fifth day of her life. With the diagnosis of neonatal hypocalcemia, she was treated with intravenous calcium gluconate injected into the superficial temporal vein on the right temple. She received a loading dose of 240 mg calcium gluconate in distilled water over 2 days. At 45 hours after delivery, some of the solution extravasated and subsequently infiltrated into surrounding tissue and upper eyelid. Calcium gluconate was discontinued, the cannula was removed and warm compresses were applied. She was diagnosed with calcinosis cutis secondary to extravasation of calcium gluconate. Fortunately, there was no ulcer, skin necrosis, or granulation. No spesific medical or surgical therapy was



Figure 1. Appearance of the patient after injury caused by calcium gluconate extravasation. A. The overlying skin and subcutaneous tissue was fairly hard and erythematous B. Arrow shows subcutaneous calcium deposition at the upper eyelid.

attempted. On 13th day of her life the size of the firm lesion had markedly resolved however subcutaneous calcium deposits remained. She was discharged on the 14th day of her life from the hospital. At the second month after delivery, routine control examination revealed no sequela (Fig. 2).



Figure 2. Same site as in Figure 1 at two months post-injury.

DISCUSSION

Skin necrosis due to extravasation of intravenous fluids is an important cause of morbidity in pediatric population. At an overall prevalence of nearly 70% at least one extravasation injury in newborns has been reported ⁽⁷⁾.

Extravasation is defined as the unintentional infusion of fluid into an extravascular space with the potential of causing damage. This may be due to misplacement at initial cannulation or displacement of the cannula afterwards. Tissue injury occurs either due to direct toxicity or high osmolality of the infusate. There are several theories to explain the pathogenesis of the calcification, including tissue damage and transient elevation of the local calcium concentration. Local tissue injury increases cell membrane permeability, allowing cytosolic influx of calcium

that exceeds the capacity of mitochondria to sequester calcium and phosphate in the cytoplasm. With calcinosis caused by extravasated calcium, the primary pathological alterations described are collagen degeneration and soft tissue necrosis ⁽⁸⁾. In addition, it has been suggested that high phosphorus content of the infant's blood serum might have facilitated this process ⁽⁸⁾.

Preterm skin vulnerability to damage increases with decreasing gestational age. The epidermis has fewer layers in the extreme preterm infant, and the dermis has less cohesion and strength ⁽⁹⁾. The difficulty in placing IV cannulae within such small patients contributes to the tissue damage. Veins themselves are more fragile and so more readily ruptured by any increase in the intravascular pressure. The supporting connective tissue is less thick so movement of the cannula outside the vein may be more likely to occur. Neonates cannot localise pain and generalised signs of discomfort may not alert staff to the problem.

Calcinosis cutis is usually easy to diagnose when massive extravasation of calcium infusion is followed by erythema, swelling, induration, and soft tissue necrosis ⁽¹⁰⁾. Usually, progressive clearing of calcification occurs without specific treatment 2-3 months after its onset, and completes after 5-6 months ^(11,12). Calcinosis cutis in infants may be severe, with generalized soft tissue calcifications throughout the body, extremities, and face after the injection of intravenous calcium gluconate, but still it can be treated conservatively, as such generalized calcifications tend to resolve at 7 months of age ⁽⁸⁾.

Hereby we described a neonate with a calcinosis cutis lesion at temple, forehead and eyelid region following extravasation of calcium gluconate. As in the literature, we managed the neonate conservatively, and healing of the lesion occurred after two months. Due to its proximity to the globe and difficulty to make a diagnosis without the knowledge of this entity, we think that this rare complication must be kept in mind in neonates requiring intensive care.

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