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Ischemic Volkmann Contracture from Intrauterine Compartment Syndrome

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Abstract

Neonatal compartment syndrome has distinct clinical features, which requires timely and appropriate intervention. Skin lesions present on the forearm should raise suspicion for underlying neonatal compartment syndrome and tissue ischemia. The spectrum of presentation varies and can range from local skin lesions to a swollen forearm to frank distal gangrene. Late referral to a surgeon at the time of Volkmann syndrome results in irreversible muscle damage and functional deformities. As such, it can lead to significant long-term consequences if not promptly evaluated and treated.

Introduction

- Neonatal compartment syndrome is a rare condition, described as a distinct entity in 1992 by Caouette-Laberge et al
- The largest published case series reports only 24 infants over 20-years (1980-2000)
- We present a case of an infant noted, at birth, to have skin lesions of the antecubital and forearm areas with decreased hand movement

Case Report

- This is a 4250g large for gestational age female born at 38 weeks and 2 days to a 27-year-old G2P2 mother with a history of Type 1 diabetes mellitus



Figure 1a. Dorsal aspect of right forearm with findings of erythema and ulceration.



Figure 1b. Ventral aspect of right forearm with ulceration present in the antecubital fossa measuring 2 x 3 cm.

- Physical exam noted an active infant with limited movement of the right arm and decreased palmar grasp
 - Positional preference of wrist flexion, elbow extension, and mild pronation favoring Erb position
 - Fingertips had delayed capillary refill and pale color
- Doppler examination did not reveal vascular occlusion

Clinical Course

- Admitted to neonatal intensive care unit for suspected soft tissue infection of the arm secondary to infected aplasia cutis congenita, thus initiated on IV antibiotics
- Evaluated for possible brachial plexus injury

DAY 6 OF LIFE



Figure 2a. Dorsal aspect of right forearm with a 3 x 1.5 cm eschar



Figure 2b. Antecubital fossa of right forearm with also a 3 x 1.5 cm eschar



Figure 3. Right wrist drop and developing contracture

- Referred to a tertiary care facility for a pediatric hand surgery evaluation
- The patient still remains without wrist or distal flexion but is attending ongoing therapies



Discussion

- Neonatal compartment syndrome is a rare entity
- It mimics other skin diseases such as gangrene of newborn, aplasia cutis congenita, and necrotizing fasciitis
- Skin lesions present on the forearm should raise suspicion for underlying neonatal compartment syndrome and tissue ischemia^{1,2}
- The exact pathogenesis of this condition is unknown
 - Extrinsic factors described include mechanical compression secondary to fetal posture and oligohydramnios, umbilical cord loops, amniotic band constriction, or direct birth trauma^{1,2,3}
 - Intrinsic factors include hypercoagulability leading to thrombosis^{2,3}
- We hypothesize that this large for gestational age newborn could have sustained birth trauma resulting in mechanical compression
- To our knowledge, there have been fewer than 100 reported cases in the literature

Conclusion

Neonatal compartment syndrome requires early diagnosis and urgent surgical evaluation to provide adequate treatment. In the literature, very few cases underwent emergent fasciotomy within 24 hours.² Early intervention can lead to recovery of tissue.² Almost 70 years ago, Lightwood⁴ stated, "The presence of wrist-drop demands a search for its cause; if it is unilateral there will be a local one." To this we add that the presence of unilateral arm movement difficulties in the newborn with associated skin changes demands consideration of neonatal compartment syndrome with prompt diagnostic and emergent therapeutic interventions to attempt preservation of limb function.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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