



Neglected Neonatal Compartment Syndrome and Compound Presentation at Birth - A Case Report

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Abstract

Background: Increased pressure within a limited limb compartment is the hallmark of the uncommon and potentially fatal Neonatal Limb Compartment Syndrome (NLCS). Physicians might not be able to tell NLCS apart from other illnesses that mirror it. Due to a low index of suspicion for this ailment, misdiagnosis is likely and could cause a delay in receiving necessary and urgent treatment.

Case Report: A one-day old male neonate born to parous two mother presented with right forearm and hand swelling, pain and darkening of 30 min after cesarean delivery for the indication of compound presentation (hand prolapse). On physical exam the vital sign were normal except there was darkened, cold bullous swelling in right forearm and hand. This case was treated non-operatively with limb elevation and suppository analgesics and his condition improved completely.

Abbreviations

CBC: Complete Blood Count; gm: gram; NCS: Neonatal Compartment Syndrome; NLCS: Neonatal Limb Compartment Syndrome; USA: United States of America

Introduction

A rare disorder known as Neonatal Compartment Syndrome (NCS) can cause nerve lesions, Volkmann contracture, and variations in limb length [1]. Potential causes are generally categorized as intrinsic or extrinsic. Intrinsic causes include hypercoagulable states that can result in intravenous or intraarterial thromboses, while extrinsic causes include mechanical compression, which can be caused by oligohydramnios, amniotic band constriction, birth trauma, abnormalities of the umbilical cord, or malpresentation [1]. Numerous patients have incorrect diagnoses, which causes fasciotomy delays and poor prognoses. A review of the literature encompassing 24 case reports of newborn compartment syndrome revealed a correlation between the degree of development and function impairment and the severity of the initial injury. Further damage of final function may result from a delayed diagnosis and treatment of a growing compartment syndrome [2]. Here we report a case of one day old male neonate with diagnosis of hand and forearm compartment syndrome.

Case Presentation

A 30-year-old woman with pushing down pain lasting one day arrived at obstetric triage at 38 weeks and 1 day gestation. Her prior delivery was a spontaneous vertex delivery with a good outcome and an alive fetus, and her pregnancy had gone well with no known medical conditions or drug addiction. She was receiving routine prenatal treatment at the health center and her ultrasound revealed a normal anatomical assessment.

When she arrived at labor and delivery, she denied having a fever or chills and described having pushing down pain for the previous 24 h. She also mentioned having good fetal activity. Her uterus was not painful, her pulse was 102, her white blood cell count was 15,700, and there was no left shift. She was afebrile. An ultrasound verified a compound presentation (hand prolapse) with an estimated gestational age of 38 weeks and 5 days, an estimated fetal weight of 2,800 g, and an amniotic fluid index of 2.6 cm. A nonstress test was suggestive of category II tracing for estimated gestational age.

Exam results showed that the forearm was crossing the head and face in a complex appearance. She was advised that she was no longer a candidate for a vaginal delivery in light of the exam results and the category II tracing. After undergoing a low transverse cesarean surgery while under epidural anesthesia, a viable male newborn weighing 2,600 g was delivered, with Apgar scores of 8 and 9 at 1 and 5 min. The fetus was observed to be presenting with an arm adjacent to his head at the time

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Figure 1a & 1b: Initial image.



Figure 2a & 2b: Follow up image at 6 week.

of the hysterotomy. For additional care, the infant was brought to the neonatal critical care unit.

During the physical examination in the neonatal critical care unit, the baby exhibited a capillary refill that was sluggish, circumferential darkish, and considerably chilly. Bullous rupture swelling extended over the entire right arm below the elbow (Figure 1a, 1b).

At admission the CBC profile, random blood sugar and coagulation profile was normal to his age. Orthopedic surgery was consulted immediately and non-operative management with strict limb elevation to level of heart and suppository paracetamol and discharged on his 5th day of admission with complete resolution of compartment syndrome. And on six week follow up neonate is growing appropriate for his age with no major compartment syndrome complication and the limb looking normal (Figure 2a, 2b).

Discussion

This case illustrates a peculiar labor complex presentation problem. An extremity prolapses alongside the presenting portion of the presentation, which is known as a compound presentation. Most of the time, an arm appears next to the fetal head. It has been found that 1 in 250 to 1 in 1,500 deliveries involve compound presentations [3,4]. A prolapse of the lower extremities is far less prevalent. Prematurity is the most common risk factor, and cord prolapse is the most common consequence, occurring in up to 20% of compound presentations [3]. Prematurity, cord prolapse, and violent births have been linked to high rates of perinatal morbidity and mortality, according to previous research [4]. Many of these cases end on their own when the prolapsing portion retracts as the condition advances.

When fascial compartment pressure exceeds perfusion pressure, tissue ischemia and eventual necrosis ensue, causing compartment syndrome. Acute or chronic compartment syndrome are both possible. Trauma is linked to acute compartment syndrome in the majority of instances [5]. While fractures account for the bulk of instances, there are other possible causes as well, such as burns,

vascular damage, crush injuries, and iatrogenic factors such improper positioning during surgery or prolonged regional anesthesia [6]. Compartment syndrome symptoms include discomfort, pallor, paresthesia, pulselessness, and poikilothermia. The majority of cases are discovered when patients report experiencing pain that is excessive for the injury, particularly when the affected muscle or muscles are being stretched. Compartment syndrome represents a potentially catastrophic surgical emergency that may result in irreparable tissue damage within hours [7].

Numerous techniques have been put forth to identify compartment syndrome. Although Garner et al. recommend using a pulse pressure of less than 30 mmHg in the right clinical situation, many in the past felt that this was a clinical diagnostic [6]. The intramuscular pressure is subtracted from the diastolic blood pressure to determine the pulse pressure. Nonetheless, a number of writers concur that the diagnosis is clinical in nature and that pressure readings might be helpful in ambiguous instances only [5].

Following a review of medical records from 1980 to 2000, Ragland et al. reported on 24 incidences of forearm compartment syndrome in neonates. Eleven patients had problems with their left arm and thirteen with their right arm. In the first 24 h of life, only one patient needed to see a hand surgeon. None of their patients had a compound presentation, despite the fact that they list a number of possible causes, including fetal position, oligohydramnios, umbilical cord loops, constricted amniotic bands, and direct delivery trauma [2].

A 37-year-old infant appeared at 31 2/7 weeks with an early rupture of the membranes, according to a case report from the United States published in 2022. The infant had compartment syndrome. Her condition was handled cautiously up until the onset of chorioamnionitis at 32 5/7 weeks. She was identified with a complex presentation after her labor was forced and she had progressed to 8 cm. She had a low transverse c-section since the fetal heart rate displayed a category II trace with no further drop. Due to significant edema and ecchymosis of the right arm, the baby's right arm and both feet prolapsed on the fetal head after birth, requiring an emergency fasciotomy to prevent compartment syndrome. After cautious management, the foot edema went away on its own [5]. Otherwise, there are no other case reported on neonatal compartment syndrome in labor and deliveries complicated with compound presentation.

This instance demonstrates a rare but potential compound presentation issue. When advising patients who appear with compound presentations, particularly those with hand prolapse, doctors who are caring for these patients must be aware of these uncommon but potential problems.

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