

Case Report

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Multidisciplinary Management of a Collodion Baby with Favorable Neonatal Outcome: A Case Report

Dr. Sherin S S¹, Dr. Sowmiyasree M P², Dr. Jasmine S³, Dr. Lavanya basava⁴, Dr. Musthafa T M⁵, Dr. Archana Dinaraj⁶, Dr. Rajparath R⁷, Dr. Amudha R⁸, Dr. Ganavi Ramagopal^{9*}

^{1,2,3,4}Postgraduate Student, Department of Pediatric, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur.

⁵Postgraduate Student, Department of Dermatology, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur.

^{6,7}Assistant Professor, Department of Pediatric, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur.

⁸Professor and HOD, Department of Dermatology, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur.

⁹Professor and HOD, Department of Pediatric, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur.

*Corresponding Author: Dr. Ganavi Ramagopal

Email: gaganavi10@gmail.com

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Abstract: Collodion baby is a rare neonatal condition. When infants with this condition are born, their entire bodies are covered by a membrane this membrane is taut, shiny to the touch and the eye, with a texture similar to the parchment commonly seen in daily life. This barrier, which ought to protect the skin, malfunctions and cannot fulfill its normal protective role. Newborns with the condition then face multiple risks: rapid fluid loss leading to dehydration, disrupted electrolyte balance in the body, increased susceptibility to pathogenic infections, and inability to maintain a stable body temperature. When this condition occurs, the infant must receive professional clinical intervention as early as possible. This paper documents such a case: a male infant born at 38 weeks of gestation, a full-term birth. During the initial examination immediately after the newborn was first assessed, it was found that the skin across his entire body was taut, shiny, and presented with an abnormal yellowish hue. In addition to this abnormal skin condition, he also presented with several other issues: the eyelids of both eyes were everted and could not close, his lips were protruding and everted, the shape of his ears differed from that of a normal newborn, and even his limbs could not extend freely, presenting with symptoms of pseudo contracture. In response to all of the infant's conditions, the medical and nursing team developed a care plan one by one. The treatment and nursing care provided included constantly helping him maintain a stable body temperature, replenishing the fluids and nutrients his body required via intravenous infusion, applying topical emollients to his skin daily to protect the skin, delivering specialized ophthalmic treatment for his eyelid ectropion, administering routine antibiotics in advance to prevent infection, and arranging special nursing staff to help him feed smoothly to obtain nutrients. In addition, the hospital coordinated teams from multiple different departments to work together, providing continuous joint care for him and addressing all the clinical conditions he developed. One week after birth, the collodion membrane covering the male infant's body began to gradually shed. The eyelids that had previously been unable to close returned to normal, and the eversion symptoms resolved completely. The pseudo contracture that had prevented his limbs from extending also gradually improved throughout his hospitalization. Throughout the entire period from admission to discharge, the male infant's hemodynamic status remained stable, and he was discharged smoothly on the 18th day after birth. The doctor's discharge instructions clearly required that when the child was brought back to the outpatient clinic for follow-up visits, a genetic test should be completed for the child. This case also reminds all relevant medical staff that to achieve good short-term recovery outcomes for this type of patient, three elements are indispensable: early identification of this special condition, meticulous delivery of all nursing work that supports the child's physical recovery, and organization of multi-department joint diagnosis and treatment. All three of these points are critically important.

Keywords: Collodion baby; congenital ichthyosis; ectropion; eclabium; neonatal care.

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INTRODUCTION

Collodion baby is a rare neonatal presentation, which simply refers to a set of unique physical manifestations that appear in newborns. Infants with this condition are born covered in a membrane that stretches tightly over

the skin, presenting a shiny appearance, with a texture similar to parchment used in handicrafts or old-fashioned lamps. It is not an independent disease, but a common manifestation shared by a group of genetic-related keratinization disorders, which include many subtypes.

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The condition that most frequently presents with this manifestation is autosomal recessive congenital ichthyosis (ARCI), which specifically encompasses lamellar ichthyosis and congenital ichthyosiform erythroderma. The currently recorded incidence range is approximately 1 case per 50,000 to 300,000 live births. To diagnose this condition in the neonatal stage, clinicians mainly rely on clinical observation, because even skin biopsies or histopathological examinations conducted shortly after onset cannot reliably distinguish the specific subtype of ichthyosis underlying the presentation [1,2].

The skin barrier of these infants is impaired and cannot perform the protective function of a healthy newborn's skin, exposing them to a host of health risks: first, excessive transepidermal water loss occurs, which subsequently leads to dehydration, electrolyte imbalance, and hypothermia. In addition, they may also develop infections and feeding difficulties. In severe cases, the tightly stretched membrane restricts the infant's chest movement, which can even interfere with normal breathing. Beyond these systemic risks, the tautness of the membrane can also cause a series of malformations unique to these patients, such as ectropion, eclabium, flattened or malformed ears, sparse hair, and pseudocontractures of the limbs [3].

Given these numerous potential dangers, early identification of the condition, paired with collaborative care from a multidisciplinary team, is the core of clinical management for this scenario. The key specific interventions include: maintaining the infant in a temperature-stable environment, carefully adjusting and replenishing the fluids and electrolytes the infant requires, continuously monitoring for signs of infection, regularly applying emollients to the infant's skin, administering lubricating medications to the infant's eyes, and providing timely nutritional support if the infant cannot feed smoothly [4,5]. Most infants with this condition will later progress to a specific form of congenital ichthyosis, but a small subset of infants differ: their physical condition improves significantly on its own within the first few weeks after birth, a presentation classified as the self-healing collodion phenotype [2,6]. This article presents a case of a full-term newborn who fully met all the typical diagnostic criteria for a collodion baby, whose early recovery status was very favorable after receiving comprehensive treatment and care from a multidisciplinary team.

CASE DETAILS

The full-term male infant was admitted to the neonatal intensive care unit immediately after birth due to abnormal skin conditions.

This was the first child of a non-biological couple. The entire pregnancy proceeded without incident until the 38th week, when an emergency suddenly arose, forcing the delivery of the baby via lower segment cesarean

section. The primary reason for the urgent surgery was that examinations detected fetal bradycardia, meaning the fetal heartbeat was too slow. Additionally, the medical record noted cephalopelvic disproportion; even without the fetal heart issue, a vaginal delivery would have been impossible. Throughout the pregnancy, aside from the mother being diagnosed with anemia, no other problems arose. To treat the mother's anemia, doctors administered iron sucrose and transfused 1 unit of packed red blood cells.

The second-trimester detailed anatomy ultrasound for the fetus only detected an echogenic bright spot in the left ventricle; all other pregnancy ultrasound results were normal. After birth, the infant's Apgar score, which assesses neonatal health, was 8 at 1 minute after birth and 9 at 5 minutes after birth. His birth weight was 2.496 kilograms. At delivery, he showed no signs of asphyxia or respiratory distress, and his baseline condition was relatively stable.

A full physical examination of the male infant soon revealed the first abnormality: his entire body's skin was tightly stretched, covered in a shiny, thickened pale yellow film with a parchment-like texture. Desquamation was also present on his trunk. Further examination of other areas showed bilateral ectropion of the upper eyelids, meaning the eyelids could not properly cover the eyeballs, with the right side more severe than the left. He also had everted lips, malformed bilateral ears, and joints in his upper and lower limbs that could not extend normally. This limitation of movement, not caused by the joint itself, is called pseudocontracture. Apart from these external abnormalities, his vital signs—basic life-sustaining indicators including body temperature, heart rate, and respiratory rate—were all stable, and no other abnormalities were found in examinations of his internal organs.

All baseline tests conducted shortly after admission, including complete blood count, C-reactive protein, serum electrolytes, and calcium, fell within normal ranges. Doctors first secured an umbilical venous catheter, a specialized infusion tube inserted through the umbilical vein. Once secured, intravenous fluid replacement was immediately initiated to supply the infant with the water and energy his body needed. Later, the hospital summoned a dermatology specialist for a consultation. After assessing the infant's skin condition, the dermatologist recommended using topical emollients and topical antibiotics to care for the skin and prevent infection. An ophthalmologist was also consulted; after examining the infant's everted eyelids, they also recommended topical antibiotics, plus a lubricating gel to protect the exposed eyes.

Before the blood bacterial culture results were available, doctors administered intravenous antibiotics to the infant based on clinical experience, a practice known as empirical therapy, to proactively prevent potential



secondary infections. Initially, the infant was cared for in a standard neonatal incubator, but on the second day after birth, he was transferred to a radiant warmer, a specialized care station that maintains body temperature via direct radiant heat. His body was wrapped in plastic wrap to protect the fragile layer of skin. Throughout his hospital stay, his body temperature never fluctuated abnormally. Blood cultures consistently showed no growth of pathogenic bacteria, and he never exhibited any clinical symptoms of sepsis, so the antibiotics were discontinued after only 5 days. Starting on the second day after birth, he was fed Paladai milk. On the seventh day after birth, the umbilical venous catheter previously inserted through the umbilical cord was removed. By the ninth day after birth, he had fully transitioned to direct breastfeeding, no longer requiring nutritional supplementation via a catheter. Subsequent ultrasounds of his abdomen and pelvis, as well as a cranial neurosonogram, all returned normal results. Only the echocardiogram detected two small developmental issues: a tiny patent foramen ovale, and a tiny patent

ductus arteriosus; no other abnormalities in the heart structure were found.

One week after birth, the parchment-like collodion membrane on the male infant's body began to shed noticeably. The previously everted eyelids gradually returned to normal, and the pseudocontractures in his limbs improved little by little during his hospital stay. He remained hemodynamically stable, with an overall good physical condition, and was discharged smoothly on the 18th day after birth. Before discharge, doctors specifically instructed the family to bring the baby back to the hospital when he reached 4 weeks of age to complete genetic testing, to identify the root cause of the abnormalities present at his birth.

The male infant's excellent early recovery was made possible by doctors' timely identification of his condition, combined with meticulous supportive treatment and multidisciplinary collaborative care from all involved departments, which allowed him to successfully pass the dangerous period after birth.



Figure 1: Clinical features of the collodion baby



DISCUSSION

Collodion baby is not a definitive final diagnosis; more accurately, it is merely a unique set of symptoms that manifest in newborns at birth. The majority of infants presenting with these symptoms are concurrently diagnosed with autosomal recessive congenital ichthyosis. These manifestations arise due to mutations in genes responsible for epidermal differentiation and skin barrier formation. The potential mutated genes listed in the original text include TGM1, ALOX12B, ALOXE3, NIPAL4, ABCA12, CASP14, CERS3, CYP4F22, LIPN, ALDH3A2, PNPLA1, ERCC2, ABHD5, SDR9C7, and SULT2B1. Generally, when an infant is still in the newborn stage, it is impossible to identify which specific gene is defective, nor can a precise genetic-level diagnosis be completed, a situation that has been extensively documented in existing research [5,7].

The infant in this report presented with all the typical manifestations of a collodion baby: the skin all over his body was shiny, dry and hard to the touch like parchment, both eyelids were everted and could not close, the lips were also everted, the shape of the ears was abnormal, and all limbs could not extend normally, presenting with pseudo-contracture. Previous cases of collodion babies recorded by other physicians have also presented with identical symptoms to this infant [6-9]. The tight membrane wrapping the infant's body not only restricts his physical activity but may also disrupt the body's original normal operating rhythm. Even though nearly the entire skin of this infant was affected by the condition, during his hospitalization, his blood circulation-related indicators such as heart rate and blood pressure remained normal, he did not develop internal electrolyte imbalance, nor did he contract any severe infectious complications.

CONCLUSION

Collodion baby is a rare neonatal condition. Simply put, newly born infants present with a specific set of clinical manifestations, which originate from impaired skin barrier function: the skin cannot retain the body's internal moisture like normal skin, nor can it block external invasions. This triggers a series of severe health-threatening risks, and only early detection and intervention can mitigate these risks. It is critical to identify this condition as early as possible and provide continuous supportive care for the infant immediately. This is essential to reduce the incidence of complications including dehydration, electrolyte imbalance, hypothermia, impaired respiration, hypoglycemia, and sepsis, each of which can threaten the newborn's life. In the case reported in this article, medical staff followed this standard of care: they carefully regulated body temperature to prevent the infant from developing hypothermia; replenished fluids in a timely manner to avoid dehydration; provided meticulous care for the affected skin lesions to prevent further skin complications; simultaneously cared for the infant's

eyes, delivered adequate feeding support, and conducted continuous close monitoring of the infant's physical condition to catch every abnormal change. Ultimately, the infant's early recovery outcomes were highly favorable.

To manage this rare condition properly, multidisciplinary team collaboration forms the foundation of all effective diagnosis and treatment. Only through coordinated work among medical staff from different departments can all aspects of care be delivered comprehensively, with no risk point overlooked. Long-term follow-up visits are also required in the subsequent period, paired with genetic testing for assessment. Only through this approach can the root cause of the onset be identified, the infant's long-term health trajectory be predicted, and tailored counseling and guidance be provided to the child patient's family members, helping them understand potential challenges the infant may face in the future and prepare in advance. If more people can develop awareness of this neonatal condition, interventions can be initiated earlier, risks can be controlled in a timely manner, and clinical treatment outcomes can be improved.

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