

# Acute management of constriction bands in a newborn with collodion membrane with early manual release



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**Key words:** collodion; constriction bands; ichthyosis; pseudoainhum; topical retinoids.

## INTRODUCTION

Collodion baby (CB) is a rare newborn phenotype characterized by erythroderma and a tight, parchment-like membrane covering the entire body, which often leads to secondary findings such as ectropion, eclabium, and pseudocontractures.<sup>1</sup> As the membrane desquamates over the course of the neonatal period, areas of fibrous constrictive bands known as pseudoainhum can form. Pseudoainhum may cause hypoperfusion of the fingers and toes leading to ischemia and autoamputation.<sup>2</sup> Given the high morbidity associated with pseudoainhum, prompt treatment is necessary to minimize long-term effects. We hereby describe the immediate improvement in perfusion without long term functional abnormalities for digital constriction bands treated with manual release on the third day of life.

## CASE REPORT

A newborn male, born at term via spontaneous vaginal delivery to non-consanguineous parents, was admitted to the neonatal intensive care unit for management of collodion membrane with associated bilateral ectropion, eclabium, and minimal mobility of the extremities and joints (Fig 1). APGAR scores were 1 and 7 at 1 and 5 minutes, respectively, due to initial cyanosis and lack of respiratory effort which improved with airway support. The newborn was generously covered with petroleum jelly and placed in a humidified incubator. Intravenous ampicillin 50 mg/kg every 12 hours and gentamicin 4 mg/kg every 24 hours were

### Abbreviation used:

CB: collodion baby

administered for the first 36 hours of life. Over the first 2 days of life, the collodion membrane began to desquamate and tight constriction bands around the fingers became more prominent (Fig 2, A). Constriction bands were limited to the bilateral fingers and were not present on the toes. Tretinoin 0.01% gel twice daily application to the hands was recommended. As desquamation progressed on day 3 of life, constriction bands persisted with worsening blanching at the fingertips (Fig 2, B). Due to evidence of hypoperfusion and in an aim to avoid autoamputation of the distal fingers, the decision was made to perform early manual release of the bands following the technique described by Roberts and Adelson.<sup>3</sup> At this point, approximately 5 grams of topical tretinoin had been applied.

Informed consent was obtained, and the areas of concern were cleansed with alcohol swabs. Using a sterile 11-blade, constriction bands were superficially released at the proximal interphalangeal joints (Fig 2, C). The patient tolerated the procedure well. Tretinoin 0.01% was continued twice daily, and prophylactic topical mupirocin ointment was applied twice daily for a total of 3 days. Continued inpatient follow-up over the next few days was notable for improved perfusion in the fingers (Fig 3). Congenital ichthyoses genetic panel revealed an *ALOX12B*

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**Fig 1.** Newborn with collodion membrane and bilateral ectropion, eclabium, and hypomobility of the extremities and joints.

pathogenic variant. During outpatient follow-up at 26 days of life, the constriction bands had completely resolved, with no defects of the digits. Topical tretinoin was discontinued. At 5-month outpatient follow-up the patient continued to do well with complete resolution of the collodion membrane and well-perfused fingers bilaterally (Fig 4).

## DISCUSSION

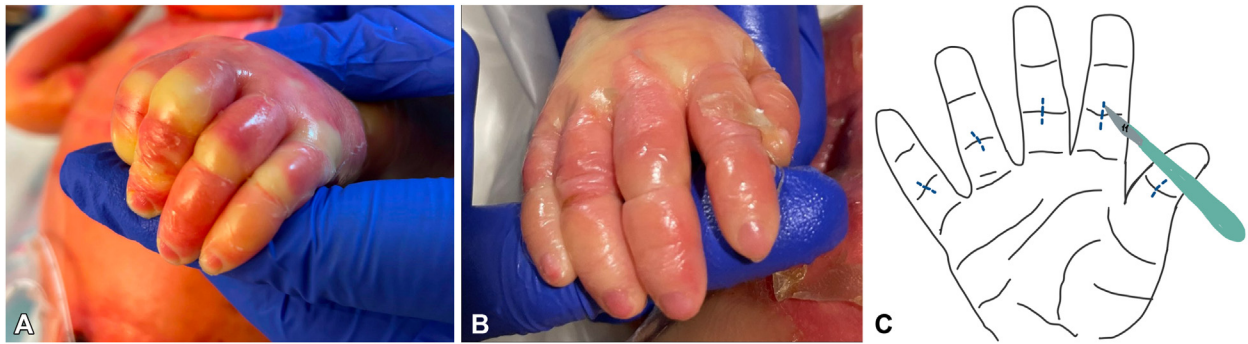
CB is a potential clinical presentation of several genetic conditions, with the majority falling under the autosomal recessive congenital ichthyoses, a spectrum of conditions encompassing classic lamellar ichthyosis to congenital ichthyosiform erythroderma with varying clinical outcomes and severity. These conditions have several potential long-term consequences, including skin infections, sepsis, and autoamputation of the digits secondary to digital ischemia from constriction bands.<sup>4,5</sup> In light of the extreme barrier dysfunction seen with this condition, it is important to provide comprehensive care for patients with CB, including transfer to a neonatal intensive care unit, placement in a high-humidity incubator, monitoring of body temperature, and monitoring of water and electrolyte balance as described in Prado et al.<sup>1</sup> Current treatment options for distal limb constriction bands in CB include keratolytic agents such as topical tazarotene and tretinoin, however, these agents take weeks to have full effect<sup>6</sup> and may not be sufficient to resolve impending digital ischemia.

Surgical management using a linear band excision technique has been described in the release of contractures in harlequin ichthyosis, the most severe form of CB, in which longitudinal incisions were made through the thickened membrane of the fingers and toes of a newborn child with constriction bands and evidence of ischemic changes on day 6 of life, with good functional use of all digits in follow-up several years later.<sup>7</sup> Furthermore, the use of an 11-blade to release constriction bands in a two-month-old child was found to be an effective technique with immediate improvement in the perfusion of the fingers.<sup>3</sup> Our patient did not have harlequin ichthyosis but the risk for vascular compromise was clinically significant, therefore we opted for early surgical release on day 3 of life.

In our case, mupirocin, an antibacterial agent shown to be very effective against common skin pathogens, including *Staphylococcus* and *Streptococcus* species,<sup>8</sup> was applied for 3 days to minimize postincision infection risk. Since the areas of interest were small and localized, the risk of absorption of mupirocin and tretinoin was very minimal in this case. The patient did not experience any postprocedure complications.

Current consensus guidelines favor the use of topical retinoids to further help resolve digital constriction bands due to their beneficial effects on the reduction of scale and hyperkeratotic thickening.<sup>9</sup> However, given that improvement with topical retinoids is more gradual (over a span of days to weeks), early manual release should be strongly considered as a safe and effective option when the digits are at risk of acute vascular compromise. In our case, topical retinoids were administered for approximately 4 weeks to maximize the desquamation of the collodion membrane, as well as to promote the full resolution of constriction bands and help maintain good perfusion of the digits. Approximately 80 total grams of topical tretinoin was used over the 4-week period with twice daily application as an adjunct therapy.

To our knowledge, this is the first case report describing manual release of constriction bands in a newborn with collodion membrane (other than harlequin ichthyosis) in the first week of life. It further emphasizes the efficacy and safety of early treatment of constriction bands with manual release when there are clinical signs suggesting high risk for acute vascular compromise, such as blanching of the digits. Including early manual release in forthcoming consensus guidelines would be an important addition for pediatric dermatologists and neonatologists alike to minimize morbidity in patients born with collodion membrane.



**Fig 2.** Constriction bands in a colloidion baby with evidence of hypoperfusion on first day of life (**A**), with persistent concerns of hypoperfusion on third day of life immediately prior to manual release (**B**). Diagram showing manual release procedure using an 11-blade scalpel (**C**), (Cartoon illustrated by Jinia El Feghaly, MD).



**Fig 3.** Improved perfusion in the digits bilaterally 4 days post manual release of constriction bands (**A**, right hand, **B** left hand).



**Fig 4.** Complete resolution of colloidion membrane and good perfusion of the digits bilaterally at 5-month follow-up (**A**, right hand, **B** left hand).

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#### Conflicts of interest

None disclosed.

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