



NEWBORNS WITH COLLODION SKIN DISORDERS

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ABSTRACT

Collodion Baby is a descriptive term for newborns with the entire surface of the body wrapped in a rigid yellowish membrane that resembles solid and translucent parchment paper. A rare disorder that often occurs in preterm babies with low birth weight. Collodion babies can have defects in protein and fat metabolism due to genetic mutations. Management with emollients, fluid and electrolyte balance and overcoming infection. Case Report : Reported newborn came to the emergency room of Soeselo Hospital referral from Puskesmas with Collodion Baby and low birth weight. Yellowish skin is obtained throughout the body such as translucent thick parchment, fissures with some erosion and ectropions in both eyes. The patient is placed in an incubator with a temperature of 30-32o C, emollient therapy, topical antibiotics on fissures and erosions, prophylactic antibiotics and antibiotic creams for ectropion. Discussion : Collodion baby is a condition at risk of serious complications including: risk of infection, hypernatremic dehydration, fluid and electrolyte imbalances and temperature instability caused by epidermal lipid disorders and protein homeostasis, resulting in increased transepidermal water loss (TEWL) caused by mutations in the transglutaminase 1-TGM1, ALOXE3 or ALOX12B, ABCA12, HIPAL4/ichthyin, ABHD5 genes responsible for epidermal homeostasis. Conclusion: Collodion Baby is a disorder with severe corneal damage. The importance of proper and comprehensive management with the aim of minimizing complications can reduce morbidity and mortality.

Keywords: Ichthyosis, Collodion, Ectropion, Newborn Diseases, Low birth weight

INTRODUCTION

A collodion baby is a congenital condition characterized by a parchment-like membrane covering the entire body (Priyadharishini & Evelyn, 2021). Collodion baby is a form of clinical disorder that rarely occurs in newborns, with a prevalence of 1:50,000-100,000 births (Vanier et al., 2022). Encodes the enzyme transglutaminase (Tgase 1), which disrupts the integrity of the layer between the cell membrane and the intercellular matrix, so that its function as a barrier to the release of body fluids is disrupted and results in an increase in the release of body fluids (Chulpanova et al., 2022) (Park et al., 2023). Symptoms of this disease will immediately appear when the baby is born with the entire skin surface involvement (Waghule et al., 2020). Collodion baby is a skin disorder with severe cornification damage, generally occurring in

preterm babies (Dias et al., 2023). Collodion syndrome is a rare disease, so appropriate management to minimize complications is important (Sayomi et al., 2023). The main goal of treatment is to eliminate scaling and reduce xerosis without causing excessive irritation (Polena et al., 2022). The treatment is bathing daily and applying a light emollient such as petroleum jelly. Comprehensive care to improve long-term survival involves multidisciplinary pediatricians, dermatologists, otorhinolaryngologists, ophthalmologists, plastic surgery care, and physiotherapy (Shanbhag et al., 2020). Reporting a case whose incidence is infrequent with an emphasis on early appropriate therapeutic intervention, thereby minimizing complications that will arise, and aims to provide knowledge about clinical symptoms to look out for and clinical skills in dealing with various complications that can arise as the disease progresses (Nori et al., 2023).

The primary objective is to report and document the case of a collodion baby, a rare congenital condition, emphasizing the importance of early and appropriate therapeutic intervention. By presenting this infrequent incidence, the aim is to contribute to the existing medical knowledge regarding the clinical symptoms and complications associated with collodion baby syndrome. Specifically, the goal is to highlight the significance of prompt and adequate management in minimizing potential complications that may arise due to the skin barrier disruption. This involves implementing a treatment approach focused on eliminating scaling and reducing xerosis without causing excessive irritation to the delicate skin of the affected newborn (Shah & Sheth, 2021).

Furthermore, the report seeks to enhance clinical awareness among healthcare professionals, providing valuable insights into the symptoms that should be monitored closely and the multidisciplinary care required (Bhidayasiri et al., 2020). Collaboration between pediatricians, dermatologists, otorhinolaryngologists, ophthalmologists, plastic surgeons, and physiotherapists is crucial for comprehensive care, addressing immediate concerns, and ensuring long-term survival and well-being. In summary, the objective is twofold: first, to contribute to the medical literature by documenting a rare collodion baby syndrome, and second, to underscore the importance of early intervention and multidisciplinary care in managing this congenital condition and minimizing associated complications. The multidisciplinary approach involving pediatricians, dermatologists, otorhinolaryngologists, ophthalmologists, plastic surgeons, and physiotherapists contributes to the novelty. Comprehensive care for collodion baby syndrome requires a coordinated effort among various medical specialties to manage both immediate and long-term complications.

RESEARCH METHODS

The newborn was female, referred by the community health center to the emergency room at RSUD, Dr. Soeselo Slawi, with thick and transparent dry skin covering the whole body, and the baby's eyelids appeared to be bent outwards, which appeared 4 hours after birth (Supanji et al., 2022). The baby was born at the Community Health Center to a 32-year-old multigravida mother with a gestation age of 36 weeks via spontaneous delivery with a birth weight of 2200 grams, body length of 46 cm, chest circumference of 33 cm, and head circumference of 32 cm. On examination of the neonate's vital signs, the results were expected, and the APGAR score was 8-9-10 in the first 1, 5, and 10 minutes, respectively, and the amniotic fluid was clear. On physical examination, yellowish skin was found from head to toe, with a thick parchment-like membrane covering the entire body. There were fissures and erosion in the body's folds, and ectropion was found in the baby's eyes (Figure 1).

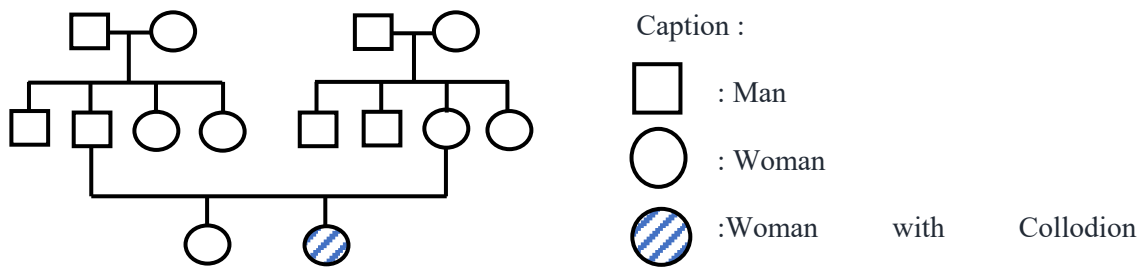


Figure 1. Family pedigree with Collodion Baby



Figure 2. Neonate with Collodion Baby



Figure 3. Post-treatment

Using topical emollients in Collodion baby management is a supportive measure to enhance skin health and minimize discomfort. It forms an integral part of the overall care plan designed to address the specific challenges associated with this congenital skin disorder. There is no history of similar disorders in the family related to skin disorders or other genetic diseases, no history of inbreeding, no history of maternal complications during pregnancy or exposure to other drugs. The patient is the second child, whose first child is three years old. Complete blood laboratory results, instant blood sugar, and electrolytes were within normal limits. Patients are treated in the Peristi room to be monitored regarding body temperature, humidity, and fluid-electrolyte balance and given prophylactic antibiotic injections in collaboration with the Pediatrician. Patient therapy is given topical emollients throughout the body, antibiotic cream is given to the fissure area, and antibiotic eye cream is given to the eyes. Patients are still given breast milk and libitum every 2 hours during treatment. The patient was in an incubator with a temperature set between 30-32 C for six days until he was finally allowed to go home with the advice to continue providing emollients regularly and breastfeeding. One week later, the patient was checked into Dr. Soeselo Hospital's Skin Clinic with a recovered condition with the membrane peeling off but still having erythroderma.

RESULTS AND DISCUSSION

Collodion Baby syndrome is a condition seen in newborns, characterized by a firm, shiny, yellowish, see-through membrane resembling collodion, commonly called collodion membrane (Ehrlich, 2022). This membrane develops due to an imbalance in the lipid and protein levels in the epidermis. The syndrome originates with ichthyosiform erythroderma, a condition primarily linked to collodion babies. Typically, the disorder affects the entire body, presenting a rigid appearance similar to parchment or being immersed in hot wax. The majority of collodion babies display autosomal recessive ichthyosiform erythroderma, resulting from functional mutations in genes like TGM1, ALOXE3 or ALOX12B, ABCA12, HIPAL4/ichthyin, ABHD5, or others associated with epidermal homeostasis. Despite the unknown cause of Collodion Baby syndrome, it often follows an autosomal recessive inheritance pattern, indicating a rare association with consanguinity.

In 10% of instances, collodion babies exhibit normal skin, while the remaining 15% are associated with conditions like ichthyosis vulgaris, trichothiodystrophy, and metabolic or endocrine disorders impacting keratinization. The tension around the eyes and mouth results in ectropion and eversion of the lips, referred to as Albion, creating a fish-like appearance with thinning of the nose and ears. If left untreated, this condition can lead to blocked nostrils and, if forcibly opened, may induce keratitis and potential blindness. The rigid skin on the chest can cause breathing difficulties, occasionally resulting in respiratory obstruction. Collodion babies,

frequently born prematurely between 32 and 36 weeks, often have low birth weight, though premature birth itself is not a significant contributor. Typically, the collodion membrane starts to dry and peel off within the initial 48 hours, entirely shedding within 2-4 weeks.

Therapeutic strategies for Collodion Baby syndrome concentrate on preserving the skin barrier, managing infections, maintaining fluid and electrolyte balance, and implementing early retinoid therapy. Initial treatment involves moisturizers and topical keratolytic agents containing sodium chloride, urea, vitamin E acetate, glycerol, and petroleum jelly. However, caution is crucial to prevent the absorption of topical products and potential poisoning. Hyperkeratotic agents such as lactic acid, glycolic acid, salicylic acid, N-acetyl-cystine, and glycol may be applied in severe cases. Ectropion is addressed with artificial tears and lubricants, with surgery considered in severe instances. Retinoids like isotretinoin are effective due to their keratolytic effects. Regular cleaning of the external auditory canal is vital to prevent scale buildup and reduce the risk of hearing loss.

Collodion infants face a heightened risk of dehydration and electrolyte imbalance because of elevated insensible loss through the skin, requiring the utilization of incubators with elevated humidity levels, continuous temperature monitoring, and adequate nutritional support. The application of Aquaphor has proven effective in reducing transepidermal water loss and lowering the risk of infections. When caring for babies with Collodion Baby Syndrome, it is recommended to approach skincare cautiously, restrict the use of products, and diligently observe for potential infections.

CONCLUSION

Collodion Baby is a congenital skin disorder marked by a tight, parchment-like membrane covering the entire body at birth. This condition reveals severe cornification damage and a compromised skin barrier, emphasizing its impact on the skin's structure and function. The genetic underpinning, particularly mutations in the TGM 1 gene responsible for the transglutaminase (Tgase 1) enzyme, solidifies its classification as a congenital skin disorder. Unique clinical features set Collodion Baby apart from other neonatal conditions, reinforcing its status as a specific clinical entity.

Management strategies for Collodion Baby are primarily geared towards comprehensive skin care, focusing on hydration and preventing potential complications associated with skin abnormalities. The term "Collodion" itself underscores the skin's film-like appearance, highlighting its primary involvement in this condition. Collodion Baby demands a

multidisciplinary approach to holistic care and treatment, acknowledging its unique challenges and clinical nature.

In conclusion, Collodion Baby is not merely a manifestation of disease but a distinct skin disorder affecting infants born with a collodion membrane. Its rarity, genetic basis, and emphasis on skin-related manifestations reinforce the need for specialized care. The management of Collodion Baby involves supportive measures, including environmental control, emollient application, vigilant monitoring for complications, and addressing fluid and electrolyte balance.

BIBLIOGRAPHY

- Bhidayasiri, R., Panyakaew, P., Trenkwalder, C., Jeon, B., Hattori, N., Jagota, P., Wu, Y.-R., Moro, E., Lim, S.-Y., & Shang, H. (2020). Delivering patient-centered care in Parkinson's disease: challenges and consensus from an international panel. *Parkinsonism & Related Disorders*, 72, 82–87.
- Chulpanova, D. S., Shaimardanova, A. A., Ponomarev, A. S., Elsheikh, S., Rizvanov, A. A., & Solovyeva, V. V. (2022). Current strategies for the gene therapy of autosomal recessive congenital ichthyosis and other types of inherited ichthyosis. *International Journal of Molecular Sciences*, 23(5), 2506.
- Dias, J. V., Cardoso, K., Prado, S. N., & Cavaco, H. (2023). Congenital ichthyosis: a multidisciplinary approach in a neonatal care unit. *BMJ Case Reports*, 16(2), e250077.
- Ehrlich, B. (2022). *The brain in search of itself: Santiago Ramón y Cajal and the story of the neuron*. Farrar, Straus and Giroux.
- Nori, H., King, N., McKinney, S. M., Carignan, D., & Horvitz, E. (2023). Capabilities of gpt-4 on medical challenge problems. *ArXiv Preprint ArXiv:2303.13375*.
- Park, J. Y. C., King, A., Björk, V., English, B. W., Fedintsev, A., & Ewald, C. Y. (2023). Strategic outline of interventions targeting extracellular matrix for promoting healthy longevity. *American Journal of Physiology-Cell Physiology*.
- Polena, H., Chavagnac-Bonneville, M., & Sayag, M. (2022). Improvement of quality of life in dialysis and diabetic patients by skin dryness and pruritus management with an ecobiological dermo-cosmetic product. *Clinical, Cosmetic and Investigational Dermatology*, 2143–2152.
- Priyadharishini, J., & Evelyn, F. L. (2021). Collodion baby syndrome: A case study. *Indian Journal of Continuing Nursing Education*, 22(2), 127–130.
- Sayomi, B. A., Eyekpegba, O. T., Joel-Medewase, V. I., & Akinboro, A. O. (2023). Collodion baby, lamellar ichthyosis; A report of two cases and literature review. *JOURNAL OF AFRICAN NEONATOLOGY*, 1(1), 31–34.
- Shah, M. K., & Sheth, P. K. (2021). *Pediatric Dermatology in Skin of Color: A Practical Guide*. CRC Press.
- Shanbhag, S. S., Chodosh, J., Fathy, C., Goverman, J., Mitchell, C., & Saeed, H. N. (2020). Multidisciplinary care in Stevens-Johnson syndrome. *Therapeutic Advances in Chronic Disease*, 11, 2040622319894469.

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Supanji, I. M. W., Budayasa, A. A. R., Permatananda, P. A. N. K., Cahyawati, P. N., & Aryastut, A. A. S. A. (2022). Relationship Between Maternal Age, Education, and Parity in The Incidence of Spontaneous Abortion in Bali. *Science Midwifery*, *10*(4), 3091–3095.

Vanier, M. T., Caillaud, C., & Levade, T. (2022). Disorders of Sphingolipid Synthesis, Sphingolipidoses, Niemann-Pick Disease Type C and Sphingolipid Metabolism disorders Neuronal Ceroid Lipofuscinoses Neuronal Ceroid-Lipofuscinoses disorders. In *Inborn Metabolic Diseases: Diagnosis and Treatment* (pp. 735–764). Springer.

Waghule, T., Sankar, S., Rapalli, V. K., Gorantla, S., Dubey, S. K., Chellappan, D. K., Dua, K., & Singhvi, G. (2020). Emerging role of nanocarriers based topical delivery of anti-fungal agents in combating growing fungal infections. *Dermatologic Therapy*, *33*(6), e13905.

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First publication right:

Asian Journal of Engineering, Social and Health (AJESH)

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