

Original Research Article

# Study of physiological skin changes in neonates

Sweta Parmar<sup>1\*</sup>, Bela Shah<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Dermatology, GMERS Medical College, Vadnagar, Gujarat, India

<sup>2</sup>Professor and Head, Department of Dermatology, BJ Medical College, Ahmedabad, Gujarat, India

\*Corresponding author email: [drswetaparmar@gmail.com](mailto:drswetaparmar@gmail.com)

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## Abstract

**Background:** Physiological cutaneous changes and clinical presentation is very frequently in neonates. The skin of the new born is covered with greyish white greasy material vernix caseosa, a physiologic protective covering derived partially by secretion of sebaceous glands and in part as a decomposition product of the infant's epidermis. It acts as a natural protectant to the infant in utero. It should be allowed to come off by itself.

**Aim:** To study the various physiological changes in neonates.

**Materials and methods:** We studied 200 neonates for the pattern of cutaneous changes. 200 neonates were examined within 24 hours of birth over the period of 2 years. We prospectively enrolled and analysed 200 patients with various dermatoses in infants from July 2010- December 2012 in the Department of Dermatology. The complete clinical history was taken and complete physical examination was performed. Types of clinical lesions and their distribution along with mucous membrane lesions were noted; any change in hair, nail, and teeth was noted.

**Results:** Most common cutaneous change observed was Mongolian spots followed by physiological exfoliation and erythema neonatorum. Physiological cutaneous change was observed in 100% neonates.

**Conclusion:** We confirm the variation in physiological cutaneous changes and their time of onset in neonates. This study showed physiological changes were present in all newborn. Number of lesion was more in preterm babies.

## Key words

Neonates, Milia, Physiological changes, Epstein pearls, Erythema toxicum.

## **Introduction**

The skin of the infant differs from that of adult. It is thinner and the body surface area-to-weight ratio of an infant is five times that of an adult. Premature infants have an increased TEWL, which may result in morbidity because of dehydration, electrolyte imbalance, and thermal instability [1].

### **Physiologic phenomenon of the new born**

#### **Acrocyanosis**

Acrocyanosis is a feature of the newborn, particularly seen in the full-term newborn. The cyanosis is absent on the warm central parts of body such as the tongue but markedly present on the palms and soles and around the mouth.

#### **Cutis marmorata**

It is a normal bluish reticulated mottling of the skin seen on the trunk and extremities. It is a physiologic response to chilling with resultant dilatation of capillaries and small venules; usually disappear as the infant is rewarmed. Cutaneous marbling may be seen in older children with congenital hypothyroidism [3], Cornelia de Lange syndrome, the Adams–Oliver syndrome, in trisomy 18, trisomy 21 and homocystinuria. When these changes are persistent and are deep violaceous in color, cutis marmorata telangiectatica congenita should be considered.

#### **Harlequin Color Change [2]**

This phenomenon occurs when the baby is lying on its side. The upper half of the body becomes pale and the dependent half turns into deep-red color, with a sharp midline demarcation between the two. It is considered to reflect immaturity of hypothalamic centres responsible for the control of peripheral vascular tone.

#### **Sebaceous Gland Hyperplasia**

These are multiple, uniform, pinpoint, yellowish papules seen most prominently on the nose, cheeks, upper lip and forehead. It is seen due the influence of maternal androgens.

#### **Milia [4]**

Represents minute follicular epidermal cysts. Both the sebaceous gland hyperplasia and the milia tend to disappear spontaneously during the first weeks of life.

#### **Physiological Scaling of the New born**

Usually first appears around the ankles on the first day of life [5]. It may remain much localized or may gradually become more widespread, usually reaching its maximum extent and intensity by the eighth day [6].

#### **Acne Neonatorum**

Acne neonatorum is a benign, self-limiting condition. Acneiform eruption develops within the first 30 days of life. No treatment is necessary.

#### **Miniature Puberty**

In the newborn female, the genitalia appear succulent. The size of the clitoris is enlarged. Frank withdrawal bleeding may occur from the uterus on the third or fourth day, usually lasting for 2 to 3 days. The male genitalia also appear similarly large. Both sexes show hypertrophy of the mammary glands at birth. The swelling subsides and usually becomes undetectable by the end of the fourth week.

#### **Mongolian Spots**

Lesions of congenital dermal melanocytosis are benign, blue–black large macular lesions characteristically located over the lumbosacral area most commonly seen in Asian, black, and Hispanic populations. They typically self-resolve during childhood.

#### **Epstein's Pearls**

These are one or more 1–2 mm, yellowish white, keratinous cysts, known as Epstein's pearls, may be seen along the alveolar ridges and/or in the midline at the junction of the hard and soft palate [7, 8].

#### **Preterm Neonate**

They have a rather translucent, gelatinous quality. Preterm infants are often covered in

lanugo hairs, which tend to be most dense on the face, limbs and trunk. This hair would normally be shed *in utero* about 1 month before term.

### **Post-term Neonates**

The baby is small with lack of subcutaneous fat, which causes the baby to look thin and wrinkled. Vernix is often stained yellowish green by meconium.

### **Erythema Toxicum Neonatorum [9]**

The onset is during the first 48 hours after birth [11]. The eruption takes the form of a blotchy, macular erythema which is most profuse on the trunk- anterior trunk, face and proximal parts of the limbs. These macules fade within a day. Spontaneous recovery occurs rapidly. The macular erythema shows edema in the upper dermis, with a sparse and largely perivascular inflammatory infiltrate comprising principally eosinophils. No treatment is required.

### **Miliaria [10]**

Miliaria occurs when there is obstruction of the intraepidermal portion of the sweat duct. Relative immaturity of the sweat duct leading to delayed patency of the sweat pore is an important predisposing factor in early infancy. *Miliaria rubra* appears to be caused by sweat duct obstruction deeper within the epidermis. *Miliaria crystallina* presents as crops of clear, thin-walled, superficial vesicles 1–2 mm in diameter, without associated erythema. Frequently, some of the lesions are pustular (*miliaria pustulosa*).

### **Transient Pustular Melanosis [11]**

These lesions are almost invariably present at birth. The eruption is 1–3 mm flaccid, superficial, fragile pustules, with no surrounding erythema. These pustules favor the chin, neck, forehead, back and buttocks. The pigmentation may persist for about 3 months. Pustular lesions show intra or subcorneal collections of neutrophils and a few eosinophils. The pigmented macules demonstrate basal and suprabasal increase pigmentation.

### **Infantile Acropustulosis**

In this recurrent crops of intensely itchy, 1–4 mm vesicopustules appear on the soles and sides of the feet, and on the palms, dorsa of the feet, hands and fingers, and on the ankles, wrists and forearms. Mucosal lesions do not occur. Excoriation results in erosions and then crusts. Pruritus may be intense. The onset is in the first year of life; lesions may be present at birth. *Biopsy* shows Subcorneal or intra epidermal aggregations of neutrophils, with a sparse perivascular lymphohistiocytic infiltrate in the underlying papillary dermis.

### **Eosinophilic Pustulosis**

The condition generally has its onset in infancy. Lesions occur predominantly in the scalp; comprising mildly pruritic, 1–3-mm-diameter pustules on an erythematous base, with prominent secondary crusting, occasionally even in areas lacking hair follicles. The Smears of pustule contents plentiful eosinophils.

### **Cradle Cap**

This term is applied to almost any situation in which there is adherent scaling of the scalp during infancy. This is generally believed to represent persisting vernix. This rash is generally considered to be a manifestation of infantile seborrhoeic dermatitis.

### **Materials and methods**

We enrolled and analysed 200 neonates with various skin changes from July 2010 to December 2012 in the Department of Dermatology. Neonates were examined within 24 hours of birth. The complete clinical history was taken, including age of onset, religion, presenting features, family history, birth history were noted. Complete physical examination was performed. Types of clinical lesions and their distribution along with mucous membrane lesions were noted; any change in hair, nail, and teeth was noted. General and systemic examinations were performed.

### **Results and Discussion**

The study of 200 cases below one year of age was classified according to the clinical manifestation, age and sex distribution. Out of 200 patients, 108 (54%) were male and 92(46%) were female (**Table – 1**).

**Table – 1:** Sex distribution.

|        |     |
|--------|-----|
| Male   | 108 |
| Female | 92  |
| Total  | 200 |

**Table – 2:** Distribution of various dermatological conditions.

| Dermatological condition     | Sex    |      | Total     |
|------------------------------|--------|------|-----------|
|                              | Female | Male |           |
| Physiological scaling        | 11     | 31   | 42 (21%)  |
| Erythema neonatorum          | 18     | 17   | 35(17.5%) |
| Milia                        | 11     | 8    | 19(9.5%)  |
| Neonatal Acne                | 6      | 3    | 9(4.5%)   |
| Cutis marmorata              | 7      | 4    | 11(5.5%)  |
| Sebaceous hyperplasia        | 5      | 7    | 12(6%)    |
| Epstein pearl                | 3      | 7    | 10(5%)    |
| Mongolian spot               | 62     | 50   | 112(56%)  |
| Transient pustular melanosis | 2      | 0    | 2(1%)     |

The distribution of various dermatological conditions in neonates physiological changes were seen in all 200 neonates (**Table – 2**). Non consanguinity noted in parents of 192(96%) babies. 142 (71%) babies were delivered by vaginal route and 58(29%) by caesarian section. 78% babies were normal birth weight babies and rest were preterm deliveries. Statistically significant relationship was noted between gestational age and number of lesions [12]. More number of lesions was seen in preterm babies. Physiological scaling was present in 21% neonates and erythema toxicum was seen in 17% neonates. Mongolian spot was seen in 56% patient. Neonatal acne was seen in 4.5% and cutis marmorata in 5% neonates. Sebaceous hyperplasia and Epstein pearl was present in 6% and 5% respectively.

## Conclusion

We confirm the variation in physiological cutaneous changes and their time of onset in neonates. This study showed physiological changes were present in all newborn. Number of lesion was more in preterm babies.

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