

A CLINICAL STUDY OF PHYSIOLOGICAL SKIN CHANGES IN NEONATAL PERIOD

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ABSTRACT

BACKGROUND

The objective of this study was to find out physiological skin changes in newborns during the first 3 days of life.

MATERIALS AND METHODS

Around 1000 neonates were studied during the first three days at Government T D Medical College, Alappuzha, Kerala for a period of one year from January 2013 to December 2013.

RESULTS

Physiological skin changes seen were the commonest neonatal dermatoses, followed by transient non-infective cutaneous changes. Mongolian spot and Epstein pearl were the commonest among the physiological skin changes followed by sebaceous gland hyperplasia, physiological scaling, vernix caseosa, and sucking pads. The commonest transient non-infective cutaneous changes were erythema toxicum neonatorum, milia, transient pustular melanosis, neonatal cephalic pustulosis, eosinophilic pustulosis and infantile acropustulosis.

CONCLUSION

The common cutaneous change among neonates are mainly physiological and they are transient, self-limiting.

KEYWORDS

Neonatal Dermatoses, Physiological Skin Changes, Mongolian Spot, Epstein Pearl.

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BACKGROUND

The neonatal period is the first 4 weeks of extrauterine life. A variety of skin lesions are seen in the newborn during this period.^{1,2} Majority of them are regarded as 'physiological' and/or 'transient' non-infective cutaneous eruptions. They usually subside without any treatment.^{2,3} The neonatal period is the time of rapid adaptation. The first few weeks, particularly the first few days, are critical in this regard.

A host of aberrations varying from physiological and transient to grossly pathological are seen in the skin of a neonate. Dermatoses in newborns can cause a great deal of anxiety for parents. Alleviating the concerns of the parents will prevent unnecessary intervention and harm to the baby. For this, the treating physician must be aware of the common dermatoses in this population. Majority of the newborn cutaneous lesions are physiological, transient, self-limiting and require no therapy.

Therefore, the present study was undertaken to analyse the pattern of physiological skin changes in neonatal period in this part of the country. The common physiological skin lesions include Mongolian spot, vernix caseosa, Epstein

pearl, sebaceous gland hyperplasia, milia, physiological scaling, acrocyanosis, sucking blister, neonatal occipital alopecia, physiological hypertrichosis and physiological jaundice, etc.

Physiological skin changes in the neonates are common with a prevalence of 41% to 72%.^{3,4,5} Chakrabarty in their study noted physiological skin changes in 68.8% of neonates.¹

MATERIALS AND METHODS

It is a cross sectional descriptive study of 1000 newborn babies delivered in the Department of Obstetrics & Gynaecology, Government T D Medical College, Alappuzha, Kerala. Neonates were studied during the first three days of life for a period of one year from January 2013 to December 2013.

Method of Collection of Data

Within 24 hours of birth the neonates were examined thoroughly including general, dermatological and systemic examinations and all details were recorded. The sex and birth weight at the time of first examination were recorded in each case. The neonates were examined daily for the next three days and all dermatological findings were noted. The observations were recorded in a Proforma. Informed written consent was taken from the mother/guardian.

Inclusion Criteria

All consecutive neonates born in the established period of time were included.

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Collected data was analysed by frequency, percentage and Chi square test.

RESULTS

A total of 1000 newborns were studied during the first three days of life for a period of one year from January 2013 to December 2013. Out of 1000 neonates studied, 47.3% were male and 52.7% were female. 82% neonates had normal birth weight (2.5-4 kg), 167 (16.7%) were of low birth weight (less than 2.5 kg) and 13 of them (1.3%) weighed more than 4 kg.

Around 4.3% of the neonates were preterm (less than 37 weeks), 0.2% neonates who were post-term (more than 42 weeks) and remaining were term (37-42 weeks) babies. 510 babies had born by normal vaginal delivery, 42 by instrumental delivery and 448 were delivered by caesarean section. 50.5% were born to mothers who were primiparous, 407 were born to mothers who were para 2, 8.2% were para 3, and 0.6% were para 4.

The common neonatal dermatoses observed in our study are classified as physiological skin changes, transient non-infective cutaneous changes, birth marks and pathological changes like eczemas, infections and cutaneous signs of spinal dysraphism. Physiological changes were seen in 97.6% neonates, transient non-infective cutaneous changes in 48.2% babies, birth marks in 14% and pathological changes seen in 4.9% neonates.

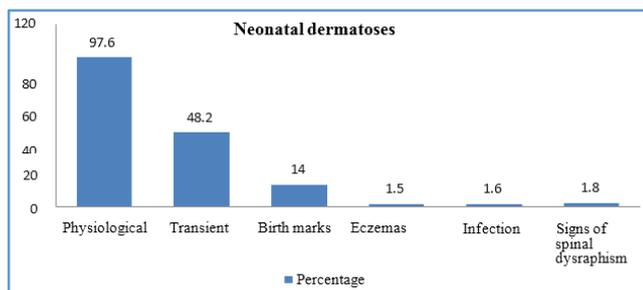


Figure 1. Distribution of Common Neonatal Dermatoses

Distribution of Physiological Skin Changes

Many babies had more than one physiological skin changes at the same time. Among these, Mongolian spot was the commonest seen in 700 (70%) of neonates. Epstein pearl in 575, sebaceous gland hyperplasia in 370, acrocyanosis in 302 and Milia in about 216(21.6%) of neonates. About 198 (19.8%) neonates had physiological scaling, vernix caseosa observed in 173 (17.3%), Physiological hypertrichosis was seen in 170 (17%) of cases.

Physiological Skin Changes	No.	%
Mongolian spot	700	70
Epstein pearls	575	57.5
Sebaceous gland hyperplasia	370	37
Acrocyanosis	302	30.2
Milia	216	21.6
Linea nigra	206	20.6
Physiological scaling	198	19.8
Physiological jaundice	197	19.7
Cutis marmorata	191	19.1
Vaginal discharge	185	18.5
Vernix caseosa	173	17.3
Hypertrichosis	170	17
Genital pigmentation	168	16.8
Hypertrophy of clitoris	141	14.1
Axillary pigmentation	95	9.5
Pigmentation of pinna	93	9.3
Knuckle pigmentation	14	1.4
Meconium staining	13	1.3
Harlequin colour change	6	0.6
Sucking blister	4	0.4
Occipital alopecia	4	0.4

Table 1. Distribution Of Physiological Skin Changes among Neonates

Physiological Changes	Male (%)	Female (%)
Mongolian spot	34.0	36.0
Epstein pearls	29.0	28.5
Sebaceous gland hyperplasia	18.7	18.3
Acrocyanosis	14.7	15.5
Milia	10.3	11.3
Linea nigra	10.3	10.3
Physiological scaling	11.1	8.7
Physiological jaundice	8.4	11.3
Cutis marmorata	9.3	9.8
Vaginal discharge	-	18.5
Vernix caseosa	7.0	10.3
Hypertrichosis	9.7	7.3
Genital pigmentation	9.7	7.1
Hypertrophy of clitoris	-	14.1
Axillary pigmentation	5.0	4.5
Pigmentation of pinna	5.8	3.5
Knuckle pigmentation	0.8	0.6
Meconium staining	0.3	1.0
Harlequin colour change	0.6	-
Sucking blister	0.2	0.2
Occipital alopecia	0.2	0.2

Table 2. Sex Distribution of Physiological Skin Changes among Neonates

Skin lesions	Preterm (%)	Term (%)	Post-term (%)
Mongolian spot	2.6	67.2	0.2
Epstein pearls	2.5	55.0	-
Sebaceous gland hyperplasia	1.1	35.9	-
Acrocyanosis	1.9	28.3	-
Milia	0.6	21.0	-
Linea nigra	0.2	20.4	-
Physiological scaling	0.2	19.6	-
Physiological jaundice	1.2	18.3	0.2
Cutis Marmorata	-	19.1	-
Vaginal discharge	0.5	18.0	-
Vernix caseosa	1	16.3	-
Hypertrichosis	1	16.0	-
Genital pigmentation	-	16.8	-
Hypertrophy of clitoris	0.9	13.2	-
Axillary pigmentation	-	9.5	-
Pigmentation of pinna	-	9.3	-
Knuckle pigmentation	-	1.4	-
Meconium staining	-	1.1	0.2
Harlequin colour change	-	0.6	-
Sucking blister	-	0.4	-
Occipital alopecia	0.2	0.2	-

Table 3. Distribution of Physiological Skin Changes According to Gestation

Transient Non-Infective Cutaneous Lesions

48.2% neonates had transient non-infective cutaneous changes, with some neonates showing more than one type of lesions. The commonest of these in our study was erythema toxicum and was seen in 37.3% neonates. Miliaria crystallina was seen in 77, miliaria pustulosa in 50 and miliaria rubra in 34 cases. Other transient non-infective dermatoses noted were transient pustular melanosis (1%), neonatal cephalic pustulosis (6%), eosinophilic pustulosis (0.5%) and infantile acropustulosis 0.2%.

DISCUSSION

Physiological changes were the commonest of the neonatal dermatoses (97.6%), followed by transient non-infective cutaneous changes (48.2%). In this study, we observed that a great majority of the lesions fall under these two categories. This is consistent with the findings in various studies by Nobby B et al, Baruah CM et al and Sachdeva M et al.

Among the 1000 neonates studied, 976 (97.6%) babies had physiological skin changes and many babies had more than one physiological skin change at the same time.

Mongolian Spots

Mongolian spots are the common physiological changes seen over the lumbosacral region, characterised by poorly circumscribed areas of slate-brown or blue-black pigmentation, usually fade out in early childhood.

In a study of neonatal dermatoses by Baruah et al, Mongolian spots were noticed in as much as 78.4% of neonates.² Mongolian spot was the most common skin manifestation noted in neonates (89%) by Dash K et al.⁴ In 500 babies examined by Agarwal G et al, second most common finding was Mongolian spot (65%) next only to Epstein pearl (78%).⁶

Mongolian spot (MS) 70%, Epstein pearl (EP) 57.5%, sebaceous gland hyperplasia (SGH) 37% were the common physiological skin changes encountered in our study. This is comparable with various studies done by Sachdeva M et al, Dash K et al, Kulkarni M et al and Nanda A et al in India.

In our study, Mongolian spot was the most common skin manifestation noted in 70% of neonates. It was found to be more common among multipara than primipara [$p=0.032$]. However, there is no significant association between Mongolian spot and higher birth weight [$p=0.202$] in our study.

Epstein Pearl

These are yellowish white, keratinous cysts which may be one or more in number, 1–2 mm in size, seen in the mouths of up to 85% of all neonates. They may occur along the alveolar ridges and/or in the midline at the junction of the hard and soft palate.^{1,2,3} These generally disappear without treatment within a few weeks. The incidence of Epstein pearl varied from 17.5% to 88.27% in different studies.^{1,2,3,7}

Epstein pearl was the next major physiological skin change seen in 57.5% of the neonates and was found to be more common in multipara than in primipara in our study. On statistical analysis, using Chi-square test, Epstein pearl was more common in multipara than in primipara [$p=0.006$]. However, no significant association was obtained between Epstein pearl and babies with higher birth weight [$p=0.228$] or male sex [$p=0.800$] in this study. Our study is comparable to a study by Sachdeva M et al (61%). In his study, Epstein pearls were most frequently observed among babies of multiparous mothers, higher birth weight and male sex.

Sebaceous Gland Hyperplasia

Sebaceous gland hyperplasia is a physiological change in the newborn which reflects the influence of maternal hormones. It is seen as multiple, uniform, pinpoint, yellowish papules on the nose, cheeks, upper lip, forehead and genitalia. It disappears spontaneously during the first weeks of life.^{3,6,8}

In our study, sebaceous gland hyperplasia was noted in 37% of neonates, being common in babies with higher birth weight, multiparous mothers and male gender. On statistical analysis, sebaceous gland hyperplasia was more common among multipara than primipara [$p= <0.0001$] and in neonates with higher birth weight than those with lower birth weight (<2.5 kg) [$p=0.038$]. This was in agreement with study by Gokdemir et al.⁹

Acrocyanosis was seen in 30.2% of newborns in our study, particularly in females. This is in contrast to another study by Sachdeva et al which had a low prevalence. Acrocyanosis is a normal physiological occurrence in the newborn, particularly the fullterm, during the first 48 hours

of birth. Most of the babies in our study were examined during the first 3 days of life and were term babies.

Milia

Milia represent minute follicular epidermal cysts, 1–3 mm, white, globular papules. Milia disappear spontaneously during the first weeks of life,⁵ though a few may persist longer. Primary milia are associated with pilosebaceous unit arising from the infundibulum of the vellus hair. Neonatal milia are primary. Jain et al found a prevalence of 27% for milia in their study.⁸ Milia were seen in 23.8% cases by Sachdeva M et al.³ Milia were seen in 93.1% neonates in the first 72 hours of birth in a study by Baruah et al.² Agarwal G et al noted milia in 42% cases.⁶

We observed milia in about 21.6% of neonates comparable to studies in India by Jain N et al and Sachdeva M et al. In our study, there were more female babies presenting with milia, most of them were term babies, and the commonest site was the face.

Peripheral Cyanosis

Peripheral cyanosis (acrocyanosis) is a vascular response to cold stress common among newborn, particularly the full-term newborn. It is more marked on the palms, soles and around the mouth. It is regarded as normal during the first 48 hrs. It is worsened by hypothermia, and is improved by warming. Peripheral cyanosis was seen among 47 (9.4%) neonates studied by Sachdeva M et al.³

Sucking Blister

These may be seen as one or two blisters or erosions present at birth, on the fingers, lips or forearms. They are caused by vigorous sucking in utero. These heal rapidly without any sequelae.

Neonatal Occipital Alopecia

The scalp hair is shed synchronously during the fifth month of foetal life. It then regrows and enters telogen in a wave from front to back, starting about 12 weeks before term. The roots in the occipital area enter telogen at about term. Therefore, a conspicuous alopecia may appear at this site at birth or within the first 2 months.¹⁰

Physiological Hypertrichosis

Increase in hair at birth may occur as a normal physiologic variant. However, unusual patterns or persistence beyond early infancy may indicate further evaluation for hereditary aberrations (e.g. hypertrichosis lanuginosa, Cornelia de Lange syndrome). Localised lumbosacral hypertrichosis, or 'hairy patch', is usually present at birth.¹¹

Physiological Scaling

It first appears around the ankles on the first day of life, and is confined to the hands and feet. It may remain localised or may become more widespread. The incidence of desquamation as observed various studies ranged from 7.2 to 83%.^{8,12,13} Superficial cutaneous desquamation was seen in 40% of the newborns studied by Sachdeva M et al in

India.³ Physiologic scaling of newborn was noted in 15 (15%) Indian neonates in a study by Dash K et al.⁴

We had about 19.8% neonates with physiological scaling. The incidence of desquamation as observed in literature varies from 7.2 to 83%. In our study, there were more number of term male babies showing physiological desquamation. It is a benign phenomenon, requiring no intervention. In a study by Agarwal G et al, physiological desquamation was seen in 52% of cases.

Vernix Caseosa

Near-term infants are thickly covered with vernix caseosa mainly composed of dead epithelial cells and sebaceous secretions. The vernix of term infants contains more squalene and a higher wax ester.⁴ It normally dries rapidly and starts to flake off within a few hours of birth.⁵ The vernix provides a mechanical barrier to bacterial infection, hence it should be left alone until it is spontaneously shed.^{6,9}

In our study, vernix caseosa was observed in 173 (17.3%) neonates. It plays an important role by providing a protective barrier. Near-term infants are covered with thick vernix caseosa while little is present in premature infants. It is more frequently seen during the first day of life. There are no comparative prevalence studies in literature on vernix caseosa. In our study, it was more evident in term female babies.

Pigmentary Changes

Hyperpigmentation of external genitalia, areola, axilla, pinna, and at base of fingernails is usually a prominent feature of dark skinned newborns. These areas are believed to be hyperpigmented as a result of melanocyte stimulating hormone (MSH) stimulation in utero, but the mechanism is unclear. Exaggerated pigmentation of the scrotum occurs in about 30% of oriental neonates.

Of the pigmentary changes, linea nigra was the most frequent change affecting 20.6% of neonates, equally seen in both male and female term babies. This is believed to be the effect of maternal hormones in utero.

Other pigmentary changes in our study were genital pigmentation (16.8%), axillary pigmentation (9.5%), pigmentation of pinna (9.3%) and knuckle pigmentation (1.4%). These areas are believed to be hyper-pigmented as a result of MSH stimulation in utero, the exact mechanism of which is unknown.

Neonates showing miniature puberty in our study accounted for 327 (32.7%) cases. The commonest of these were vaginal discharge, seen in 185 (18.5%) babies; followed by hypertrophy of clitoris in 141 (14.1%) cases and mammary hyperplasia in 1 (0.1%) neonate. A high prevalence of miniature puberty (71%) was noted by Jain et al. Miniature puberty was noticed in 5.6% cases of neonates in a study by Sachdeva M et al. From these two studies, it is evident that there is a wide variation in the prevalence of miniature puberty among neonates in India. Our study shows the prevalence of miniature puberty among neonates in our part of the country.

Physiological Jaundice

It results from transient elevation of serum bilirubin, causing a generalised yellow discolouration of skin in the first few days of life. It fades away after the serum bilirubin level returns to normal.¹⁰

CONCLUSION

Physiological changes were the commonest neonatal dermatoses, followed by transient non-infective cutaneous changes. Mongolian spot and Epstein pearl were the commonest among the physiological skin changes. Both Mongolian spot and Epstein pearl were more common in multipara than in primipara. They were followed by sebaceous gland hyperplasia, acrocyanosis, milia, physiological scaling and vernix caseosa. Most of them are transient, self-limited and require no special therapy.

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