

Original Article

Cutaneous manifestations in 1000 Pakistani newborns

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Abstract *Background* Cutaneous manifestations are commonly seen in neonates. Benign dermatoses in newborns must be distinguished from more serious, life threatening disorders with cutaneous manifestations.

Objective To determine the frequency of various dermatoses i.e. physiological and pathological among newborns up to 96 hours of age.

Patients and methods 1000 full-term neonates were enrolled from labour rooms and pediatric nursery of Jinnah hospital, Lahore and were evaluated for cutaneous manifestations. All the relevant data regarding history, clinical examination and investigations were recorded and analyzed.

Results Out of 1000 neonates, there were 469 boys and 531 girls. Their mean age was 72 hours (6-96 hrs). Cutaneous manifestations were present in 94% of babies and 82.5% babies had more than one manifestation. The most common dermatoses were Mongolian spots (63.2%), Epstein pearls (47.8%), sebaceous hyperplasia (44.8%), miliaria (12.8%), hypertrichosis (12%), erythema toxicum neonatorum (12%), salmon patch (12%) and impetigo (11.4%). Uncommon manifestations included desquamation 8.5%, omphalitis 8% and birth trauma (7.7%). Rare dermatoses were hemangiomas (3.5%), café-au-lait macules (2.6%), congenital melanocytic nevus (2.4%), acne neonatorum (0.9%), preauricular skin tag (0.4%), cutis marmorata telangiectatica congenita and collodion baby in (0.1%) each.

Conclusion Cutaneous manifestations are frequent in newborns.

Key words

Newborn, dermatoses, Mongolian spots.

Introduction

Neonatal period is generally regarded as the first 4 weeks of extrauterine life, whereas infancy covers the whole first year. Skin lesions are commonly seen in neonatal period and range from transient self-limiting conditions to serious

dermatoses, requiring specific therapies. Some of these disorders may have prognostic implications like congenital melanocytic nevus (CMN),^{1,2} and some, such as epidermolysis bullosa,³ mandate genetic counseling and family planning.

Cutaneous manifestations in newborns can be broadly classified into physiological conditions, transient eruptions, cutaneous infections, birth marks and inherited disorders.

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Skin lesions appearing in first few weeks of life, can have significant psychological stress on parents. Worried parents often seek medical attention for their child's skin problem. Unfortunately, specialized pediatric dermatology clinics are not yet established in most parts of Pakistan, as in many regions of world. This increases the anxiety and stress of parents, who are frequently tossed between a dermatologist and a pediatrician. Thorough knowledge of neonatal skin disorders is, therefore, necessary both for the dermatologists, as well as, for the pediatrician, for a timely diagnosis and prompt treatment.

The studies that have been conducted in Pakistan have focused mainly on the pattern of various dermatoses in older children, but not in newborns.^{4,5,6} To the best of our knowledge, this is the first study of its kind, assessing spectrum of various cutaneous manifestations in neonates. It will be helpful to the physicians and dermatologists who deal with newborns.

Patients and methods

This descriptive cross-sectional study was conducted in the department of dermatology Jinnah Hospital, Lahore. Cases were enrolled from labour room and pediatric nursery. A total of 1000 full-term neonates (born between 37-42 weeks of gestation) up to 96 hours of age were included in study.

Preterm babies (born before 37 weeks of gestation) and postdate babies (born beyond 42 weeks) were not included. In newborns fulfilling the inclusion criteria, a detailed history of mother and child, clinical examination and relevant investigations were done. The data were entered in a comprehensive proforma and later analyzed. Frequencies of various cutaneous manifestations were recorded. The relative

frequencies of different dermatoses in comparison with weight (≤ 2.5 kg vs. >2.5 kg) and sex of child were calculated by applying Chi-square test. A *p* value of ≤ 0.05 was considered significant.

Results

Of these 1000 babies, 469 (46.9%) were boys and 531 (53.1%) were girls. 221 (22.1%) children were born by cesarean section and 779 (77.9%) were delivered vaginally. The mean age of babies was 72 hours (6-96 hrs) and mean weight was 3 kg (2-5kg). Out of these 1000 newborns, 826 (82.6%) had a birth weight of more than 2.5 kg and 174 (17.4%) had a birth weight of less than 2.5 kg.

At least one skin manifestation was found in 940 (94%) babies. 825 newborns had more than one cutaneous manifestation (**Table 1**). The various dermatological features were noted and their percentages were calculated (**Table 2**). Mongolian spots were the most frequent skin condition, noted in 632 (63.2%) neonates. It appeared as macular areas of blue-grey hyperpigmentation, mostly involving sacral region and buttocks. This was followed by Epstein pearls, present in 478 (47.8%) babies. They were most frequently found over the midline at the junction of hard and soft palate and presented as superficial, pearly white to yellowish dome-shaped papules. Sebaceous hyperplasia was noted in 448 (44.8%) of the newborns. In most of the cases, it was seen on nose.

Miliaria was observed in 128 (12.8%) newborns. Of these 128 babies, 90 had miliaria rubra, 29 had miliaria crystalline and 9 had miliaria pustulosa. Lesions were mostly present on upper chest, arm, back and forehead. The frequency of hypertrichosis, erythema toxicum neonatorum

Table 1 Distribution of cases by gender.

Gender	Total No of cases N=1000	Cases with skin features N=940 (94%)	Cases without skin features N=60 (6%)	Cases with more than one skin feature N=825 (82.5%)
	N (%)	N (%)	N (%)	N (%)
Male	469 (46.9)	429 (91.47)	40 (8.53)	422 (89.97)
Female	531 (53.1)	511 (96.23)	20 (3.77)	403 (75.89)

Table 2 Frequencies of various dermatoses in newborns up to 96 hours of age (n=1000).

Condition	N (%)
Mongolian spots	632 (63.2)
Epstein pearls	478 (47.8)
Sebaceous hyperplasia	448 (44.8)
Miliaria	128 (12.8)
Hypertrichosis	120 (12.0)
ETN	120 (12.0)
Salmon patch	120 (12.0)
Impetigo	114 (11.4)
Desquamation	85 (8.5)
Omphalitis	80 (8.0)
Birth trauma	77 (7.7)
Milia	70 (7.0)
Hemangioma	35 (3.5)
Café-au-lait macules	26 (2.6)
CMN	24 (2.4)
Acne-neonatorum	9 (0.9)
Preauricular skin tag	4 (0.4)
CMTC	1 (0.1)
Collodion baby	1 (0.1)

CMN (Congenital melanocytic nevus), CMTC (cutis marmorata telangiectatica congenita), ETN (erythema toxicum neonatorum)

(ETN) and salmon patch was 12% each.

114 (11.4%) babies developed impetigo, mostly on second or third day of life. It was mostly seen on face. Most of the babies had non-bullous impetigo. Desquamation frequently involved hands and feet. It was noted in 85 (8.5%) newborns. It usually began on second day of life. 80 (8%) babies developed infection of the umbilical cord stump, omphalitis. Majority of these presented on third or fourth day of life as redness and pus accumulated at the site of cord stump.

Birth trauma occurred in 77 (7.7%) newborns. Most common of these was caput succedaneum

seen in 68 of these babies. Cephalohematoma was observed in 5 and 4 babies presented with erosions, lacerations, petechiae or ecchymoses mostly on presenting part. Out of these 77 babies, mothers of 52 newborns had obstructed/prolonged labour, 17 had forceps delivery and 8 had vacuum extraction.

Other less common cutaneous manifestations were milia (7%), hemangioma (3.5%), café-au-lait macules (2.6%), CMN (2.4%), acne neonatorum (0.9%), preauricular skin tag (0.4%), collodion baby (0.1%), cutis marmorata telangiectatica congenita (0.1%).

Correlation of various cutaneous manifestations with sex showed that sebaceous hyperplasia and ETN were significantly more in baby boys ($p < 0.01$) (Table 3). As far as, correlation with weight was concerned, out of 1000 newborns, 174 had a birth weight of less than or equal to 2.5 kg, while 826 had a birth weight of more than 2.5 kg. We found that hypertrichosis, miliaria and Epstein pearls had a significant relation to the birth weight ($p < 0.05$). Epstein pearls and miliaria were more in babies with a body weight > 2.5 kg; while hypertrichosis was more in newborns with a body weight of < 2.5 kg (Table 4).

Discussion

Skin manifestations are common in the neonatal period. Frequency of different dermatoses varies in different racial groups. In our study, Mongolian spots, Epstein pearls, sebaceous

Table 3 Comparison of various dermatoses in relation to sex.

Condition	Total patients	Males (n=469)	Females (n=531)	χ^2	p value
Mongolian spots	632	310	322	3.189	0.74
Epstein pearls	478	235	243	1.883	0.170
Sebaceous Hyperplasia	448	258	190	37.236	<0.001*
Miliaria	128	67	61	1.746	0.186
ETN	120	87	33	35.884	<0.001*
Hypertrichosis	120	58	62	0.112	0.737
Salmon patch	120	56	64	0.0029	0.956

* Significant p value, ETN (erythema toxicum neonatorum)

Table 4 Comparison of various dermatoses in relation to body weight.

Conditions	Total patients	Body weight ≤ 2.5 kg (n=174)	Body weight > 2.5 kg (n=826)	χ^2	p value
Mongolian spots	632	118	514	1.92	0.165
Epstein pearls	478	41	437	49.59	<0.001
Miliaria	128	11	117	7.92	0.005*
ETN	120	15	105	2.27	0.131
Hypertrichosis	120	84	36	262.50	<0.001*
Desquamation	85	16	69	0.131	0.717

* Significant p value, ETN (erythema toxicum neonatorum)

hyperplasia, miliaria and hypertrichosis were the most common dermatoses seen in newborns up to 96 hours of age.

We found that cutaneous manifestations were present in 94% of the newborns. Two previous studies, one by Moosavi and Hosseini⁷ and another by Chulabhorn¹ reported a 100% frequency of cutaneous manifestations among newborns. This difference could be due to the different study protocol as we examined only full term neonates rather than every baby born in labour room. In addition to this, racial, genetic and environmental differences may also be responsible.

Mongolian spots were the most common manifestation with a frequency of 63.2 % (**Table 3**). As all of our patients were of the same race we could not have the racial comparison but several studies demonstrated that they are significantly more common among black neonates.¹

Epstein pearls were present in 47.8% of the newborns examined. Significant differences are seen when we compared this frequency with that of other international studies, e.g. Nanda *et al.*⁸ gave a frequency of 88.7%, while Moosavi and Hosseini⁷ came up with a frequency of 70.2%. There is no local study available to compare these frequencies. We also found that Epstein pearls were significantly more in babies with a birth weight of more than 2.5 kg. An international study reported its relation with maturity of the baby,¹ it was found that Epstein pearls were significantly more in full-term neonates as compared to pre-term or postdate babies.

Different authors have found different associations of sebaceous hyperplasia in neonates, e.g. Moosavi and Hosseini⁷ reported its association with infants maturity and found that this cutaneous manifestation was significantly more in full term neonates. On the other hand, Mc Kiernan and Spencer.⁹ found that the condition was more extensive in pre-term neonates. We were not able to find such an

association, as we did not examine pre-term or postdate babies. However, we found that sebaceous hyperplasia was significantly more in male newborns ($p < 0.001$). The possible reason for this association may be the increased levels of circulating testosterone in male newborns along with the effect of maternal androgens, leading to increased activity of sebaceous glands.¹⁰

Miliaria was noted in 12.8% newborns in our study. This is a relatively higher frequency as compared to the other studies e.g. it was noticed in 1.7% of American neonates¹ and 4.5% of Japanese newborns.¹¹ The difference might be due to the different climate of these countries, as in our study newborns were enrolled during the hot and humid climate. Secondly, our cultural and social practices of overwrapping the babies may also be responsible for this difference. Racial differences in the distribution and number of eccrine sweat glands may be another factor for this difference.¹² We found that miliaria was more in newborns with a birth weight > 2.5 kg. The reason for such an association is not known. However, further studies are required to see the effect of body weight on the size and rate of sweat production in human eccrine sweat glands.

Hypertrichosis was seen in 12% babies. Moosavi and Hosseini⁷ noted it in 25.7% of Iranian newborns, while the frequency of occurrence in American babies was reported to be only 1.3%.¹ These differences are probably due to racial characteristics. We noticed a significant association of hypertrichosis with a body weight of ≤ 2.5 kg. Exact reason for this association is not known. It could be possible that these babies are "small for dates" and the lanugo hair in them is not completely shed at the time of birth.

ETN was observed in 12% babies in our study. It was more commonly seen in males. Reason for such an association is not clearly understood, but the increased level of adrenal and gonadal androgens in male newborns, may have a direct effect on hair follicle and on sebaceous glands, which are involved in pathogenesis of ETN.¹³ In Japanese infants, the frequency of occurrence has been reported to be 40.8%¹⁰ and in Indians it is 28.6%.⁸ Two other reports, one by Rivers *et al.*¹³ and another by Sarachi *et al.*,¹⁵ gave frequencies of 34% and 70%, respectively. They did not look for its association with gender of newborn. The difference of frequency in our findings may be the result of the different time of examination i.e. within first 96 hours of examination. Because ETN sometimes begins as late as the seventh day,¹⁶ we probably have missed some of the infants who developed ETN after 96 hours of birth.

12% neonates in our study had salmon patch. This frequency is relatively less as compared to that reported by Chulabhorn in American babies.¹ They noticed salmon patch in 26.2% babies. The frequencies reported in Indian,⁸ Australian¹³ and Japanese¹¹ neonates are 28.4%, 33.8% and 22.3%, respectively. These differences can also be attributed to racial differences.

Our study revealed a relatively higher frequency of impetigo (11.4%), as compared to most of the similar international studies e.g. it was reported to be 0.02% in American newborns,¹ and in 1% of Iranian neonates.⁷ Nanda *et al.*⁸ from India found almost similar frequency of impetigo i.e. 11.3%. These differences can be explained on the basis of seasonal and temperature differences. Overcrowding, less efficient sterilization and cleanliness in our hospitals and poor standard of hygiene in our individuals may

be the other factors contributing to increase frequency of impetigo in our population.

The frequency found for desquamation (8.5%) was higher than that reported in other studies e.g. it was 1.9% in Iranian neonates⁷ and lower than American newborns, i.e. 13%.¹ The differences might be due to different study protocols and genetic differences.

Frequency of traumatic skin lesions (7.7%) was much more in our study as compared to that reported in United States of America i.e. 1%.¹ Out of these 77 newborns, mothers of 52 babies had prolonged/obstructed labour, 17 had forceps delivery and 8 had vacuum extraction.

Café-au-lait macules may be a manifestation of certain progressive neurocutaneous disorders. Our observation revealed that only 26 babies had café-au-lait spots and a positive family history of neurofibromatosis was present in only one child.

The survey of congenital melanocytic nevi showed a frequency of 2.4%. Their prevalence among the American neonates has been reported to be 3.4%, with a high occurrence in black neonates.¹ Kroon *et al.*¹⁷ from Denmark reported a frequency of 3.4 %. The size of congenital melanocytic nevus is important. We found that none of the CMN had a size of more than 15mm or a malignant appearance.

The rare dermatoses, which we did not encounter in our study, include transient neonatal pustular melanosis, subcutaneous fat necrosis of newborns, nevus sebaceous, port wine stain, supernumerary nipples and blue nevus. All of these conditions have been noticed in various frequencies by different authors.^{1,7} These differences cannot be explained by differences in the method of study and we think

that they probably depend upon racial characteristics.

We conclude that cutaneous manifestations are common in newborns up to 96 hours of age. Thorough knowledge of these dermatoses is mandatory for dermatologist, pediatrician and for the primary care physician, for a timely diagnosis, early treatment and counseling.

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