Journal of Pakistan Association of Dermatologists. 2017;**27 (2)**:124-130.

Original Article

Cutaneous lesions in neonatal intensive care unit in a tertiary care center

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Abstract

Objective To document the pattern of skin lesions among the neonates admitted in intensive care unit and evaluate the association between age, gender, maturity and birth weight.

Methods A total of 200 neonates, who were hospitalized in the NICU of SDMCMS&H were included in this single contact cross-sectional study. All diagnoses were made on clinical basis. The relationships between the occurrence of the lesions with the various maternal and neonatal factors were analyzed. The statistical analysis of the associations was done using percentage and student t-test.

Results The following cutaneous changes were noted. Lanugo hair was found in 121 neonates. 93 children showed Mongolian spots. The signs of miniature puberty were found in 82 children.105 children had sebaceous hyperplasia. 77 children had physiological desquamation. Erythema neonatorum was found in 59 patients and in only 3 of them it persisted beyond 7 days. 40 children had miliaria. Cutis marmorata was noted in 20 children. Other transient skin conditions seen were milia (5), vernix caseosa (5), acrocyanosis (3), neonatal acne (3), erythema toixcum neonatorum (1) and neonatal alopecia (1).

Conclusion Skin lesions are very common in the neonatal period. In the present study, most of the skin lesions were physiological and transitory. Pediatrician and dermatologists should be aware of these skin lesion in neonatal ICU and should be able to differentiate it from serious skin conditions in order to avoid unnecessary investigations and treatment in neonates.

Key words
Neonates, lanugo hair, Mongolian spots, sebaceous hyperplasia, cutis marmorata, vernix caseosa, acrocyanosis, neonatal acne, erythema toixcum neonatorum, neonatal alopecia.

Introduction

The skin of the neonate differs from that of the adult, in that it is thinner, delicate, has weaker intercellular attachments and produces fewer sweat and sebaceous gland secretions and is more susceptible to several infections.[1] Neonatal skin disorders are classified into 4 main types: physiologic skin disorders, acquired skin disorders, developmental skin disorders and iatrogenic complications.[2]

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The present study was undertaken to know the pattern of skin lesions among the neonates admitted in intensive care unit and evaluate the association between age, gender, maturity and birth weight. No such study has been conducted in this part of Karnataka.

Methods

A total of 200 neonates, who were hospitalized in the NICU of SDMCMS&H were included in this single contact cross-sectional study from November 2015 to February 2016. The neonates receiving phototherapy were excluded from the study. The oral cavities were not examined. All diagnoses were made on clinical basis and no skin biopsy was done. The maturity of the neonates was determined by the prenatal and obstetric medical records. Preterm was defined as less than 37 weeks of gestational age, while full-term was between 37 to 42 weeks and post-term more than 42 weeks. Early neonatal period was defined as age less than 7 days and late neonatal was between 8 and 28 days. The data were collected and documented using a Microsoft Excel worksheet. The relationships between the occurrence of the lesions with the various maternal and neonatal factors were analyzed. The statistical analysis of the associations was done using percentage and student t-test. Institutional ethical committee clearance was obtained

Results

The total number of male children was 107 and female children were 93 with ratio 1.15:1. 87 children were preterm, 104 were term and 9 were delivered postterm. 127 babies were in early neonatal period while 73 in late neonatal period. 96 neonates were delivered by lower segment caesarian section and 104 neonates were delivered vaginally.

The neonates were admitted for the varied reasons. Respiratory distress was diagnosed in 34 neonates. 33 neonates were admitted for low birth weight, 11 for very low birth weight and 3 for extremely low birth weight. 25 neonates were born with meconium stained liquor. 17 neonates were admitted for birth asphyxia, 16 for small for gestational age, 11 for intrauterine growth retardation, 6 neonates for twin deliveries, 8 for preterm care and 3 for post term care. The other reasons are as follows: anorectal anomalies (1), congenital heart disease (4), bilateral hydronephrosis (1), type III intestinal atresia (1), cleft lip and cleft palate (1), convulsions (2), dysmorphic features (1), gastrointestinal bleed (1), hypoglycemia (3), hyaline membrane disease (4), infant of diabetic mother (1), neonatal seizures (1), not feeding well (4), premature rupture of membrane (3), renal anomalies (1), trachea-esophageal fistula (1), tachypnea (1), weak cry (1). 2 neonates were admitted for congenital ichthyosis with collodion baby and 1 infant for the Kasabach-Merritt syndrome.

In 34 neonates of respiratory distress, 7 were low birth weight. Cellulitis, congenital heart disease and dysmorphic features were found in 1 infant. In 25 neonates born with meconium stained liquor, 10 of them had respiratory distress and 6 had birth asphyxia.

The following cutaneous changes were noted **(Table 1)**. Lanugo hair was found in 121 neonates. 93 children showed Mongolian spots. The signs of miniature puberty were found in 82 children i.e. pigmented linea alba in 61 children, pigmented genitalia in 58, vaginal discharge in 16 and breast enlargement was found in 3 children. 105 children had sebaceous hyperplasia. 77 children had physiological desquamation and majority had desquamation in postneonatal period. Erythema neonatorum was found in 59 patients and in only 3 of them it

persisted beyond 7 days. 40 children had miliaria. Cutis marmorata was noted in 20 children. Other transient skin conditions seen are milia (5), vernix caseosa (5), acrocyanosis (3), neonatal acne (3), erythema toixcum neonatorum (1) and neonatal alopecia (1).

In the developmental lesions found were congenital melanocytic nevus (2), faun tail nevus (2), hemangioma (1) and preauricular skin tag (1).

In acquired skin lesions, intertrigo was seen in 8 neonates, icterus was seen in 4 neonates and oral thrush was noted in 1 infant.

In iatrogenic skin diseases, 15 neonates had bruises, 14 had ecchymoses, contact dermatitis, plaster dermatitis and erosions were seen in 1 infant. Other skin lesions found were petechiae (1), purpura (1), sclerema (1), loss of subcutaneous fat (1), hypospadiasis (1), generalized edema (1), ophthalmia neonatorum (1), micrognathia (2), lentigines (1), simian crease (2), umbilical hernia (1), prominent veins (1), hairy pinna (1), hydrocele (1), phimosis (1), insect bite (1), cleft lip and cleft palate (1) , cellulitis (1), scrotal dermatitis (1), triangular face (1).

Relation between gestational age and cutaneous lesions is shown in **(Table 1)**. Lanugo hair, sebaceous hyperplasia, erythema neonatorum, cutis marmorata and iatrogenic bruises were frequently seen in preterm neonates, whereas miniature puberty, physiological desquamation, milia, neonatal acne, Mongolian spot, miliaria and intertrigo were more frequently seen in term neonates. Lanugo hairs (z=2.874, p=0.004) and sebaceous hyperplasia (z= 2.21, p=0.027) in preterm neonates was statistically significant, whereas miniature puberty (z=6.921, p<0.001) in post-term was statistically significant as calculated by student t-test.

Relation between sex of children and cutaneous lesions is shown in **Table 2**. Physiological desquamation, iatrogenic bruises and ecchymosis were more common in male neonates, whereas sebaceous hyperplasia, erythema neonatorum and cutis marmorata were more common in female neonates. Erythema neonatorum (z=2.507, p=0.012) showed statistically significant correlation with female preponderance.

Relation between age and cutaneous lesions is also depicted in **Table 2**. In early neonatal period, predominant cutaneous lesions were miniature puberty, erythema neonatorum, cutis marmorata, milia, vernix caseosa, Mongolian spots and intertrigo. In late neonatal period common cutaneous lesions were physiological desquamation, neonatal acne, iatrogenic bruises and ecchymosis. Erythema neonatorum (z=5.81, p<0.001) was statistically significant in early neonatal period, whereas physiological desquamation (z=4.345, p<0.001) was statistically significant during late neonatal period.

Table 3 represents the relation between birth weight and cutaneous lesions. The birth weight of 94 neonates was below 2 kg and 106 neonates weighed above 2 kg. Lanugo hair and sebaceous hyperplasia were commonly seen in neonates weighing below 2 kg whereas miniature puberty was seen in neonates above 2 kg. Other findings like physiological desquamation, Mongolian spots, miliaria, cutis marmorata and erythema neonatorum did not show statistically significant difference. Sebaceous hyperplasia (z=3.625, p<0.001) was statistically significant in neonates with birth weight <2kg, whereas miniature puberty (z=6.38, p<0.001) was statistically significant in neonates with >2kg birth weight.

Table 1 Table showing cutaneous lesions in relation to gestational age (n=200).

	Total (N=200) N (%)	*Pre-Term (N=87) N (%)*	*Term (N=104) N (%)*	*Post-term (N=9) N (%)*
Physiologic skin lesions				
Lanugo hair	121 (60.5)	63 (72.41)	53 (50.96)	5 (55.55)
Sebaceous hyperplasia	105 (52.5)	55 (63.21)	48 (46.15)	2 (22.22)
Mongolian spot	93 (46.5)	36 (41.37)	51 (49.03)	6 (66.66)
Miniature puberty	82 (41.0)	10 (11.49)	64 (61.53)	8 (88.88)
Physiological desquamation	77 (38.5)	29 (33.33)	46 (44.23)	2 (22.22)
Erythema neonatorum	59 (29.5)	28 (32.18)	28 (26.92)	3 (33.33)
Miliaria	40 (20.0)	16 (18.39)	24 (23.07)	0 (0.00)
Cutis marmorata	20 (10.0)	12 (13.79)	8 (7.69)	0 (0.00)
Milia	5 (2.5)	0 (0.00)	5 (4.80)	0 (0.00)
Vernix caseosa	5 (2.5)	2 (2.29)	3 (2.88)	0 (0.00)
Acrocyanosis	3 (1.5)	0 (0.00)	2 (1.92)	1 (1.11)
Neonatal acne	3 (1.5)	0 (0.00)	3 (2.88)	0 (0.00)
Erythema toxicum neonatorum	1 (0.5)	0 (0.00)	1 (0.96)	0 (0.00)
Hemangioma	1 (0.5)	1 (1.14)	0 (0.00)	0 (0.00)
Neonatal alopecia	1 (0.5)	0 (0.00)	1 (0.96)	0 (0.00)
Developmental skin disorders				
Congenital melanocytic nevus	2 (1.0)	0 (0.00)	2 (1.92)	0 (0.00)
Faun tail nevus	2 (1.0)	2 (2.29)	0 (0.00)	0 (0.00)
Preauricular skin tag	1 (0.5)	0 (0.00)	1 (0.96)	0 (0.00)
Acquired skin disorders				
Intertrigo	8 (4.0)	1 (1.14)	7 (6.73)	0 (0.00)
Icterus	4 (2.0)	1 (1.14)	3 (2.88)	0 (0.00)
Pallor	1 (0.5)	0 (0.00)	1 (0.96)	0 (0.00)
Iatrogenic				
Iatrogenic bruises	15 (7.5)	10 (11.49)	5 (4.80)	0 (0.00)
Iatrogenic Ecchymoses	14 (7.0)	6 (6.89)	8 (7.69)	0 (0.00)
Contact dermatitis	1 (0.5)	1 (1.14)	0 (0.00)	0 (0.00)
Erosions	1 (0.5)	1 (1.14)	0 (0.00)	0 (0.00)
Others				
Micrognathia	2 (1.0)	0 (0.00)	2 (1.92)	0 (0.00)
Simian crease	2 (1.0)	0 (0.00)	2 (1.92)	0 (0.00)

Table 2 Cutaneous lesions in relation to sex and age (n=200).

	Total (N=200)	*Male (N=107) N (%)*	*Female (N=93) N (%)*	*Early neonatal (0-7Days) (N=127) N (%)*	*Late neonatal (8-28 Days) (N=73) N (%)*
Physiologic skin lesions					
Sebaceous hyperplasia	105	52 (48.59)	53 (56.98)	65 (51.18)	40 (54.79)
Mongolian spot	93	52 (48.59)	41 (44.08)	69 (54.33)	24 (32.87)
Miniature puberty	82	44 (41.12)	38 (40.86)	57 (44.88)	25 (34.24)
Physiological desquamation	77	48 (44.85)	29 (31.18)	34 (26.77)	43 (58.90)
Erythema neonatorum	59	23 (21.49)	36 (38.70)	56 (44.09)	3 (4.10)
Miliaria	40	22 (20.56)	18 (19.35)	24 (18.89)	16 (21.91)
Cutis marmorata	20	8 (7.47)	12 (12.90)	16 (12.59)	4 (5.47)
Milia	5	2 (1.86)	3 (3.22)	5 (3.93)	0 (0.00)
Vernix caseosa	5	3 (2.80)	2 (2.15)	4 (3.14)	1 (1.36)
Acrocyanosis	3	0 (0.00)	3 (3.22)	2 (1.57)	1 (1.36)
Neonatal acne	3	2 (1.86)	1 (1.07)	0 (0.00)	3 (4.10)
Erythema toxicum neonatorum	1	0 (0.00)	1 (1.07)	0 (0.00)	1 (1.36)

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Hemangioma	1	1 (0.93)	0 (0.00)	0 (0.00)	1 (1.36)
Neonatal alopecia	1	0 (0.00)	1 (1.07)	0 (0.00)	1 (1.36)
Developmental skin disorders					
Congenital melanocytic nevus	2	1 (0.93)	1 (1.07)	2 (1.57)	0 (0.00)
Faun tail nevus	2	2 (2.80)	0 (0.00)	2 (1.57)	0 (0.00)
Preauricular skin tag	1	1 (0.93)	0 (0.00)	0 (0.00)	1 (1.36)
Acquired skin disorders					
Intertrigo	8	4 (3.73)	4 (4.30)	7 (5.51)	1 (1.36)
Icterus	4	3 (2.80)	1 (1.07)	1 (0.78)	3 (4.10)
Pallor	1	0 (0.00)	1 (1.07)	1 (0.78)	0 (0.00)
Iatrogenic					
Iatrogenic bruises	15	11 (10.28)	4 (4.30)	6 (4.72)	9 (12.33)
Ecchymoses	14	11 (10.28)	3 (3.22)	8 (6.29)	6 (8.22)
Contact dermatitis	1	0 (0.00)	1 (1.07)	0 (0.00)	1 (1.36)
Erosions	1	0 (0.00)	1 (1.07)	1 (0.78)	0 (0.00)
Micrognathia	2	0 (0.00)	2 (2.15)	1 (0.78)	1 (1.36)
Others					
Simian crease	2	1 (0.93)	1 (1.07)	1 (0.78)	1 (1.36)

Table 3 Cutaneous lesions in relation to birth weight (n=200).

	Total (N=200)	*<2kgs (N=94) N (%)*	*>2kgs (N=106) N (%)*
Physiologic skin lesions			
Lanugo hair	121	67 (71.27%)	54 (50.94%)
Sebaceous hyperplasia	105	63 (67.02%)	42 (40.38%)
Mongolian spot	93	40(42.55%)	53(50.96%)
Miniature puberty	82	16 (17.02%)	66 (62.5%)
Physiological desquamation	77	34 (36.17%)	43 (41.34%)
Erythema neonatorum	59	29 (30.85%)	30 (28.84%)
Miliaria	40	17(18.08%)	23(22.11%)
Cutis marmorata	20	12 (12.76%)	8 (7.69%)
Milia	5	1 (1.06)	4 (3.77)
Vernix caseosa	5	3 (3.19)	2 (1.88)
Acrocyanosis	3	1 (1.06)	2 (1.88)
Neonatal acne	3	0 (0.00)	3 (2.83)
Erythema toxicum neonatorum	1	0 (0.00)	1 (0.94)
Hemangioma	1	1 (1.06)	0 (0.00)
Neonatal alopecia	1	0 (0.00)	1 (0.94)
Developmental skin disorders			
Congenital melanocytic nevus	2	0 (0.00)	2 (1.88)
Faun tail nevus	2	2 (2.12)	0 (0.00)
Preauricular skin tag	1	0 (0.00)	1 (0.94)
Acquired skin disorders			
Intertrigo	8	3 (3.19)	5 (4.71)
Icterus	4	1 (1.06)	3 (2.83)
Pallor	1	0 (0.00)	1 (0.94)
Iatrogenic			
Iatrogenic bruises	15	9 (9.57)	6 (5.66)
Ecchymoses	14	6 (6.38)	8 (7.69)
Contact dermatitis	1	0 (0.00)	1 (0.94)
Erosions	1	1 (1.06)	0 (0.00)
Others			
Micrognathia	2	0 (0.00)	2 (1.88)
Simian crease	2	0 (0.00)	2 (1.88)

Discussion

The prevalence of neonatal dermatoses varies from 40.0% to 100% in different studies.[3,4] In the present study cutaneous lesions were present in all the 200 neonates.

Lanugo hair (60.5%) was the most frequently found cutaneous lesion in the present study which was similar to other study.[5] Predictably, it was seen commonly in preterm and neonates weighing less than 2 kg.

Sebaceous gland hyperplasia (52.5%) was the next common dermatosis in the present study. The prevalence was similar to other studies which showed the prevalence varying from 3% to 89.4%.[1,5,6,7] It was commonly seen in female, preterm and in neonates weighing less than 2kg.

Mongolian spots were found in 93 (46.5%) patients. Majority of them (97.84%) had spots on the sacrum. This finding is in agreement with most of the Indian studies.[4,5,7,8,9] They were frequently seen in term neonates and early neonatal period.

Genital or axillary hyperpigmentation, breast enlargement, pigmented linea alba or vaginal discharge in females were taken as the signs of miniature puberty. It was observed in 41% of the neonates which was similar to the study by Jain *et al*.[5] A Turkish study[10] noted a much lower prevalence of scrotal hyperpigmentation and labial hypertrophy. Boccardi *et al.*[11] suggested that hyperpigmentation of the genital area was more common in newborns of non-European origin. They speculated that the variation in genital hyperpigmentation might be related to the differential activation of melanocytes. Therefore, racial factors and skin type may be important factors. The frequency of miniature puberty in term neonates and in neonates weighing more than 2 kg was high and statistically significant. It was seen more commonly in early neonatal period. Linea nigra has been postulated to be a response to the maternal and placental hormones that enter the total circulation. Among these hormones, estrogen and progesterone have been reported to exert a melanocyte stimulating effect which also causes darkening of linea alba in pregnant women.[6,12]

Physiological desquamation was found in 38.5% of the neonates comparable to a study by Jain *et al.*[5], where the frequency of occurrence was 48.33%. 25.97% of them had desquamation only around the ankle, indicating that it could be the initial site of desquamation as pointed out in another study.[13] It was found to be more frequent in term, male neonates and in late neonatal period. It did not show statistically significant difference in terms of birth weight, though commonly seen in neonates with birth weight more than 2 kg. Vernix caseosa was seen in 2.5% of the neonates.

Many babies develop a striking generalized hyperemia few hours after birth, known as erythema neonatorum that fades spontaneously within 24-48 h.[14] It was seen in 59 (29.5%) neonates, which was not reported in other studies. In only 3 of them, it persisted beyond 7 days. It was seen more frequently in preterm and female neonates and was statistically significant ($z=5.81$, $p<0.001$) in early neonatal period.

Miliaria was found in 20% of the neonates which was comparable to other Indian studies.[5,7,8] It was more common in term neonates. Cutis marmorata was seen in 10% of the neonates, Jain *et al.*[5] noted a figure of 20% in their study, while study on Egyptian neonates reported 3%.[1] It was seen frequently in preterm, female and early neonatal period.

In our study, intertrigo and napkin dermatitis

were seen in 4% of the neonates which is lower as compared to Egyptian (15.2%)[1] and Pakistan study.[15] The lower prevalence may be due to changing the napkins as frequently as required. It was observed frequently in term neonates and in early neonatal period.

Iatrogenic complications like bruise (7.5%) and ecchymosis (7.0%) were noted mainly in the ankles and dorsum of the hand, the site of insertion of intravenous cannula. The results were lower compared to Indian[5] and Brazilian study.[16] It was observed frequently in male, preterm, low birth weight neonates and in late neonatal period.

We noted 2 cases of collodion baby, 2 cases of body dysmorphic syndrome and a case of Kasabach-Merritt syndrome as an incidental finding.

Conclusion

Skin lesions are very common in the neonatal period. In the present study, most of the skin lesions were physiological and transitory. Pediatricians and dermatologists should be aware of these skin lesions in neonatal ICU and should be able to differentiate them from serious skin conditions in order to avoid unnecessary investigations and treatment in neonates.

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