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Original Research Article

A clinical study of neonatal dermatosis

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ABSTRACT

Background: The neonatal period is the first 4 weeks of extra-uterine life. Neonatal dermatology encompasses a spectrum of cutaneous disorders from benign to life threatening. The present study was undertaken to evaluate the various dermatoses and hence assess the spectrum of dermatological conditions during the neonatal period and to study the relationship of neonatal dermatoses with maturity and birth weight of the neonates.
Methods: Three hundred neonates with cutaneous manifestations, attending the OPD of dermatology and Paediatrics during one year period, were studied. Neonates receiving phototherapy and those with lesions secondary to trauma were excluded. Clinical history coupled with complete general physical, systemic and dermatological examination.
Results: Three hundred cases of neonatal dermatoses were included in study. Out of 300 cases, 179 (59.7%) were male babies and 121 (140.3%) were female (sex ratio 1:5), 271 (70.3%) were term babies, 27 (9%) were preterm and 2 (0.7%) were post term. Transient/non-infective cutaneous lesions were the commonest 144 (48%) followed by Infectious 68 (22.67%), eczematous disorder 33 (11%) and pigmentary dermatoses 25 (8.33). Vascular lesions and hematomas accounted for 18 (6%) while genodermatoses were seen 7 (2.33%). 5 cases of subcutaneous fat disorders were observed.
Conclusions: As the spectrum of neonatal dermatology is vast, its knowledge to dermatologist is very important so as to differentiate the more common benign disorders from less frequent life-threatening dermatoses, so that timely intervention could facilitate a better therapeutic outcome.

Keywords: Impetigo, Miliria cyrstallina, Neonatal dermatoses

INTRODUCTION

The neonatal period is defined as first four weeks of extra uterine life. The skin of the newborn serves a pivotal role in transition from aqueous intra uterine environment to extra uterine terrestrial life. Neonatal skin differs in structure and function from that of adults and hence the dermatoses seen during this period differ in their clinical presentation and therapeutic requirements. The skin of neonate is thinner less hairy has, weaker inter cellular attachments, increased susceptibility to external irritants, microbial infections and decreased contact allergen reactivity.[1] The appreciation of normal physiological phenomena and their differentiation from more significant cutaneous disorders of new born is critical for dermatologist in order to modify the approach for caring of new born skin during this period. Most of the studies.[2-4] regarding neonatal dermatoses have focused on the first few hours or days after birth but literature regarding full neonatal period is meagre and no such study is available from this part of the country and hence this study is an attempt to provide the frame work for an effective

approach to the spectrum of clinical manifestations encountered during neonatal period.

METHODS

Three hundred neonates with cutaneous manifestation who presented to outpatient clinics of dermatology and pediatrics and those admitted in neonatal ward were included prospectively in this single contact study. Neonates receiving phototherapy and lesions secondary to trauma were excluded.

The birth history and relevant maternal history were recorded. Following this all neonates were thoroughly examined in broad day light and relevant clinical details regarding morphology, distribution, colour and configuration of lesions noted. Other parameters that were recorded included sex, birth weight, maturity and age at the time of examination. Photographic records were maintained. Provisional clinical diagnosis was confirmed by relevant investigation wherever indicated like Gram staining, KOH smear and Tzanck. Data was analysed and inferences were drawn.

RESULTS

Three hundred cases of neonatal dermatoses were included in study. Out of 300 cases, 179 (59.7%) were male babies and 121 (40.3%) were female (sex ratio 1:5), 271 (70.3%) were term babies, 27 (9%) were preterm and 2 (0.7%) were post term. 265 (88.3%) neonates had a birth wt ≥2.5 kg and 35 (11.7%) <2.5 kg with a mean birth weight of 2.7±0.43 kg.

Neonatal dermatoses were categorized into following groups:

- Transient benign cutaneous lesions.
- Cutaneous infections.
- Vascular lesions (tumours and malformations) and hematomas.
- Pigmentary dermatoses.
- Subcutaneous fat disorders.
- Genodermatoses.
- Other dermatoses.

Transient/non-infective cutaneous lesions were the commonest 144 (48%) followed by Infectious 68 (22.67%), eczematous disorder 33 (11%) and pigmentary dermatoses 25 (8.33). Vascular lesions and hematomas accounted for 18 (6%) while genodermatoses were seen 7 (2.33%). 5 cases of subcutaneous fat disorders were observed. The most common dermatoses in order of frequency were Miliaria (22%), Erythema toxicum neonatorum (15%), Impetigo (9%), Scabies (8%), Umbilical granuloma (7.33%) and Seborrhoeic dermatitis (7%). The most common incidental findings in these neonates were Mongolian spot in 67%, Salmon patch in 22.3 % and Milia in 8.67%. Thus, out of 300 neonates who presented to us, 71 had one dermatoses, 156 had two and 62 had two or more.

Table 1: The commonest dermatoses observed in present study.

Groups	Dermatoses	No. of neonates (%) n=300
I Transient /Non-infective		
1	Miliaria	66 (22)
	Rubra	37 (12)
	Crystallina	29 (10)
2	Erythema toxicum neonatorum (ETN)	45 (15)
3	Umbilical granuloma	22 (7.33)
4	Neonatal acne	10 (3.33)
5	Transient neonatal pustular melanosis	1 (0.33)
II Cutaneous infections		
1	Impetigo	27 (9)
2	Scabies	24 (8)
3	Candidiasis	14 (4.67)
4	Dermatophytosis	2 (0.67)
5	Cellulitis	1 (0.33)
III Eczematous disorder		
1	Seborrhoeic dermatitis (SD)	21 (7)
2	Perianal dermatitis	8 (2.7)
3	Contact dermatitis	4 (1.3)
IV Vascular lesion and hamartomas		
1	Hemangioma	16 (5.33)
2	Nevus sebaceous	2 (0.66)
V	Pigmentary disorders	
1	Nevus achromicus	15 (5)
2	Melanocytic nevi	9 (3)
3	Nevoid hypermelanosis	1 (0.3)
VI Subcutaneous fat disorder		
1	Subcutaneous fat necrosis	3 (1)
2	Sclerema neonatroum	2 (0.67)
VII Genodermatoses		
1	Collodion baby	4 (1.33)
2	Epidermolysis bullosa simplex	2 (1.67)
3	Incontinentia pigmenti	1 (0.33)
VIII Other dermatoses		
1	Mongolian spot	201 (67)
2	Salmon patch	67 (22.3)
3	Milia	26 (8.66)

Among the transient benign lesions Erythema toxicum neonatorom (ETN) and Miliaria Crystallina were seen in earlier weeks of neonatal life (all cases ETN were <7 days of age and 93.3% of cases presented within the first 72 hrs of birth.

Miliaria rubra, neonatal acne and umbilical granuloma were common in later half of neonatal period. Majority of infections presented in the 2nd week of life except scabies, which was common in 3rd and 4th week.

Table 2: Incidence of lesions in association with the neonates' sex.

Groups	Dermatoses	N %	
		Males (n=179)	Females (n=121)
I Transient /Non-infective			
1	Miliaria	48 (26.81)	18 (14.8)
	Rubra	28 (15.62)	9 (7.4)
	Crystallina	20 (11.17)	9 (7.4)
2	Erythema toxicum neonatorum	24 (13.4)	21 (17.3)
3	Umbilical granuloma	12 (6.7)	10 (8.26)
4	Neonatal acne	6 (3.3)	4 (3.3)
5	Transient neonatal pustular melanosis	1 (0.55)	-
II Cutaneous infections			
1	Impetigo	17 (9.49)	10 (8.26)
2	Scabies	15 (8.37)	9 (7.4)
3	Candidiasis	10 (5.5)	4 (3.3)
4	Dermatophytosis	1 (0.55)	1 (0.82)
5	Cellulitis	-	1 (0.82)
III Eczematous disorder			
1	Seborrhoeic dermatitis	14 (7.82)	7 (5.7)
2	Perianal dermatitis	4 (2.23)	4 (3.3)
3	Contact dermatitis	3 (1.67)	1 (0.82)
IV Vascular lesion and hamartomas			
1	Hemangioma	4 (2.23)	12 (75)
2	Nevus sebaceous	1 (0.55)	1 (0.82)
V Pigmentary disorders			
1	Nevus achromicus	9 (5.02)	6 (4.9)
2	Melanocytic nevi	3 (1.67)	6 (4.9)
3	Nevoid hypermelanosis	-	1 (0.82)
VI Subcutaneous fat disorder			
1	Subcutaneous fat necrosis	2 (1.11)	1 (0.82)
2	Sclerema neonatroum	2 (1.11)	-
VII Genodermatoses			
1	Collodion baby	1(0.55)	3(2.47)
2	Epidermolysis bullosa simplex	1(0.55)	1(0.82)
3	Incontinentia pigmenti		1(0.82)
VIII Other dermatoses			
1	Mongolian spot	115 (64.24)	56 (46.28)
2	Salmon patch	38 (21.22)	29 (23.96)
3	Milia	18 (10.05)	8 (6.6)

Peak age for eczematous disorder was between 21-28 days age group. Most cases of hemangiomas (87.5%) and all nevus depigmentosis presented in late neonatal period. Analysing the sex differences among various dermatoses, a male predominance was noted in all except hemangiomas, which were more common in females.

The correlation between the common dermatoses and sex of the neonate is shown in Table 2.

Table 3: Incidence of lesions in association with the neonates' birth weight.

Groups	Dermatoses	N (%)	
		≥2.5 kg (n=265)	<2.5 kg (n=35)
I Transient /non-infective			
1	Miliaria	58 (21.9)	8(22.85)
	Rubra	34 (12.83)	3 (25.71)
	Crystallina	24 (9.05)	5 (14.28)
2	Erythema toxicum neonatorum	45 (17)	-
3	Umbilical granuloma	17 (6.41)	5 (14.28)
4	Neonatal acne	8 (3.01)	2 (5.71)
5	Transient neonatal pustular melanosis	1 (0.37)	-
II Cutaneous infections			
1	Impetigo	25 (9.4)	2 (5.71)
2	Scabies	23 (8.6)	1 (2.85)
3	Candidiasis	13 (4.9)	1 (2.85)
4	Dermatophytosis	1 (0.37)	1 (2.85)
5	Cellulitis	-	1 (2.85)
III Eczematous disorder			
1	Seborrhoeic dermatitis	20 (7.54)	1 (2.85)
2	Perianal dermatitis	4 (1.5)	4 (11.42)
3	Contact dermatitis	3 (1.13)	1 (2.85)
IV Vascular lesion and hamartomas			
1	Hemangioma	13 (4.9)	3 (8.57)
2	Nevus sebaceous	1 (0.37)	1 (2.85)
V Pigmentary disorders			
1	Nevus achromicus	15 (5.66)	1 (2.85)
2	Melanocytic nevi	7 (2.64)	2 (5.71)
3	Nevoid hypermelanosis	1 (0.37)	1 (2.85)
VI Subcutaneous fat disorder			
1	Subcutaneous fat necrosis	3 (1.13)	-
2	Sclerema neonatroum	1 (0.37)	1 (2.85)
VII Genodermatoses			
1	Collodion baby	3 (1.13)	1 (2.85)
2	Epidermolysis bullosa simplex	1 (0.37)	1 (2.85)
3	Incontinentia pigmenti	1 (0.37)	
VIII Other dermatoses			
1	Mongolian spot	3 (1.13)	1 (2.85)
2	Salmon patch	1 (0.37)	-
3	Milia	1 (0.37)	-

Overall, the frequency of neonatal dermatoses was higher in babies with a birth weight of 2.5 kg except for Miliaria crystalline, umbilical granuloma and perianal dermatitis as shown in Table 3. In relation to maturity (Table 4) hemangiomas, perianal dermatitis and neonatal acne were common in preterm babies while Erythema toxicum neonatorum, Impetigo, scabies and Seborrhoeic dermatitis had a higher frequency in term babies

DISCUSSION

Though there have been a number of studies reporting frequency of skin lesion in neonates, they have been mainly focussed on the first few days of life or have dealt

with specific dermatoses like birth marks and physiological conditions.

Table 4: Incidence of lesions in association with the neonates' gestational age.

Groups	Dermatoses	N (%)		
		Preterm (n= 271)	Term (n=27)	Post term (n=2)
I Transient /Non Infective				
1	Miliaria	33 (12.17)	4 (14.81	-
2	Erythema toxicum neonatorum	44 (16.23)	1 (3.70)	-
3	Umbilical granuloma	22 (8.11)	-	-
4	Neonatal acne	8 (2.95)	2 (7.40)	-
5	Transient neonatal pustular melanosis	1 (0.36)	-	-
II Cutaneous infections				
1	Impetigo	25 (9.22)	1 (3.70)	1 (50)
2	Scabies	24 (8.85)	-	-
3	Candidiasis	13 (4.79)	1 (3.70)	
4	Dermatophytosis	1 (0.36)	1 (3.70)	-
5	Cellulitis	1 (0.36)	-	-
III Eczematous disorder				
1	Seborrhoeic dermatitis	19 (7.01)	2 (7.40)	-
2	Perianal dermatitis	4 (1.47)	4 (14.81)	-
3	Contact dermatitis	3 (1.10)	1 (3.70)	-
IV Vascular lesion and hamartomas				
1	Hemangioma	13 (4.79)	3 (11.11)	-
2	Nevus sebaceous	1 (0.36)	1 (3.70)	-
V Pigmentary disorders				
1	Nevus achromicus	13 (4.79)	1 (3.70)	1 (50)
2	Melanocytic nevi	8 (2.95)	1 (3.70)	-
3	Nevoid hypermelanosis	1 (0.36)	-	-
VI Subcutaneous fat disorder				
1	Subcutaneous fat necrosis	3 (1.10)	-	-
2	Sclerema neonatroum	1 (0.36)	1 (3.70)	-
VII Genodermatoses				
1	Collodion baby	3 (1.10)	1 (3.70)	-
2	Epidermolysis bullosa simplex	2 (0.73)	-	-
3	Incontinentia pigmenti	1 (0.36)	-	-
VIII Other dermatoses				
1	Mongolian spot	181 (66.78)	8 (29.62)	-
2	Salmon patch	65 (24)	2 (7.40)	-
3	Milia	26 (9.59)	-	-

So, the present clinical study was undertaken to assess the frequency of dermatoses occurring in the first 4 weeks of life and study the pattern of neonatal dermatoses. Also, the known relation of neonatal dermatoses with birth weight and gestational age of the babies was studied.

Transient benign cutaneous dermatoses

Miliaria was the commonest transient dermatoses seen in 66 neonates with a higher frequency among males. Miliaria rubra was seen in 37 cases (25.7%) and miliara crsytalline in 29 (20.1%). These findings are comparable to other studies.[4-6] The humidity and temperature in this part of the country and the relative immaturity of sweat gland in early infancy favours the development of miliaria.

Figure 1: Miliaria crystalline.

Miliaria crystallina (Figure 1) was seen more among low birth weight babies (14.3%) as compared to normal birth weight (9%). This could be attributed to the fact that such babies are kept warm and excessively bundled.

Figure 2: Erythema toxicum neonatorum.

Erythema toxicum neonatorum (Figure 2) was observed in 15% of neonates with no sexual predominance. Our frequency is comparable to studies by Mossavi and Hosseini but lesser than Hidano et al.[7,8] This may be because of the transient and benign nature of erythema toxicum noenatorum itself and hence lesser chances of seeking medical advice. Majority of neonates in our study were <1 week old with 99.3% (42) of them being <72 hrs of age and none was low birth weight. These observations

are more or less similar to Carr et al, Kulkarni and Singh.[9,10] In present study, 22 cases presented with Umbilical granuloma (Figure 3).

Figure 3: Umbilical granuloma.

Umbilical granuloma forms from excess granulation tissue persisting at base of the umbilicus after the cord separation (6-8 days after birth). The faulty practise of applying cow-dung to umbilical stump may result in infection and inflammation favouring umbilical granuloma formation. Neonatal acne was seen in 10 cases (3.33 %) in present study and is comparable to the frequency observed by Sachdeva et al who found it to be 5.4%. 60% of cases were seen late neonatal period and males were more commonly affected. The production of testosterone by foetal testis may be responsible for male predominance as suggested by Plewig and Kligman.[11] A single case of transient neonatal pustular melanosis (0.36%) was also observed in present study. Pigmented macules with scaling were seen over abdomen. Smear from pustule was sterile and revealed neutrophils. Our findings are in confirmation to those noted by Barr et al, Paul et al.[3,12]

Figure 4: Impetigo.

Cutaneous Infection was seen in 22.7 % of neonates. Impetigo (Figure 4) forms the largest group with 27 cases. Similar findings were noted by Nanda S et al and can be explained by the hot and humid climate in this part of the country.[14] Most cases in our study presented in the second week of life (63%) with a male preponderance which is in accordance with Fortunov et al.[15] A higher percentage was noted among term babies and those with birth weight of >2.5 kg.

Scabies was seen in 15 cases in our study, all in the late neonatal period with involvement of face, trunk, limbs, palms and soles. This is in accordance with findings by Billy et al.[16] Maternal infestation was seen in all cases and a similar history in sibling was found in 11 cases. Scabies is in general a very common infestation in this part of the country and hence the higher frequency of neonatal scabies.

Figure 5: Candid diaper dermatitis.

In present study, 14 (4.67%) cases of neonatal candidiasis were seen. 6 (2%) of patients had oral thrush with a without involvement of napkin area (Figure 5) and majority (71%) presented within first 2 weeks of life. This in view of the findings reported by Gupta et al and Mendiratte et al.[17,18] History of antibiotic therapy was present in 6 patients but non-revealed any evidence of maternal viginal candidiasis. There was no marked difference in frequency with relation to birth weight and gestational age.

Tinea faciei was observed in 2 neonates, each presenting in 2nd and 3rd week of life. Reports of dermatophytic infections in the first 2 weeks of life are scanty; however, cases have been reported at nine days and 18 days, Surpam et al.[19] Both present cases were KOH positive and in one there was history of Tinea capitis in sibling.

Disorder of subcutaneous fat, accounted for 5 cases of neonatal dermatoses. 3 cases of subcutaneous fat necrosis, all presenting in late neonatal period were observed were term with birth weight >2.5 kg and delivered vaginally. They presented with indurated painless plaques over back, buttocks and shoulders. In all these babies, lesions resolved spontaneously. This is in view of findings noted by Silvermann.[20] Sclerema neonatorum was observed in 2 cases. Both were delivered vaginally and one was preterm. 1 had respiratory distress with congestive heart failure and the other septicaemia. These underlying risk factors may result in redistribution of blood circulation with relative ischemia to skin and subcutaneous tissue as proposed by Moligner.[21]

Eczematous

Seborrhoeic dermatitis was the commonest eczematous disorder noted in our study (21/33). Babies with a birth weight of > 2.5 kgs were more commonly affected and majority was in the 4th week of life. This is in agreement with observation by Wanankul et al who found infantile Seborrhoeic dermatitis most commonly in infants below two months of age.[22] Seborrhoeic dermatitis affects both sexes and is most common in first 3-8 weeks of life and is believed to be due to increases sebaceous gland activity as a result of maternal hormones (Athertron et al).[23] The low number of cases noted by other observers is because their study was confined to early neonatal period.

Perianal dermatitis, occurring as irritation of skin in immediately around the anus, was seen in 8 cases in our study. All of them were less than 3 weeks old. This is in agreement with study by Cooke.[24] We observed it to be 10 times more frequent in preterm babies than full term babies as has been noted by Saraeli et al and Dash et al confirming the view that preterm new born show definite evidence of barrier immaturity. Present study noted a much less frequency and this may be attributed to the breast-feeding practice in this part of country. Contact irritant dermatitis/diaper dermatitis was seen in only 4 cases.

Vascular lesions and hemartomas

Hemangiomas were observed in 16 cases (5.33%) in our study. Majority of these (14) presented in late neonatal period and only 2 presented at birth. We noted a higher frequency among females (75%) and preterm babies (11.5%) as compare to term babies (4.79%) and these observations are consistent with Osburn et al and Amir et al who noted a similar relationship.[25,26] Head and neck was the predominant site for hemangioma in our study (62.5%) similar to previous studies Chiller et al and Senthilkumar.[27,28]

Figure 6: Infantile hemangioma.

Ulceration is the commonest complication occurring in hemangiomas (Figure 6). Chiller et al observed it in (21%) of the cases where as Senthilkumar et al in 23. 5%. We observed ulceration in 3 cases (18.7%). 2 cases (0.6%) of Nevus sebaceous (of Jadassohn) both over the face (Figure 7), were also seen. Nevus sebaceous is an organoid hemartoma of appendageal structures that is usually evident at birth, located on scalp or face.

Figure 7: Nevus sebaceous.

Pigmentary dermatoses

Nevus Achromicus/ Depigmentosus (ND) (Figure 8) was observed in 15 cases (5%) of study group) Most of them (80%) were born at term and all had birth weight of > 2.5 kg. All neonates with nevus depigmentosus presented to us in late neonatal period. Most of them had lesions over trunk (abdomen) and limbs in the form of single macular lesions, bands or bizarre specks of hypopigmentation as has been observed by Coupe.[29] Melanocytic nevi were seen in 9 neonates in present study.

Figure 8: Nevus achromicus.

Genodermatoses

Collodion baby, a less severe form of harlequin ichthyosis was seen in 4 cases (1.67%). All except one presented at birth.

Two cases of *Epidermolysis bullosa* simplex and a single case of incontinentia pigmentia was seen. Collodion and EBS were thus common dermatological emergencies in

neonatal period observed by us similar to the study by Sarkar et al.[30]

Others

Mongolian spots were seen in 67.7% of neonates most commonly present over the lumbosacral area (91.5%) these findings are comparable to those by Nanda et al, Osburn et al, Sachdeva et al, Moosavi and Hosseini. Salmon patch was the most common vascular birthmark in our study (22.33%), commonest site being the nape of neck (35/67) followed by upper eyelid (18) and glabella (3). Present findings are in agreement with those of Hidano et al, Osburn et al, Nanda et al. Salmon patches represent a physiological vascular phenomenal composed of distended dermal capillaries, that tend to fade, generally within the first year of life.

Structural anomalies

Accessory tragus was only structural anomaly noted in 2 of our neonates. In both cases it was located in preauricular area. This is similar to the findings of Nand et al and Sachdeva et al.[4]

CONCLUSION

The study of neonatal dermatoses is interesting. Several skin lesions, physiological or pathological are present at birth and in number of others appear during late neonatal period.

Most of the previous studies on neonatal dermatoses have been confined to early neonatal period, which has led to underreporting of dermatoses occurring in late neonatal period. Present study highlights that transient benign lesions are common and occur in early neonatal period while infections, eczematous and vascular lesions present mostly to late neonatal period. However exact incidence of these dermatoses and statistical significance with relation to birth weight and maturity (at birth) could not be arrived at because of number of cases studied were not many and came from various sources without a common denomination. Hence further studies involving larger number of patients with emphasis on both early and late neonatal period are desirable.

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