

Clinical Spectrum of Cutaneous Manifestations in Neonates: An Observational Study.

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ABSTRACT

Background: Though the commonly observed skin lesions in neonatal period are physiological and transient (milia, Mongolian spots or superficial desquamation) there are serious dermatological conditions which needs proper management (epidermolysis bullosa, ichthyosis or infections). It is essential to differentiate essentially transient cutaneous conditions from pathological lesions. These transient lesions also cause undue worry in parents hence counselling of parents regarding its benign nature plays an important role in management of these patients. Only few neonates are brought to dermatologists for opinion despite having serious skin conditions hence very few studies have been published on this topic. Aims and objectives- 1. To study various cutaneous manifestations in neonates according to their etiopathogenesis. 2. To correlate them with the gestational age. **Methods:** This was a prospective observational study. Total 65 neonates with cutaneous lesions either physiological, pathological or both were included in the study on the basis of a predefined inclusion and exclusion criteria. Antenatal, natal and postnatal history was sought and all the neonates were clinically examined thoroughly for skin lesions and the findings were recorded in the preformed pro-forma. Statistical analysis was done using SSPE 21 software. P value less than 0.05 was taken as significant for statistical purposes. **Results:** The study consisted of 65 neonates out of which there were 43 (66.15%) males and 22 (33.84%) with a M:F ratio of 1.9:1. Transient skin lesions were the most common cutaneous findings seen in our study and some of the neonates had multiple transient skin lesions. This was followed by naevi and birth marks found in 23(35.38%) patients, physiological changes 14(21%), infections 12 (18.47%), genodermatosis 07(10.76%), eczematous lesions 5(7.69%), miscellaneous changes 07(10.76%) and developmental anomaly in 1(1.53%) patient. **Conclusion:** In neonates it is essential to differentiate essentially harmless and transient skin lesions which don't need any treatment from pathological skin conditions which require proper diagnosis and specific treatment.

Keywords: Neonates, Transient Skin Lesions, Physiological changes, Genodermatoses.

INTRODUCTION

Neonatal dermatology is gaining importance in recent years with advancing medical knowledge and availability of therapeutic and diagnostic tools. Neonatal skin is 40 to 60 percent thinner than adult skin and has higher rate of trans-epidermal water loss but has higher water content in stratum corneum.^[1] Evolution of diseases is very rapid in neonates as compared to adults. So conditions which initially appear to be serious turn out to be insignificant whereas in others opposite is true.^[2] Cutaneous changes are commonly seen in neonates as a normal process of adaptation to external air environment after birth. Many times these changes have atypical course or they may take a prolonged time to subside.^[3] In such cases dermatological

consultation is usually sought to rule out pathological conditions. For the proper diagnosis of cutaneous diseases in neonate an adequate knowledge of these conditions is required to avoid unnecessary treatment for benign conditions. At the same time some of the skin lesions in neonatal period can be the marker of underlying systemic disease which may need immediate attention. Early diagnosis and prompt treatment of these diseases is associated with a better outcome and delay in treating these conditions may significantly increase the morbidity in neonates.^[4]

There are innumerable skin conditions that can occur in neonates which can simply be categorised into following groups.

1. Physiological changes of skin- Desquamation of skin, Lanugo hair, Physiological Jaundice, scrotal pigmentation and vaginal discharge.^[5]
2. Transient non infective skin lesions- Skin conditions seen in neonatal period which tend to resolve by 30 days of age are termed as transient eg Erythema toxicum neonatorum, Mongolian spots, milia, Epstein pearls, miliaria, sebaceous hyperplasia,

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transient neonatal pustular melanosis, suckling blisters, neonatal acne, cutis marmorata and Harlequin color change.^[6]

3. Infections- common infections seen in neonatal period are staphylococcal infections, staphylococcal scalded skin syndrome, impetigo, viral infections like varicella and herpes simplex infection, fungal infections and scabies.^[7]
4. Eczematous and inflammatory dermatoses- diaper dermatitis and seborrheic dermatitis are commonly observed in neonates. Prolonged wetness, decreased barrier function of skin contact with urine and stool, increased skin PH are the predisposing factors for diaper dermatitis.^[8]
5. Naevi or birth marks in the neonates- Mongolian spots, port-wine stain, salmon patch, haemangioma, epidermal naevus, congenital melanocytic naevus, naevus depigmentosus and cafe-au-lait spots.^[9]
6. Congenital anomalies- like aplasia cutis congenita, hair collar sign, Anetoderma of prematurity, cutis marmorata telangiectatica congenita and sacral dimple.^[10]
7. Genodermatosis/ heritable diseases-various genodermatosis like lamellar ichthyosis, harlequin baby, epidermolysis bullosa present since birth with skin as a major organ involvement.^[11]

It is reassuring to know that majority of the skin lesions are either physiological or transient in nature. However in some cases neonates may have serious dermatological conditions such as ichthyosis, epidermolysis bullosa or serious bacterial pyoderma. Moreover in Majority of the conditions these neonates are under treatment of paediatrician hence they are uncommonly sent to dermatologists' opinion therefor very few studies are undertaken on the topic of cutaneous manifestations in neonate. We undertook this study because of paucity of published studies on this topic.

MATERIALS AND METHODS

This was a cross sectional, observational study conducted in the department of dermatology at a tertiary care centre situated in urban area of Maharashtra. The newborn babies and neonates referred to our outpatient department (from neonatal intensive care unit, post natal care unit and paediatric outpatient department) were included in this study on the basis of a predefined inclusion and exclusion criteria. Total 65 neonates with dermatological findings either physiological, pathological or both were included in the study. The patients were followed up wherever necessary. All neonates were recorded for their birth weight, gestational age and any significant maternal obstetric history. The patients were categorised according to their gestational age as preterm, full term, post term and based on birth weight into small (SGA), appropriate (AGA), and large (LGA) for gestational age. A

detailed antenatal, natal and postnatal history was taken. History of similar illness in any of the family members was also sought. All the neonates were clinically examined thoroughly for cutaneous lesions. Babies were examined for involvement of skin including scalp, mucosae, palms, soles, genitals and nails. All the findings were classified according to the etiological basis. Any skin lesion if present was noted down in terms of morphology, distribution and progression. The investigations like skin biopsy, smear from vesicle, pus for culture and sensitivity, KOH mount for fungal scraping were done when needed. Neonates were appropriately treated. If the condition was found to be physiological or transient in nature (Physiological jaundice, Mongolian spots or milia etc) then the parents were counselled about the temporary and harmless nature of the condition. In cases where the neonates required specific treatment (Antibiotics for pyoderma) then the specific treatment and follow up advice was given.

The statistical analysis was done using SSPE 16 software. For statistical purposes P value less than 0.05 was taken as significant. Microsoft Office was used for making charts and graphs.

Inclusion Criteria

1. Babies in neonatal age group (up to 28 days) and having any skin lesion or manifestation.
2. Parents ready to give inform consent.

Exclusion Criteria

1. Babies more than 28 days of age.
2. Parents refused consent.

RESULTS

In this study a total of 65 patients were included on the basis of inclusion and exclusion criteria. Out of these 65 neonates there were 43 (66.15%) males and 22 (33.84%) females with a M:F ratio of 1.9:1.

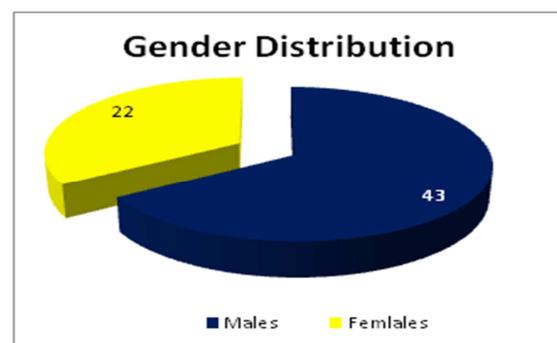


Figure 1: Gender Distribution of the studied cases.

The analysis of the studied cases on the basis of gestational age showed that amongst the neonates brought to our OPD for skin conditions majority were full term babies (55.38%) followed by preterm babies (41.53%). Only 2 neonates belonged to the category of post-term babies.

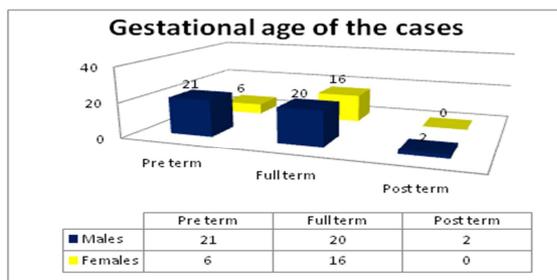


Figure 2: Distribution of neonates with skin changes according to sex and gestational age.

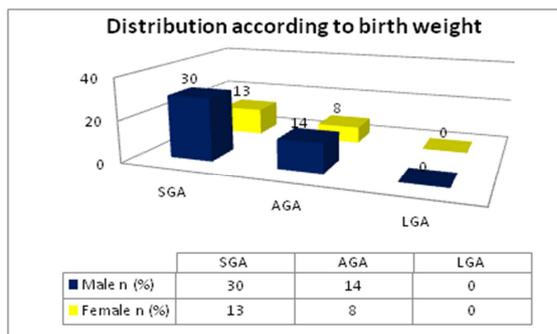


Figure 3: Distribution of neonates according to birth weight.

Amongst the studied cases majority of the neonates were small for gestational age (66.16%) followed by appropriate for gestational age babies (33.84%). There was no baby who was large for gestational age.

The analysis of skin lesions on the basis of morphology, number of lesions and progression showed that the most common skin lesions were transient skin lesions (118.46%- The total number exceeds 65 (i.e. total no of patients) as many patients had more than one finding) followed by naevi and birth marks (35.38%), physiological changes (21%) and infections (18.47%). Less common causes of skin lesions included Genodermatosis (10.76%), miscellaneous conditions (10.76%) and eczematous eruptions (7.69%). Transient neonatal skin changes were the most common findings seen in our study which was 77 in number. The total number exceeds 65 (i.e. total no of patients) as many patients had more than one finding. This was followed by birth marks found in 23(35.38%) patients. The other findings were physiological changes (21%), infections (18.47%), genodermatosis (10.76%), eczematous lesions (7.69%), miscellaneous changes (10.76%) and developmental anomalies (1.53%).

Table 1: Etiological classification of neonatal dermatosis according to gestational age and gender of the baby.

Sr. No	Etiology	Gestational age			Sex		Total n=65
		Preterm	Full term	Post term	Male (n=43)	Female (n=22)	
1	Physiological changes	6 (9.23%)	7 (10.76%)	1 (1.53%)	10 (23.25%)	4 (18.18%)	14 (21%)
2	Transient skin changes	29 (44.61%)	58 (89.23%)	2 (3.07%)	59 (137%)	18 (81.81%)	77* (118.46%)
3	Infections	7 (10.76%)	5 (7.69%)	-	8 (18.60%)	4 (18.18%)	12 (18.47%)
4	Eczematous eruption	4 (6.15%)	1 (1.53%)	-	4 (9.30%)	1 (4.54%)	5 (7.69%)
5	Naevi and birth marks	10 (16.92%)	13 (21%)	-	15 (34.88%)	8 (36.36%)	23 (35.38%)
6	Developmental anomaly	1 (1.53%)	-	-	1 (2.32%)	-	1 (1.53%)
7	Genodermatosis	5 (7.69%)	2 (3.07%)	-	4 (9.30%)	3 (13.63%)	7 (10.76%)
8	Miscellaneous	5 (7.69%)	2 (3.07%)	-	4 (9.30%)	3 (13.63%)	7 (10.76%)

* In transient skin lesions total number exceeds 65 because of presence of multiple lesions in one patient.

Table 2: Types of physiological and transient non infective skin changes, infections and eczematous lesions in relation to gestational age.

	Gestational age			Total
	Preterm	Full term	Post term	
Physiological changes				
Desquamation	-	4(6.15%)	1(1.53%)	5(7.69%)
Lanugo hair	1(1.53%)	1(1.53%)	-	2(3.07%)
Icterus	4(6.15%)	2 (3.07%)	-	6(9.23%)
Scrotal pigmentation	1(1.53%)	-	-	1(1.53%)
Vaginal discharge	-	-	-	-
Total	6(9.23%)	7(10.76%)	1(1.53%)	14(21%)
Transient skin lesions				
ETN	2(3.07%)	13(20%)	-	15(23.07%)
Mongolian spot	5(18.51%)	14(21.53%)	1(1.53%)	20(30.76%)
Milia	3(4.61%)	6(9.23%)	-	9(13.84%)
Epstein pearls	1(1.53%)	1(1.53%)	-	2(3.07%)
Miliaria	9(13.84%)	5(7.69%)	1(1.53%)	15(23.07%)
Sebaceous hyperplasia	2(7.40%)	5(7.69%)	-	7(10.76%)

TNPM	3(4.61%)	-	-	3(4.61%)
Suckling blisters	-	2(3.07%)	-	2(3.07%)
Neonatal acne	1(1.53%)	1(1.53%)	-	2(3.07%)
Cutis marmorata	-	-	-	-
Harlequine colour change	1(1.53%)	1(1.53%)	-	2(3.07%)
Total	27(41.53%)	48(73.84%)	2(7.40%)	77(118.46%)
Infection				
Type of Infection	Preterm	Full term	Post term	Total
Bact	3(4.61%)	2(3.07%)	-	5(7.69%)
Fungal	2(3.07%)	3(4.61%)	-	5(7.69%)
Viral	1(1.53%)	-	-	1(1.53%)
Parasitic	1(1.53%)	-	-	1(1.53%)
Total	7(10.76%)	5(7.69%)	=	12(18.47%)
Eczema and inflammatory conditions				
Diaper dermatitis	3(4.61%)	1(1.53%)	-	4(6.15%)
Seborrheic dermatitis	2(3.07%)	1(1.53%)	-	3(4.61%)
Total	5(7.69%)	2(3.07%)	-	7(10.76%)

Table 3: Naevi, developmental defects and Genodermatosis

	Preterm	Full term	Post term	Total
Naevi and birth marks				
Superficial haemangioma	4(6.15%)	-	-	4(6.15%)
Deep haemangioma	-	1(1.53%)	-	1(1.53%)
Port wine stain	-	2(3.07%)	-	2(3.07%)
Salman patch	3	10	-	13(20%)
Congenital melanocytic naevus	1(1.53%)	-	-	1(1.53%)
Naevus depigmentosus	-	2(3.07%)	-	2(3.07%)
Total	8(12.30%)	15	-	23
Developmental defects				
Sacral dimple	1(3.07%)	-	-	1(3.07%)
Genodermatosis-				
Type	Preterm	Full term	Post term	Total
Collodion baby	2(7.40%)	-	-	2(3.07%)
Harlequine baby	1(1.53%)	-	-	1(1.53%)
Lamellar ichthyosis	1(1.53%)	1(1.53%)	-	2(3.07%)
Epidermolysis bullosa	1(1.53%)	-	-	1(1.53%)
Incontinentia pigmenti	1(1.53%)	-	-	1(1.53%)
Total	6(9.23%)	1(1.53%)	-	7(10.76%)
Miscellaneous conditions.				
	Preterm	Full term	Post term	Total
Iatrogenic	3(4.61%)	-	-	3(4.61%)
Insect bite	-	1(1.53%)	-	1(1.53%)
Drug rash	-	2(3.07%)	-	2(3.07%)
Sclerema neonatorum	1(1.53%)	-	-	1(1.53%)
Total	4 (6.15%)	3 (4.61%)	-	7(10.76%)

The analysis of cases for presence of Naevi, developmental defects and Genodermatosis showed that the most common skin lesion was hemangioma (6.15%) followed by iatrogenic skin conditions (4.61%). We also came across 7 cases of genodermatoses with high incidence of preterm birth found in 6 patients. We had two rare cases of collodion babies, 2 cases of lamellar ichthyosis, one case of harlequine foetus, 1 case of epidermolysis bullosa and one case of incontinentia pigmenti.

The most common transient skin lesion was found to be Mongolian spots which were seen in 20 (30.76%) neonates. The other common transient skin lesions seen in studied cases were Miliaria (23.07%) and erythema toxicum neonatrum (23.07%). Most common physiological skin changes were icterus (9.23%) and desquamation (7.69%). Commonly encountered infections were bacterial and fungal which were seen in 5 (7.69%) patients each. Diaper and seborrheic dermatitis was seen in 6.15% and 4.61% patients respectively.

DISCUSSION

The cutaneous manifestations in neonatal period vary from transient physiological changes to pathological lesions. Though majority of cutaneous changes in first one month of life represent benign changes occurring during adaption to external environment after birth and disappear after certain period with or without treatment, but can cause unnecessary worry in parent. The study was conducted to study the clinical spectrum of skin findings in neonates and to evaluate the association of these skin changes in neonatal period with the gestational age. It was interesting to note that detailed cutaneous examination of a single baby revealed many dermatological conditions simultaneously.

Physiological Changes

As shown in table no.3 physiological changes were observed in 14(21%) patients. Out of these six

babies were preterm, seven babies were full term and one post term baby. Physiological jaundice was found in 6 (9.23%) neonates with maximum incidence in preterm babies due to incomplete clearance of bilirubin. This is in discordant with K Dash who studied maximum cases in full term,^[12] whereas Behera et al has reported increased association with preterm babies as seen in our study.^[13] Physiological desquamation was seen 5(7.69%) out of which 4 were full term babies. A study by K Dash et al and Sadana et al and Behera et al also found higher incidence in full term babies which goes in accordance with our study whereas Shilpa G et al found higher incidence in preterm babies.^[14,15]

Lanugo hairs are most common in preterm infants as these hairs are normally shed in utero during the last trimester before birth.^[7] We had 2(3.07%) cases of lanugo hair in our study with equal incidence in preterm as well as full term babies. We did not come across any case of vernix caseosa and vaginal discharge. Cutis marmorata and harlequin color change.-These changes occur as a result of inability to adjust to extra-uterine environment after birth. Cutis marmorata occurs as a result of immaturity of autonomic control of cutaneous vessels whereas in harlequin colour change pinkish discoloration is seen along the midline with pallor on the other half of the body. It is a rare phenomenon found in low birth weight babies. We encountered 2 (7.40%) cases of harlequin colour change in low birth weight babies of which 1 was preterm and other was a full term baby. Shipa G reported 3 (1.4%) cases of harlequin color change but the study does not report any association with gestational age.^[15]

Transient neonatal skin changes

This was the most common presentation in our study which accounted for 77 in total.

Mongolian spots - The most common transient skin lesions observed in 20(30%) patients in our study. these represent collection of dermal melanocytes. These are congenital benign hyperpigmentation occurring in both sexes with slight male preponderance. Common location is sacral area. Extensive Mongolian spots involving trunk and extremities can be associated with inborn error of metabolism. The incidence of Mongolian spots (MS) varies from 0% to 90% as reported earlier. The incidence of our study is comparable to other studies. We found higher incidence in full term babies as reported by Behera et al.^[13] Whereas shilpa G has found the finding opposite to our study.^[15] Considering their distribution we found lumbo-sacral area as the commonest location, while other 4 neonates had atypical location like entire trunk in one baby and extending anteriorly over abdomen up to the shoulder in other 2 babies.^[16]

Erythema toxicum neonatorum (ETN) which is a benign dermatosis was second common transient lesions observed in our study [15(23%) patients].

The lesions of ETN usually appear 24- 48 hours after birth and resolve spontaneously in 1 month period.^[17] The reported incidence varies from 9% to 38%. We observed higher incidence in full term (n=13) babies. The studies by Behera et al,^[13] and Sadana et al,^[14] observed higher incidence in female babies which is in contrast to our study where we found higher occurrence in male babies. In our study, 12 cases showed resolution in less than a week but 3 patients required more than 10 days to resolve.

Miliaria was having equal incidence as ETN in our study 15(23%), Behera et al (20.8%),^[13] Baruah et al (13.2%),^[18] Dash et al.(24%) 12 and Sachdeva et al.^[19] (20.6%) also reported similar incidences. We found high incidence of miliaria in preterm babies as against Behera et al,^[13] who reported more cases in term babies. In our study higher incidence in preterm babies probably attributed to warm temperature as 4 babies were given phototherapy, 8 babies were kept warm by artificial warmer and 3 babies were wrapped tightly.

Milia- these are tiny papules 1-2 mm in size found in 30-50% neonates. The incidence reported in various studies ranges from 6.8-93.1%. We came across 9 (13%) cases of milia which is in accordance with the previous reports. The incidence of milia in our study was higher in full term babies. K. Dash et al,^[12] and Behera et al,^[13] and Sachdeva et al also showed similar findings in their studies.

Sebaceous hyperplasia - Sebaceous hyperplasia appears due to the effect of maternal androgens on the Hair follicle in neonatal period and is seen in 50% neonates. We had seven cases with incidence of 10.76% which is within the range. Behera et al found higher incidence in preterm babies as opposed to our study where we observed maximum cases of sebaceous hyperplasia in full term babies.^[13]

Transient neonatal pustule melanosis-It is seen in approximately 0.2-4% of all term newborns. They are common in black babies .The lesions evolve through three stages. Initially pustules present at birth which later form white collarettes of scale and heal with post inflammatory hyperpigmentation. It can be atypical presentation of erythema toxicum neonatorum.^[20] We had 3 (4.61%) cases of TNP, all of which were preterm.

Suckling blisters which appear as a result of vigorous sucking in utero need to be differentiated from other serious vesicular conditions like herpes simplex and bullous impetigo. We came across 2 cases of suckling blisters located on lip both of which were full term babies.^[21]

Neonatal acne- which present as erythematous papules and pustules located primarily on cheeks and develop as a result of occlusion of hair follicles and overgrowth of Malassezia species. The neonatal acne is seen in around 20 % of neonates. We came across 2 cases i.e. (3.07%) incidence in preterm babies in our study.^[22]

Infections- Out of 12 (18.47%) babies who had cutaneous infections, 7(10.76%) babies were born as preterm babies and 5(7.69%) were full term babies which suggest that premature babies were more prone for infection than full term babies may be due to immature epidermal barrier. Candidial intertrigo was the fungal infection found in 5 (7.69%) neonates in our study whereas oral candidiasis was common fungal infection reported in a study by Behera et al.^[13] Bullous Impetigo was the bacterial infection seen in 5 babies (7.69%). Other studies have also shown incidence of impetigo ranging from 4-11%. There was one case of scabies and one case of molluscum contagiosum. The mothers of neonates with scabies and molluscum contagiosum were suffering from same infection.^[23]

Eczema and inflammatory dermatosis- Diaper Dermatitis which is an eczematous reaction appearing in diaper area found in 4 (6.15%) cases. Similar incidences have been reported by Javade et al (6.87%) and Jain et al (5%).^[24,25] The use of disposable diaper in hospital and its improper use can result in diaper dermatitis. Seborrheic dermatitis was found in 3(4.61%) is comparable to the result of Shilpa G et al (4.5%).^[15]

Naevi and birth marks- Salmon patch was the commonest vascular anomaly seen in 13(20%) patients with most common sites as glabella (53%) and nape of neck (38%). Other study by Nobby et al showed similar observation with incidence of (23.8%) whereas various studies have shown the incidence ranging between 0.7 to 35. In present study the prevalence was more in full term babies as reported by Behera et al and Jain et al.^[13,25]

Superficial haemangioma which is a benign tumor seen in approx 3% of children with male to female ratio of 1:3.2. In our study we had similar finding in 4 premature babies with the M: F ratio of 1:3. But it is in contrast to the observation by Behera et al who found higher association with full term babies.^[13]

Neonates with port-wine stain may have association with Sturge Weber syndrome but in our study no such association was observed. We had one case of small congenital melanocytic naevus (1.53%) on lower back. Behera et al also reported similar incidence (1%).^[13]

Naevus depigmentosus which appear as hypopigmented macules need differentiation from naevus anaemicus, vitiligo and ash leaf macule. We came across 2(3.07%) cases of naevus depigmentosus. Sacral dimple was found in single premature male baby. Lumbo-sacral dimples can be associated with spinal dysraphism, but no such abnormality was detected in our case. Genodermatosis which were seen in 7(10.76%) patients in our study found to be associated with preterm birth.^[26] Ichthyotic group was the most common type of genodermatosis in this study with five cases. Out of these two cases were of collodion babies, two cases of lamellar ichthyosis and one case

of harlequin foetus. Harlequin foetus is the most severe form of lamellar ichthyosis with a high mortality rate. All these neonates had positive history of consanguinity in parents in our study.

Epidermolysis bullosa simplex- This is a heritable vesiculo-bullous disorder in which vesicles and bullae appear at the site of trivial trauma.^[26,27] We found single case of epidermolysis bullosa simplex in a preterm male child. Baruah et al also reported a single case of EBS in 500 cases studied.^[18]

Incontinentia pigmenti- In this study a single case of incontinentia pigmenti was seen which presented in vesicular stage in a full term male child. Incontinentia pigmenti is an X linked dominant disorder common in female as a result of lethality in males.^[29]

Iatrogenic skin lesions included 2 cases of phototherapy induced miliaria crystallina and one case of injection site hematoma. All 3 cases were preterm babies as in these patients prematurity and associated disorders required hospitalisation making them prone for iatrogenic skin lesions.^[30]

Ampicillin included rash was seen in 2 cases both of which were full term babies. We also report 1 case of insect bite reaction and Sclerema neonatorum due to sepsis was seen in 1 neonate.

CONCLUSION

In our study physiological and transient cutaneous manifestations were the commonest presentation. In present study neonates with superficial haemangioma, developmental defects like sacral dimple, epidermolysis bullosa and genodermatosis were found to be born as premature babies. Similarly iatrogenically induced skin lesions and infections were seen in preterm babies at the same time premature babies were also found to be more prone for skin infections like bullous impetigo and oral candidiasis. The mothers can be the source of infections like herpes, scabies and molluscum contagiosum in neonatal period. It is important to differentiate essentially harmless and transient skin changes from pathological dermatoses which need specific treatment.

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