

A clinical study to assess the patterns of muco-cutaneous changes in newborns during the first five days after birth

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ABSTRACT

Background: Skin is the largest organ in the human body accounting for approximately 13% of the neonatal body weight as compared to 3% of the adult weight. It is the most visible and easily accessible organ of the body. **Objective:** To study the patterns of muco-cutaneous changes in newborns during the first 5 days after birth. **Materials and Methods:** This prospective study was conducted in postnatal wards of department of Obstetrics and gynaecology and neonatal unit of department of Paediatrics of a tertiary care teaching hospital. All the newborns within first 5 days after birth, irrespective of gender, underlying disease and general condition of the baby were included in the study. All the newborns were examined within 24 h of birth and followed up till 4 days after birth and the findings were noted in the preformed case-study proforma. **Results:** The present study was conducted on 200 newborns with cutaneous lesions. The muco-cutaneous diseases were divided into physiological, transient and pathological diseases. Among these newborns 114 (57%) were males, and 86 (43%) were females. The most common manifestations observed were Mongolian spots 156 (78%), sebaceous gland hyperplasia 81 (40.5%), Epstein pearls 79 (39.5%), milia 43 (21.5%), physiological jaundice 16 (8%), vernix caseosa 14 (7%), erythema toxicum 13 (6.5%), salmon patch 5 (2.5%), hypertrichosis/lanugo 2 (1%), sucking blisters 1 (0.5%) and bacterial infection of Staphylococcal scalded skin syndrome 1 (0.5%). **Conclusion:** Muco-cutaneous manifestations are very common in neonates but as these are the transient conditions, so no intervention is required. Early recognition of these lesions is important to distinguish them from more serious skin disorders.

Key words: Newborn, Skin manifestations, First 5 days of life

Skin is the largest organ in the human body accounting for approximately 13% of the neonatal body weight as compared to 3% of the adult weight [1]. It is the most visible and easily accessible organ of the body. Factors influencing the pattern of muco-cutaneous changes in neonate are related to gestational age, hereditary, race, maternal health and external factors such as hygiene, socioeconomic status, customs and modes of delivery [2]. Although anatomical elements develop by 22–24 weeks but functional, biochemical and structural maturity is usually late. Skin maturation both structural and functional begins at the moment of birth and completes by first year of life [1]. Newborn period is the vital period of adaptation during which several skin conditions manifest.

The prevalence of skin manifestations in the newborn varies between 79.4% and 100% [3]. Most often these are temporary lesions caused by physiological responses, while others resulting from transient diseases, and some as markers of more severe pathologic conditions [1]. Muco-cutaneous lesions can vary from Mongolian spot to transient condition like erythema toxicum neonatorum, which are benign, self-limited and require no therapy. However it is important to address parental concern and relieve the anxiety of parents [4]. It is necessary to identify and

differentiate the benign lesions from pathological lesions like congenital melanocytic nevi, which have the risk of malignant transformation. Hence early diagnosis is the key for the early intervention in pathological conditions [3].

It is necessary that the attending paediatrician should be able to identify, classify and make a diagnosis of the lesion, which will avoid unnecessary intervention and also addresses the concerns of the parents and caregivers. If diagnosis is confusing, it is important to take a dermatologists opinion. The studies conducted on neonatal muco-cutaneous skin lesions in India are limited. Therefore, this study was conducted to determine the patterns of muco-cutaneous changes, both physiological and pathological, in newborns during the first 5 days after birth.

MATERIALS AND METHODS

The study was a prospective study which was conducted in postnatal wards of Department of Obstetrics and Gynaecology and neonatal unit of Department of Paediatrics of a tertiary care teaching institution for a period of 18 months with a sample size of 200 newborns. Ethical committee clearance was obtained before starting the study.

All the new-borns of postnatal wards and new-borns who were admitted in Neonatal Intensive Care Unit within first 5 days after birth, irrespective of gender, underlying disease and general condition of the baby were included in the study. Newborns who failed follow up for 5 days after birth were excluded from the study.

All the newborns were examined within 24 h of birth and followed up till 4 days after birth by direct examination, under the supervision of the same dermatologist to prevent subjective bias every day and the findings are noted in the preformed case study proforma. Non-invasive simple investigations such as examinations of pus swabs for bacterial culture, scrapings for *Candida* and smear from pustules for gram staining and microscopic examinations and Tzanck smear were performed as and when required.

On clinical examination, the muco-cutaneous diseases were divided into physiological, transient and pathological diseases. Physiological diseases include vernix caseosa, sebaceous gland hyperplasia (SGH), milia, hypertrichosis/lanugo, Epstein pearls, Mongolian spots, physiological jaundice and acral cyanosis. Transient diseases are the ones which last only for a short period of time. These include erythema toxicum neonatorum and vascular diseases. Pathological diseases are the ones, which develop abnormal developmental changes. They consist of pigmented birth marks, infections and congenital anomalies. The physiological and transient skin lesions need only reassurance, while the pathological lesions were treated and discharged according to the diagnosis of skin lesion. The observations were recorded in a case study proforma and statistical analysis was done.

Sample size was calculated according to the formula, $n = Z^2_{(1-\alpha)} * Pq/d^2$ where n =sample size, P =prevalence, $q=(1-p)$, d =acceptable deviation. With $P=94.8\%$ and relative error=5%. The sample size is 103 [11]≈110. On an average, 200 new-borns were included in the study.

RESULTS

The present study was conducted for a period of 18 months on consecutive 200 newborns with cutaneous lesions. Among these newborns, 114 (57%) were males, and 86 (43%) were females. Of these, 94 (47%) weighed >2.5 kg, 106 (53%) weighed <2.50 kg. Majority of them were born at term - 170 (85%), 28 (14%) at preterm and 2 (1%) at post term. New-borns delivered by normal vaginal route were 19 (9.5%) and by cesarean section were 181 (90.5%). 104 (52%) mothers were primigravida and 96 (48%) were multigravida. Out of 200 neonates, multiple skin conditions were the most common and the maximum diagnosis were done clinically and few with blood investigations like serum bilirubin, blood culture etc.

The most common manifestations observed were Mongolian spots 156 (78%), SGH 81 (40.5%), Epstein pearls 79 (39.5%), milia 43 (21.5%), physiological jaundice 16 (8%), vernix caseosa 14 (7%), erythema toxicum neonatorum 13 (6.5%), salmon patch 5 (2.5%), hypertrichosis/lanugo 2(1%), sucking blisters 1 (0.5%),

bacterial infection of staphylococcal scalded skin syndrome (SSSS) 1 (0.5%) and other special skin manifestations 8 (4%). Among other skin manifestations, linear epidermal verrucous nevus 2 (1%), and one each cases of Cafe-au-lait macule, nevus hysteric, hemangioma over the tongue, pilonidal sinus, hematoma over the left sole, hyperpigmentation were observed. Muco-cutaneous lesions showed no significant association with consanguinity.

Neonates were also divided according to birth weight and pre-term, term and post-term. In total, muco-cutaneous lesions were common in term neonates (85%) and neonates of low birth weight (53%). Among physiological muco-cutaneous lesions, 14 (8.2%) neonates with vernix were term neonates, 68 (40%) were term neonates, 13(46.4%) were preterm and 1 (50%) were post term neonates having SGH and was common in neonates with birth weight >2.5 kg 42 (44.6%). Milia were more frequent in neonates weighing <2.5 kg: 23 (21.6%), and in term neonates 33 (19.4%). No significant association was noted among these. Epstein Pearls were seen more frequently in neonates born at term 70 (41.1%) as compared to preterm and post-term neonates ($p<0.05$). Mongolian spots were the most commonly observed in term neonates (139, 81.7%). One or more Mongolian spots at different sites were noticed in the same baby, 133 (85.2%) had one, 20 (12.8%) had two, 3 (2%). Proportion of newborns presented the mongolian spot ranged from 11.7% to 84.7%. In this study, Mongolian spots were observed more in neonates weighing <2.5 kg ($p=0.01$). Physiological jaundice was observed higher in term neonates 15 (8.8%) and in neonates weighing >2.5 kg 10 (10.6%).

Among transient skin manifestations, erythema toxicum neonatorum was more commonly seen in term neonates 13 (7.6%), ($p=0.08$). Vascular disorders were higher in term neonates seen in 4 (2.3%) neonates and also in neonates weighing more than 2.5 kg seen in 3 (3.1%) cases.

DISCUSSION

Muco-cutaneous lesions are not uncommon among neonates. In our study, 200 neonates with muco-cutaneous lesions were studied and followed up till 5 days of birth since some neonatal dermatomes like erythema toxicum neonatorum, milia appears between 3 and 7 days after birth [6]. Similar study period of 5 days were observed in other studies conducted by Hidano *et al.* and Kahana *et al.* [7-9]. Vernix Caseosa was seen in 7% of neonates, flexures were the most common site. It was thick, sticky and difficult to wipe in most of the neonates. This observation was similar to that of a Turkish study [10] and in another study conducted by Montegudo *et al.* study [7] proportion of presentation was 77% [11].

SGH was the second most common observations of our study in 840.5% neonates. The findings were similar to a study conducted in Pakistan [12]. In other studies, the percentage varies from 23% to 50% [13,14]. Milia was observed in 21.5% of neonates and was more frequent in neonates weighing <2500 g, which is similar to a study conducted by Sachdeva *et*

al. study [15]. Epstein Pearl was seen in 39.5% neonates and is the third commonest observation in our study. Epstein Pearls were seen more frequently in neonates born at term and is similar to the study conducted in Nepal [4].

Lanugo was seen in 1% of neonates, in contrast to Nobby *et al.* and Sachdeva *et al.*, who found incidence of 14.6% and 14.4%, respectively [15,16]. Mongolian spots were the most common manifestation seen in 78% neonates in our study. In other studies incidence ranged from 60% to 90% [13,15-18]. Mongolian spot was more commonly observed in term neonates and was similar to a observation made by Sachdeva *et al.* [15]. Proportion of newborns presented the mongolian spot ranged from 11.7% to 84.7% [4,22-28].

Physiological jaundice was noted in 8% of the neonates who were seen after 24 h of birth. The frequency as compared to other studies was less [15,16]. We observed higher incidence in term neonates and in neonates weighing more than 2.5 kg. This was comparable with study conducted in Nepal [4]. In our study, erythema toxicum neonatorum was found in 6.5% of newborn, which was comparable to most Indian studies [17,29,15]. In other studies, frequency ranged from 13% to 30%. In a study conducted by Moosavi *et al.*, it was observed that the lesions were more common on day 2 or 3 of birth which was similar to pattern to our study [30]. It was more commonly seen in term neonates, which is similar to other studies [8,27].

Vascular disorders (birthmarks) observed in this study were salmon patch in 2.5%, hemangioma in 0.5% neonates. The site of involvement of hemangioma was on the tongue in our study. The incidence of infantile hemangiomas was 1%. In other studies incidence ranged from 0.5 to 3% [31,32]. Hemangiomas are the most common congenital tumour of infancy and this correlates with literature [33]. The incidence of salmon patch in our study was lower. We did observe that the incidence was higher in term neonates and also in neonates weighing more than 2.5 kg, which was similar to a study done by Montegudo *et al* [7] (Table 3).

One preterm weighing <2.5 kg neonate born to a multigravida had SSSS, a similar case was reported by Baruah *et al.* [18]. Pigmented birth marks observed in our study were cafe-au-lait spots (0.5%), hematoma (0.5%) on right sole, nevus hystrix (0.5%) on trunk and lower limbs [33], and hyper pigmentation of the both axilla (0.5%). Linear epidermal verrucous nevus (1%) was observed in left axilla and also was seen on the scalp of preterm neonate (0.5%). A study done by I-Hsin Shih *et al.* [19] in Taiwan reported similar pattern of incidence of cafe-au-lait spots (0.4%). Congenital anomalies such as pilonidal sinus was observed in a term neonate weighing more than 2.5 kg 1 (0.5%). In the incidence of lesions, no gender predisposition was observed. The mode of delivery, maternal age and consanguinity played no role in the incidence of muco-cutaneous lesions in the neonates. The main limitation of our study was short duration of 5 days because most of the mothers and babies were discharged around this time specially those born by vaginal route. Hence, a proper follow up after 5 days was difficult.

CONCLUSION

The skin manifestations differ as neonatal skin is different from the adult skin. In our study, it was found that the mucocutaneous diseases are a frequent complaint in neonates. They were more common in term neonates and neonates of low birth weight. A paediatrician is approached by the parents or a care giver with anxiety, so early recognition is important to differentiate the pattern of mucocutaneous diseases from a serious one. A paediatrician and a dermatologist can play a vital in the management of these lesions.

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