Prevalence rate of skin manifestations in NICU-admitted neonates

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Abstract

Background Skin disorders in neonates can be regarded as determining concepts for prognosis and genetic counseling. Few studies have so far been conducted on determining and recording the relative frequency of skin disorders. The present study was therefore conducted to investigate skin manifestations and their relationship with other variables in the neonates hospitalized in the neonatal intensive care unit (NICU).

Methods The present cross-sectional study was conducted on 403 neonates, hospitalized in the NICU of Rasoul Akram Hospital in 2014 and selected using convenience sampling. The data collected from the profiles of the neonates were recorded in a data collection form.

Results Of the 403 study neonates, 366 (90.8%) had no skin manifestations, while 37 (9.2%) had skin manifestations, 18 (48.6%) of which were pathological. According to the results obtained, gender, type of delivery, gestational age and reasons for hospitalization were found not to be correlated with skin manifestations and their pathological status ($P>0.05$). Moreover, gender, gestational age and reasons for hospitalization had no significant relationships with the lesion type ($P>0.05$). Type of delivery was however found to have a statistically significant relationship with the type of skin manifestation ($P=0.043$).

Conclusion Skin manifestations in the neonates hospitalized in the NICU are found to be less frequent in the present study compared to those in other studies, which can be attributed to the **retrospective** type of study using profiles and the lack of direct medical examination of patients.

Background

The skin is the most visible and most accessible organ. The most important functions of the skin include acting as a barrier against infections, protecting internal organs, helping with the body temperature regulation, storing body insulating fats, secreting electrolytes and providing tactile sense data [1]. The neonate's skin is different from the adult's in that it is more delicate and thinner, has weaker cell junctions, produces less sweat and fat and is vulnerable to a variety of infections [2].

The baby's skin coating substance, vernix caseosa, with an antimicrobial function, plays a key role in protecting the fetus before and after delivery [3]. Skin disorders, which are commonly seen in infants, include transient benign lesions, atopic dermatitis and the associated disorders, skin lesions due to infection, bullous dermatoses, genodermatoses and postpartum symptoms [4]. There are a multitude of self-limiting transient physiological skin changes in neonates which require no treatments. Practical information is required about normal and pathological skin findings to specify which skin lesion needs rapid therapeutic actions [5].

Skin disorders in neonates can be regarded as determining concepts for prognosis and genetic counseling [6]. Numerous studies found different skin findings in different races, e.g. skin melanosis is

more prevalent in the black race, native Americans, Asians and the Spanish [7]. Few studies have so far been conducted on determining and recording the relative frequency of skin disorders. The present study was therefore conducted to investigate skin manifestations and their relationship with other variables in the neonates hospitalized in NICUs.

Methods

The present cross-sectional study used convenience sampling to select 403 neonates, hospitalized in the NICU of Rasoul Akram Hospital in 2014. The data related to the patients' profiles including gender, type of delivery (term or preterm), reasons for hospitalization, emergence of skin manifestations and their pathological status based on the specialist's opinion were investigated and recorded in the data collection form after the patients' parents submitted informed consent forms.

The data collected were analyzed in SPSS 22. Absolute and relative frequency as well as mean and standard deviation were used to explain descriptive statistics. The Chi-square and independent t-test were used for inferential statistics. $P < 0.05$ was set as the level of statistical significance.

Results

A total of 227 (56.3%) of the neonates were male and 176 (43.7%) were female. Term neonates, i.e. gestational ages of above 37 weeks, comprised 38.5% of the population. Caesarean section was the method used in 77.7% of the deliveries. According to Table 1, the most common reason for hospitalization was RDS, which was observed in 155 (38.5%) of the neonates.

Table 1: Frequency distribution of the reasons for hospitalization of the study neonates

Relative frequency	Frequency	Gender	Reasons for hospitalization
(38.5%) 155	82	Male	(Respiratory distress syndrome (RDS
	73	Female	
(1%) 4	3	Male	(Transient Tachypnea of The Newborn (TTN
	1	Female	
(0.7%) 3	2	Male	Meconium aspiration syndrome
	1	Female	
(1%) 4	3	Male	Neonatal apnea
	1	Female	
(1.2%) 5	4	Male	Pneumonia
	1	Female	
(0.7%) 3	3	Male	Pneumothorax
	0	Female	
(24.1%) 97	60	Male	Jaundice /anemia
	37	Female	
(6.7%) 27	10	Male	Sepsis
	17	Female	
(0.5%) 2	1	Male	Meningitis
	1	Female	
(1%) 4	2	Male	Hypoglycemia
	2	Female	
(5.5%) 22	8	Male	Retinopathy of pre-maturity
	14	Female	
(2.2%) 9	7	Male	Withdrawal Syndrome
	2	Female	
(0.7%) 3	2	Male	Gastrointestinal bleeding
	1	Female	
(0.2%) 1	0	Male	RDS /pneumonia
	1	Female	

(3%) 12	6	Male	RDS/jaundice/anemia
	6	Female	
(1.5%) 6	4	Male	RDS/sepsis
	2	Female	
(0.5%) 2	2	Male	RDS/hypoglycemia
	0	Female	
(0.5%) 2	1	Male	Jaundice /anemia /pneumonia
	1	Female	
(1%) 4	3	Male	Jaundice/anemia/sepsis
	1	Female	
(0.2%) 1	1	Male	Jaundice/anemia/hypoglycemia
	0	Female	
(0.2%) 1	1	Male	Sepsis/pneumonia
	0	Female	
(0.5%) 2	1	Male	Sepsis/seizure
	1	Female	
(0.5%) 2	1	Male	Sepsis/apnea
	1	Female	
(1.2%) 5	3	Male	Seizure
	2	Female	
(6.7%) 27	17	Male	Other diagnoses
	10	Female	

Of the 403 study patients, 366 (90.8%) showed no skin manifestations while 37 (9.2%) had skin manifestations, 18 (48.6%) of which were pathological. Table 2 shows different types of skin manifestations. The relationships of having skin manifestations with gender ($P=0.148$), gestational age ($P=0.935$), type of delivery ($P=0.122$) and reasons for hospitalization ($P=0.571$) were found to be statistically insignificant.

Table 2: Frequency distribution of skin manifestations in the study neonates

Relative frequency	Frequency	Gender	Reasons for hospitalization
(8.1%) 3	1	Male	Lanugo hair
	2	Female	
(8.1%) 3	2	Male	Milia
	1	Female	
(10.8%) 4	2	Male	capute succedaneum
	2	Female	
(5.4%) 2	1	Male	Cephalohematoma
	1	Female	
(8.1%) 3	1	Male	Mongolian spots
	2	Female	
(5.4%) 2	2	Male	Neural tube defects
	0	Female	
(5.4%) 2	2	Male	Erythema toxicum
	0	Female	
(5.4%) 2	2	Male	Ichthyosis
	0	Female	
(2.7%) 1	1	Male	Contact dermatitis
	0	Female	
(5.4%) 2	2	Male	Ecchymosis
	0	Female	
(10.8%) 4	3	Male	Ear nodules
	1	Female	
(13.5%) 5	3	Male	Syndromic face
	2	Female	
(2.7%) 1	1	Male	Hyperpigmentation
	0	Female	
(8.1%) 3	2	Male	(Hyperpigmentation (repeated
	1	Female	

The relationship of the type of skin manifestation with gender ($P=0.766$), gestational age ($P=0.252$) and reasons for hospitalization ($P=0.365$) was found to be insignificant, but a statistically significant relationship was observed between type of delivery and type of skin manifestation ($p=0.043$). Furthermore, lanugo and milia were relatively more prevalent in the infants born via C-section while cephalohematoma and syndromic face was more prevalent in those born naturally. Gender ($P=0.556$), gestational age ($P=0.138$), type of delivery ($P=0.414$) and reasons for hospitalization ($P=0.081$) were found not to have a relationship with the pathological status of skin manifestation.

Discussion

The present study explored the prevalence of skin manifestations among the neonates hospitalized in the NICU of Rasoul Akram Hospital in 2014. The male:female ratio was 1.28, which is similar to overall statistics of deliveries in Iran. Preterm infants need more support as they are more vulnerable to respiratory diseases. That is why the majority of NICU beds are assigned to these infants, and also the number of preterm neonates in this study was 1.6 times the number of term neonates. It is also worth mentioning that 77.7% of the subjects were born via C-section. Given that today's nationwide policy is to promote natural delivery and limit C-sections to high-risk cases, the infants born via C-section normally require more respiratory life support compared naturally born infants. In addition, C-section is an aggressive non-physiological method in nature and increases the risk of respiratory and life damages to the infants, which is consistent with the findings obtained in the present study.

RDS and jaundice/anemia were respectively the most common reasons for hospitalization in the NICU. These diseases as a whole contributed to more than 60% of reasons for hospitalization, while combinational causes such as RDS/pneumonia, jaundice/hypoglycemia and sepsis/pneumonia were uncommon. In contrast to previously conducted studies [8-11], a mere 37 cases (9.2%) were found to have skin manifestations. The reason is that the data collection method in the present study was retrospective and profile-based and the patients were not directly examined by the physician, while in other studies, sampling was prospective and the target population was examined by dermatologists and pediatricians. This was impossible in the present study and the number of subjects identified with skin manifestations was therefore lower compared to those in other studies.

The maximum frequency of skin manifestations was respectively related to syndromic face ($n=5$), caput succedaneum and ear nodules ($n=4$ each), while the minimum was observed in contact dermatitis and hyperpigmentation ($n=1$ each). Pathological skin manifestation was observed in 18 cases, the majority of which were syndromic face ($n=5$) and caput succedaneum ($n=4$).

The results obtained indicate that gender, type of delivery, gestational age and reasons for hospitalization had no relationships with having skin manifestations and their pathological status. Furthermore, gender, gestational age and reasons for hospitalization had no significant relationship with the lesion type. Type

of delivery was however found to have a statistically significant relationship with the type of skin manifestation. Lanugo and milia were more prevalent in the infants born via C-section; cephalohematoma and syndromic face were more common in the natural delivery cases. Overall, the prevalence of skin manifestations in the infants born via C-section was higher compared to that in natural delivery cases.

Conclusions

Skin manifestations in the neonates hospitalized in NICUs are found to be less frequent in the present study compared to those in other studies, which can be attributed to the retrospective type of the study using profiles and the lack of direct medical examination of patients. In order to attain more reliable results, more studies are recommended using prospective multicenter sampling of a larger sample size.

Abbreviations

NICU: neonatal intensive care unit

RDS: Respiratory distress syndrome

TTN: Transient Tachypnea of the Newborn

Declarations

Availability of data and materials

The dataset used during the current study will be available from the corresponding author on reasonable request.

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Author's contribution

SM and AM developed research questions and design, collected and managed all data, performed all statistical analysis and interpretation, wrote and edited the text. AM supervised the research process throughout; contributed in the development of research questions, design and methodology, managed all logistics and clinic based activities, advised on analysis and led interpretation of results and was a major contributor in developing the manuscript. SM advised on the approach and methodology, edited and proofread the manuscript substantially. All authors read and approved the final manuscript.

Ethics approval and consent to participate

The study is approved by ethics committee of Mazandaran University of Medical Sciences. Written consent was obtained from participants.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

References

1. Ryan E, Warren L. Birthmarks–identification and management. *Aust Fam Physician*. 2012;41:274-7. www.ncbi.nlm.nih.gov/pubmed/22558616
2. Dohil MA, Baugh WP, Eichenfield LF. Vascular and pigmented birthmarks. *Pediatr Clin North Am*. 2000;47:783-812, v-vi. www.ncbi.nlm.nih.gov/pubmed/10943257
3. Benjamin LT. Birthmarks of medical significance in the neonate. *Semin Perinatol*. 2013;37:16-9. <http://dx.doi.org/10.1053/j.semperi.2012.11.007> www.ncbi.nlm.nih.gov/pubmed/23419758
4. Alper J, Holmes LB, Mihm MC, Jr. Birthmarks with serious medical significance: nevocellular nevi, sebaceous nevi, and multiple cafe au lait spots. *J Pediatr*. 1979;95:696-700. www.ncbi.nlm.nih.gov/pubmed/114614
5. Chaithirayanon S, Chunharas A. A survey of birthmarks and cutaneous skin lesions in newborns. *J Med Assoc Thai*. 2013;96 Suppl 1:S49-53. www.ncbi.nlm.nih.gov/pubmed/23724455
6. Monteagudo B, Labandeira J, Leon-Muinos E, Carballeira I, Corrales A, Cabanillas M, et al. [Prevalence of birthmarks and transient skin lesions in 1,000 Spanish newborns]. *Actas Dermosifiliogr*. 2011;102:264-9. <http://dx.doi.org/10.1016/j.ad.2010.08.001> www.ncbi.nlm.nih.gov/pubmed/21324425
7. Shih IH, Lin JY, Chen CH, Hong HS. A birthmark survey in 500 newborns: clinical observation in two northern Taiwan medical center nurseries. *Chang Gung Med J*. 2007;30:220-5. www.ncbi.nlm.nih.gov/pubmed/17760272
8. Tsai FJ, Tsai CH. Birthmarks and congenital skin lesions in Chinese newborns. *J Formos Med Assoc*. 1993;92:838-41. www.ncbi.nlm.nih.gov/pubmed/7904869
9. Hidano A, Purwoko R, Jitsukawa K. Statistical survey of skin changes in Japanese neonates. *Pediatr Dermatol*. 1986;3:140-4. www.ncbi.nlm.nih.gov/pubmed/3952030
10. Criado PR, Valente NS, Noda A, Belda Junior W. Cutaneous New World Leishmaniasis on a Port-wine stain birthmark. *An Bras Dermatol*. 2014;89:669-70. <http://dx.doi.org/10.1590/abd1806->

4841.20142532 www.ncbi.nlm.nih.gov/pubmed/25054762

11. Wassef M, Blei F, Adams D, Alomari A, Baselga E, Berenstein A, et al. Vascular Anomalies Classification: Recommendations From the International Society for the Study of Vascular Anomalies. *Pediatrics*. 2015;136:e203-14. <http://dx.doi.org/10.1542/peds.2014-3673>
www.ncbi.nlm.nih.gov/pubmed/26055853