MÆDICA - a Journal of Clinical Medicine

STATE OF THE ART

MAEDICA – a Journal of Clinical Medicine
2017; 12(1): 42-47

Newborn Skin: Common Skin Problems

Zekayi KUTLUBAY[a], Ali TANAKOL[a], Burhan ENGİN[a], Ersin SİMSEK[b], Server SERDAROGLU[a], Yalçın TUZUN[a], Erkan YILMAZ[c], Bülent EREN[d]

[a]Dermatology Department, İstanbul, Cerrahpasa Faculty of Medicine, İstanbul University, Istanbul, Turkey
[b]Private Family Physician, Istanbul, Turkey
[c]Blood Bank, Tissue Typing Laboratory; İstanbul, Cerrahpasa Faculty of Medicine, İstanbul University, Istanbul, Turkey
[d]Council of Forensic Medicine of Turkey, Bursa Morgue Department, Bursa, Turkey

ABSTRACT

The newborn skin can be separated from adult's skin in several ways. In dermatologic examination it can be easily observed that it is thinner, less hairy and has less sweat and sebaceous gland secretions. These differentiations present especially in preterm newborns. Their skin is exposed to mechanical trauma, bacteria and weather, heat alterations. At birth, newborn skin is protected by the coverage of vernix caseosa, which has lubricating and antibacterial features and its pH ranges from 6.7 to 7.4. Beneath the vernix caseosa the skin has a pH of 5.5-6.0. In newborn dermatologic examination it is very important to distinguish transient benign dermatoses and severe diseases, make early diagnosis and treat congenital skin disorders. Although the benign cases are common in this life period, clinical presentations can be much more exaggerated, dramatic and cause a great deal of anxiety to parents. Therefore, as a doctor, knowing the dermatological, pathological and non-pathological common skin rashes guides the family in the right direction, offers advice to reduce uncertainty and time for the treatment of severe conditions and builds a confidential doctor-patient relationship.

In this review, our aim is to provide a general overview to common skin rashes in newborn period.

Keywords: newborn, common skin rushes, innocent, pathologic, congenital

INTRODUCTION

Rashes are extremely common in newborns. During the first four weeks of life, the newborn period includes various dermatologic skin problems. Most of them are innocent and transient. However, serious infectious, congenital skin diseases and sometimes malign tumors should be taken into consideration. Neonatal skin lesions are common. Differentiation of the nonsignificant conditions from more serious clinical entities is important (1, 2). Infants with unusual presentations or signs of systemic illness should be evaluated for Candida, viral, and bacterial infections. Milia and miliaria result from immaturity of

Address for correspondence:
Bülent Eren, MD, Pathologist, Forensic Medicine Specialist, Associate Professor, Director of Bursa Morgue Department, Council of Forensic Medicine of Turkey Bursa Morgue Department, Esra Sok No: 4, Üçevler, Nilüfer 16120, Bursa, Turkey
Phone:+90 224 222 03 47, Fax:+90 224 225 51 70
Email: drbulenteren@gmail.com

Article received on the 26th of January 2017 and accepted for publication on the 10th of March 2017.

skin structures. Nearly all of these skin rashes are a serious concern for parents and may result in visits to the physician or questions during routine newborn examinations.

Transient Vascular Phenomena

A central erythema can be inspected during the first hours of life; the extremities tend to be much redder. By crying or heat loss, acral parts become symmetrically blue in color, without any other cutaneous changes including edema. This bluish discoloration named 'Acrocyanosis' fades away characteristically with warming of the extremities or when the newborn stops crying. It should be differentiated from central cyanosis, which is associated with cardiovascular and respiratory system diseases. Etiopathogenesis is related to vasomotor instability and immaturity (1, 2). *Cutis marmorata* can be detected during the first 2-4 weeks of life. It is also a physiological response to temperature changes like acrocyanosis. The clinical feature with red blue reticulated cyanosis of trunk and extremities can help in diagnosis (Figure 1). Pathogenesis is based on immature autonomic control of the vascular plexus. Persistent cases are together with trisomy 18, Down syndrome, hypothyroidism, Cornelia de Lange Syndrome and congenital heart disease. Both patterns did not set on after 1 month of age. *Cutis marmorata* is more common in preterm infants, although acrocyanosis is rare in preterm newborns (1). Harlequin color change is a transient erythema covering half of the newborn's body surface with a vertical pronounced demarcation line and usually occurs in the first week of life, continues up to 20 minutes and can repeat in the first three weeks. According to position, pressure creates erythematous areas, while the other parts are observed as pale. Harlequin color change is also a benign entity and it is more common in preterm neonates.

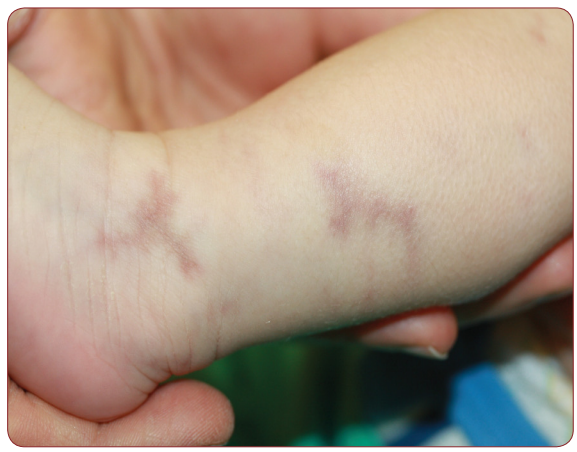

FIGURE 1. Pinkish blue marbled macules are seen on the left lower limb

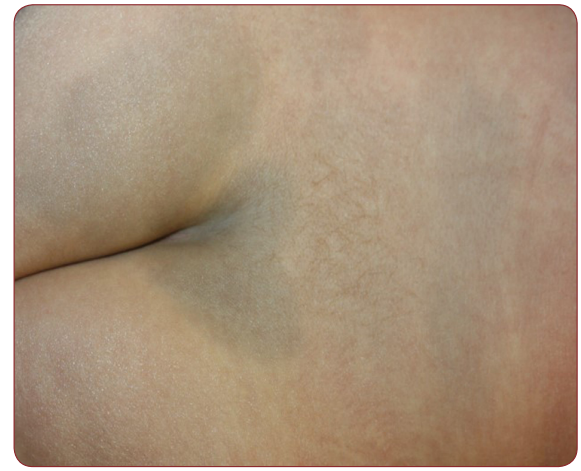

FIGURE 2. Blue-gray macule on the sacral region is characteristic for the Mongolian spot

Neonatal desquamation is another common skin problem of the newborn that usually occurs on hands, feet and ankles. If eruptions are widespread, it should be distinguished from ichthyosis vulgaris and continual peeling syndrome. This benign condition is also accompanied by post maturity. The Mongolian spot is mostly blue gray or blue green congenital patch over the sacrogluteal area (Figure 2). A specific therapy is not required and lesions fade in 3-5 years, while they expand in the first year of life. The etiology is not completely understood, but the melanocytes migration from the neural crest through the epidermis crest is interrupted (1, 2). Salmon Patch is another innocent rash occurs as a result of capillary vascular malformation. It is named either 'Angel Kiss' or 'Stork Bite' according to location – on the forehead or nape, respectively. The lesions fade in early childhood. A further laser therapy can be used if the lesions persist into adulthood (1).

Erythema Toxicum Neonatarum

Erythema toxicum neonatorum is a benign, self-limited, asymptomatic skin condition that only occurs during the neonatal period. It is one of the most common innocent and self-limited skin rashes mainly in full-term newborns. The condition affects 30-70% of the newborns. The typical newborn with erythema toxicum neonatorum has an average birth weight and is born at term (6).

The etiology of erythema toxicum neonatorum remains unknown. Increased, ground-substance viscosity in neonatal skin, with associated trauma can lead to eosinophilic inflammation within the skin. Self-limited, acute, cutaneous, graft-*versus*-host reaction caused by maternal lymphocytes in the relatively immunosuppressed fetal circulation can also be lamed in aetiopathogenesis (7). Erythematous lesions with central papule or pustule tend to locate on the face, trunk and proximal extremities. The lesions are usually surrounded by a distinctive diffuse, blotchy, erythematous halo (8). Clinical findings are mostly enough for the diagnosis. However, histopathological research is required sometimes. Pathologic specimen includes eosinophils and 15-20% of patients have circulating eosinophils in the peripheral blood (1, 9, 10). The condition requires no treatment. It typically resolves within two weeks after birth. If it does not follow the usual course, prompt consultation with a pediatric dermatologist is advised.

Transient Neonatal Pustular Melanosis

Transient neonatal pustular melanosis is a benign idiopathic skin condition. This transient skin disorder occurs especially in black newborns and occurs at birth. The eruptions locate on the forehead, neck, upper chest, sacrum, chest and thighs (11). On the skin they appear as small vesicles, superficial pustules, and pigmented macules which disappear by five days of age and resolute with fine white collarets of scale. In mostly post mature infants, there are only pigmented macules without any vesicles or pustules (12). The pigmented macules disappear approximately up to three months (1, 13). Transient neonatal pustular melanosis is a self-limited skin eruption with no associated mortality or morbidity. No systemic symptoms are associated with the skin lesions of transient neonatal pustular melanosis. No specific therapy is necessary for transient neonatal pustular melanosis (14).

Acropustulosis of Infancy

Acropustulosis of infancy or infantile acropustulosis is a recurrent, self-limited, pruritic, vesicopustular eruption of the palms and the soles occurring in young children. Palms and soles are the main localizations of the disease (15). Lesions continue typically 1-3 weeks prior to remission period which lasts 1-3 weeks. During the active phase, pruritus is the main complaint. The etiology remains unknown, but the scabies infestation may trigger the onset of the lesions in some infants (1). Many cases of infantile acropustulosis are preceded suspected scabies infestation, and a scabies id reaction has been suggested (16). Bacterial and viral culture results are consistently negative. The most recently recognized cause of infantile pustulosis is a deficiency of interleukin 1 receptor antagonist, resulting in unopposed action of interleukin 1 and life-threatening systemic inflammation (17). Children are irritable, and obviously uncomfortable, but otherwise healthy. Children have been empirically treated with antiscabies ointments prior to presentation (18). Treatment is often unnecessary because of the self-limited nature of the condition. Topical corticosteroids and oral dapsone have been used successfully. Oral antihistamines may be useful in severe itching diseases (17, 18).

Neonatal Acne

Neonatal acne presents within the first 30 days of life. It is generally a transient benign statement. However in severe cases, which do not resolve, an androgenic excess should be taken in consideration. Etiology based on androgen effect that causes sebaceous gland hyperplasia. Neonatal acne must be distinguished from infantile acne. Infantile acne tends to be more pleomorphic and inflammatory than the neonatal one (19). Recent studies show that the colonization of *Malassezia* spp. can be related to neonatal acne. It typically consists of closed comedones on the forehead, nose and cheeks, although other locations are also possible. Open comedones, inflammatory papules, and pustules can also develop. A treatment is not especially recommended, but infants can be treated with a 2.5% benzoyl peroxide lotion if lesions are extensive and persist for several months (20). Severe neonatal acne accompanied by other signs of hyperan-drogenism should prompt an investigation for adrenal cortical hyperplasia, virilizing tumors. The lesions fade away within 1-3 months (10, 13).

Milia

Common skin rush in newborn is seen with yellow/white small superficial cysts. Milia occur in nearly half of healthy newborns and are typically present at birth, although their onset may be delayed in premature neonates (21). Milia are be-

nign, keratin-filled cysts. Milia arise on facial skin bearing vellus hair follicles and arise from the lower infundibular sebaceous collar of the vellus hair (22). Milia affect 40-50% of healthy newborns. Infants born prematurely are less commonly affected. No racial predilection is observed. Physical examination shows tiny papules on newborn facial skin. This lesion originates from the pilosebaceous unit, keratin retention being the main cause. Normally lesions resolve within first few weeks, but they sometimes last and spread throughout the whole body. These cases are related to the oral-facial-digital syndrome and hereditary trichodysplasia (Marie Unna hypotrichosis). Multiple lesions occurring on the trauma areas such as hands knees and feet are important for the mild variant of scarring epidermolysis bullosa as a miscellaneous diagnosis (1, 2, 5). Milia are easily diagnosed on clinical findings alone. Histologic examination reveals small cysts lined by stratified squamous epithelium and central keratinous material. Treatment of milia is not necessary as these lesions have a tendency to spontaneously resolve (23).

Miliaria

The keratinous plugging of the eccrine ducts causes the rupture of the duct and leakage of sweat into epidermis and dermis. Both milia and miliaria result from the immaturity of skin structures, but they are clinically distinct entities. Miliaria affects up to 40% of infants and usually appears during the first month of life (24). Clinical findings are correlated with the level of obstruction. The most common type in newborns is *miliaria crystalline*, which is characterized by tiny non-inflammatory vesicles in the eccrine gland ducts at the level of stratum corneum degree; its major localizations are the intertriginous areas such as the neck axillae cloth-covered truncal areas regions. It consists of 1 to 2 mm vesicles without surrounding erythema. Each vesicle evolves with rupture followed by desquamation, and may persist for hours to days. Miliaria rubra is characterized by the small secondary inflammatory papules and pustules. Obstruction in this type of miliaria occurs in mid epidermis. Clinical findings are mostly on the forehead, upper trunk, volar aspects of the arms and covered parts of the skin. In order to avoid sweat retention, minimizing of overheating is the best prevention method (5, 13, 25).

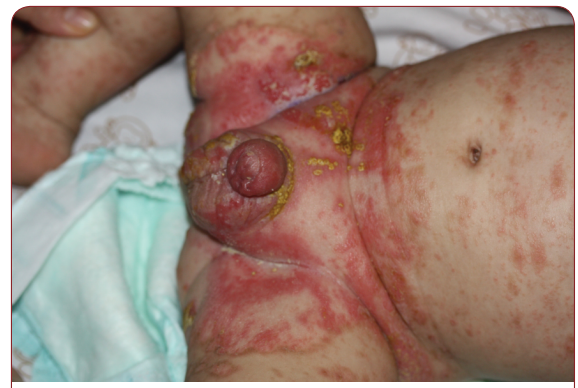

FIGURE 3. Crusted erythematous papules and plaques are noticed on the diaper region

Diaper Dermatitis

The term diaper dermatitis includes all eruptions that occur in the area covered by the diaper. It generally refers to irritant chronic contact dermatitis (26). Diaper dermatitis, considered the most common skin disorder of infancy in the United States, accounts for more than one million clinic visits per year (27). There are several causes for maceration of the skin such as urine enzymes, wiping, rubbing and stool. The most important factor is wetness of the diaper area. Due to wetness, barrier function of the skin is destroyed and penetration of irritants becomes easier. *Candida albicans* may be isolated in up to 80% of infants with perineal skin irritation. Infection occurs generally 48-72 hours after irritation (28). Diaper dermatitis is a mostly self-limited disorder that disappears within three days. Irritant contact dermatitis begins as acute erythema on the convex skin surfaces of the pubic area and buttocks, with sparing of the skin folds, reflecting the areas of the body in most contact with the diaper (26). The clinical findings are red macules papules, plaques and vesicles in the warm moist areas especially inside the diaper (Figure 3). Resistant rushes are related to chronic irritants or secondary infection with yeast or bacteria (1). When bacterial infection is superimposed, superficial erosions, yellow crusts and impetiginization are seen. The first treatment step is to use a barrier with minimal ingredients to avoid potential irritants or sensitizers. Topical antifungal agents can be used too (26).

Dimpling

One of the most commonly seen minor anomalies occurs on the sacral skin region. Generally,

dimpling is a cosmetic problem. However, when deep dimples or sinus tracts involve the lumbosacral spine, further visualizing methods – such as ultrasound during the first six months, followed by magnetic resonance imaging and computed tomography – should be used to exclude malformations (1).

Umbilical Granulomas

Umbilical granulomas occurs in the first weeks of life after the umbilical cord detaches. Normally umbilical cord area heals with epithelization without any excessive scar tissue. Granulation tissue may persist at the base of the umbilicus after cord separation; the tissue is composed of fibroblasts and capillaries and can grow to more than 1 cm. However, moisture and secondary infections create an excessive granulation tissue that can be reduced by Silver nitrate cauterization or repeated isopropyl alcohol application; they produce variable amounts of drainage that can irritate the surrounding skin (29). An umbilical polyp is brighter red as compared to a granuloma and represents retained intestinal or gastric mucosa from the vitelline duct. It is important to distinguish umbilical granuloma from the umbilical polyps which derivate from the omphalomesenteric duct or urachus, and surgical separation should be performed (1). Small umbilical granulomas usually respond to silver nitrate application. One or more applications may be needed. Care must be taken to avoid skin contact. Silver nitrate can cause painful burns. Large umbilical granulomas or those that persist after Silver nitrate treatment require surgical excision (30).

Collodion Baby

Collodion babies are often premature and transparent thick membrane encasing the newborn presents at birth that peels within 2-3 weeks. Desquamation prompts to thermal regulation difficulties and secondary infections. 60-70% of the cases tend to develop congenital ichthyosiform erythroderma. As differential diagnosis, harlequin baby should be thought. It is a severe variant of ichthyosis with thickened stratum corneum with deep cracks and fissures (1).

Neonatal Pemphigus

Neonatal pemphigus is a rare autoimmune blistering disease (31). It is characterized by flaccid blisters on the skin and, in contrast to pemphigus vulgaris, rarely mucous membranes (32). Pemphigus vulgaris patients receiving severe treatments rarely become pregnant, so neonatal pemphigus is an unusual condition. On the other hand, pemphigus vulgaris is usually seen in patients with an older age. Direct immunflourescence shows transplacental IgG autoantibodies against Desmoglein-3 that is considered to be the main reason of neonatal pemphigus (33). Some cases were reported as stillborn (34).

A further treatment was not necessary. Within three weeks the eruption fades away (35). ❑

CONCLUSION

Miscellaneous diagnosis of common skin rushes of newborns are congenital disorders, infectious diseases, which are mostly recognized by dermatologists. Hence, the first step in clinical examination should be the recognition of benign cases, which are transient, but distress parents. In order to create a reliable doctor-patient relationship, detailed advice that includes transient innocent cases is required. Subsequently, if there is any doubt about an abnormal condition, dermatology consultation is the best option. ❑

Conflict of interests: none declared.
Financial support: none declared.

References

1. **Cohen BA.** Neonatal dermatology. In: *Pediatric Dermatology*. Cohen BA, Editor, 3rd Ed. Philadelphia: Elsevier Mosby; 2005, pp. 15-16.
2. **Chang MW, Orlow SJ**. Noenatal, pediatric and adolescent dermatology. In: *Fitzpatrick's Dermatology in Medicine*. Eds. Freedberg IM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA Katz SI. 6th ed. New York, McGraw-Hill Co, 2003;1366-1386.
3. **Öztürkcan S.** Yenidoğan derisinin fizyolojik özellikleri. *Dermatose* 2003;2:202-208.
4. **Wagner AM, Hansen RC.** Neonatal skin and skin disorders. In: *Pediatric Dermatology*. Eds. Schachner LA, Hansen RC. 2th Ed. New York, Churchill Livingstone

Inc., 1995;263-347.
5. **Taieb A, Boralevi F.** Common Transient neonatal dermatoses. In: *Textbook of Pediatric Dermatology*. Eds. Harper J, Oranje A, Prose N, 2th ed, Oxford, Blackwell Publ 2006;55-66.
6. **Carr JA, Hodgman JE, Freedman RI, Levan NE.** Relationship between toxic erythema and infant maturity. *Am J Dis Child* 1966;112:129-134.
7. **Bassukas ID.** Is erythema toxicum neonatorum a mild self-limited acute cutaneous graft-versus-host-reaction from maternal-to-fetal lymphocyte transfer? *Med Hypotheses* 1992;38:334-338.
8. **Tarang G, Anupam V.** Incidence of vesicobullous and erosive disorders of neonates. *J Dermatol Case Rep* 2011;5:58-63.
9. **Tüzün Y, Zahmacıoğlu Z.** *Newborn temporary skin symptoms*. *Pediatric Dermatology*. Eds. Tüzün Y, Kotoğyan A, Serdaroğlu S, Çokuğraş H, Tüzün B, Mat MC. 1. Ed. İstanbul, Nobel Kitabevi, 2005;43-52.
10. **PekcanYaşar Ş, Mansur T.** Newborn skin physiological findings. Türkiye Klinikleri *J Pediatr* 2005;14:184-192.
11. **Van Praag MC, Van Rooij RW, Folkers E, Spritzer R, Menke HE, Oranje AP.** Diagnosis and treatment of pustular disorders in the neonate. *Pediatr Dermatol* 1997;14:131-143.
12. **Wagner A.** Distinguishing vesicular and pustular disorders in the neonate. *Curr Opin Pediatr* 1997;9:396-405.
13. **Eichenfield L, Larralde M.** In: *Neonatal skin and skin disorders. Pediatric Dermatology,* Eds. Schachner LA, Hansen RC. 3th Ed. London, Mosby. 2003:205-262.
14. **Mengesha YM, Bennett ML.** Pustular skin disorders: diagnosis and treatment. *Am J Clin Dermato*l 2002;3:389-400.
15. **Zuniga R, Nguyen T.** Skin conditions: common skin rashes in infants. *FP Essent* 2013;407:31-41.
16. **Mancini AJ, Frieden IJ, Paller AS.** Infantile acropustulosis revisited: history of scabies and response totopical corticosteroids. *Pediatr Dermatol* 1998;15:337-341.
17. **Minkis K, Aksentijevich I, Goldbach-Mansky R, et al.** Interleukin 1 receptor antagonist deficiency presenting as infantile pustulosis mimicking infantile pustular psoriasis. *Arch Dermatol* 2012;148:747-752.
18. **Truong AL, Esterly NB.** Atypical acropustulosis in infancy. *Int J Dermatol* 1997;36:688-691.
19. **Serna-Tamayo C, Janniger CK, Micali G, Schwartz RA.** Neonatal and infantile acne vulgaris: an update. *Cutis* 2014;94:13-16.
20. **O'Connor NR, McLaughlin MR, Ham P.** Newborn skin: Part I. Common rashes. *Am Fam Physician* 2008;77:47-52.
21. **Sachdeva M, Kaur S, Nagpal M,** Dewan SP. Cutaneous lesions in new born. *Indian J Dermatol Venereol Leprol* 2002;68:334-337.
22. **Honda Y, Egawa K, Baba Y, Ono T.** Sweat duct milia--immunohistological analysis of structure and three-dimensional reconstruction. *Arch Dermatol Res* 1996;288:133-139.
23. **Nguyen NV.** Pediatric Milia. http://emedicine.medscape.com/article/910405-overview. 2016
24. **Feng E, Janniger CK.** Miliaria. *Cutis* 1995;55:213-216.
25. **Atherton DJ, Gennery AR, Cant AJ.** The Neonate. In: *Rook's Textbook of Dermatology*. Eds. Burns T, Breathnach S, Cox N, Griffiths C. 7th Ed, Oxford, Blackwell Publ 2004;14.1-14.86.
26. **Serdaroglu S, Ustunbas TK**. Diaper Dermatitis (Napkin Dermatitis, Nappy Rash). *J Turk Acad Dermatol* 2010;4:04401r.
27. **Nield LS, Kamat D.** Prevention, diagnosis, and management of diaper dermatitis. *Clin Pediatr* 2007;46:480-486.
28. **Berg RW, Buckingham KW, Stewart RL.** Etiologic factors in diaper dermatitis: the role of urine. *Pediatr Dermatol* 1986;3:102-106.
29. **Pomeranz A.** Anomalies, abnormalities, and care of the umbilicus. *Pediatr Clin North Am* 2004;51:819-827.
30. **Nagar H.** Umbilical granuloma: a new approach to an old problem. *Pediatr Surg Int* 2001;17:513-514.
31. **Atherton DJ, Gennery AR, Cant AJ.** The neonate. In: Burns T, Breathnach S, Cox N, Griffiths C (eds). *Rook's Textbook of Dermatology*, 7th ed, Blackwell Science, Massachusetts, 2004;14.1-14.19.
32. **Yasukawa N, Yasuda M, Urabe H.** [Pemphigus in mother and child.] Nishinihon *J Dermatol* 1973;35:435-441.
33. **Sameera BKI, Yashodhara BM, Shashikiran U.** Pemphigus vulgaris in a pregnant woman and her neonate. *BMJ* 2012;2013:1-5.
34. **Wasserstrum N, Laros RK.** Transplacental transmission of pemphigus. *JAMA* 1983;249:1480-1482.
35. **Walker DC, Kolar KA, Hebert AA, Jordon RE.** Neonatal pemphigus foliaceus. *Arch Dermatol* 1995;131:1308-1311.