Neonatal Dermatosis

33

Ana Elisa Kiszewski

Key Points Summary

- Almost all newborns present some transient neonatal dermatosis or birthmarks
- The most prevalent transient dermatoses are milia, sebaceous gland hyperplasia, and toxic erythema
- The most prevalent birthmarks are Mongolian spots and salmon patch
- Detecting neonatal dermatoses is important because it allows parents to make adequate decisions regarding treatment
- Environmental and ethnic factors may significantly influence some neonatal transient dermatosis and birthmarks
- Some neonatal dermatoses are present in the first day of life, whereas others appear in the first weeks of life; this may justify, in part, the variation in frequency of these dermatoses found among different studies

Introduction

Directly after birth, the neonatal skin presents particular characteristics that help the transition from the fluid intrauterine environment to the gaseous and dry environment in which we live. The skin is essential for mechanical and immunologic protection, thermoregulation, and maintenance of a barrier that prevents loss of body fluids. Almost all newborns present some physiologic alteration, transient skin lesion, or birthmarks [1]. When examining oral mucosa and skin, the incidence of transient skin lesions may reach 99.3% [2]. Skin lesions are variable; they may result from a temporary physiologic reaction or may represent potentially serious dermatosis or a temporary or permanent skin spot [3]. Detecting neonatal dermatosis is important because it allows parents to make adequate decisions regarding treatment, if needed. Didactically, it is possible to classify neonatal dermatoses into the following categories:

Transient: Physiologic desquamation, vernix caseosa, suction blister, physiologic cutis marmorata, harlequin color, generalized redness, lanuginosa hypertrichosis, mini puberty, mucous cyst (Epstein pearls and Bohn nodules), milia, miliaria, sebaceous gland hyperplasia, suction blister, toxic erythema, neonatal acne, neonatal cephalic pustulosis, infantile acropustulosis.

A.E. Kiszewski, MD, PhD
Dermatology Service of UFCSPA, Federal University of Health Sciences of Porto Alegre, Porto Alegre, Brazil
e-mail: kiszewski@gmail.com

R.R. Bonamigo, S.I.T. Dornelles (eds.), *Dermatology in Public Health Environments*,
https://doi.org/10.1007/978-3-319-33919-1_33

Birthmarks: Pigmented: Mongolian spots, café-au-lait spots, congenital melanocytic nevus; vascular: salmon patch, congenital hemangioma (rapidly involuting and noninvoluting congenital hemangiomas), infantile hemangioma (precursor lesion), capillary vascular malformation (port-wine stain).

Several prospective studies performed in different continents (Americas, Europe, Asia, and Oceania) investigated the incidence of dermatosis in newborns. Despite the considerable variation observed among countries, the most prevalent transient dermatoses were milia, sebaceous gland hyperplasia, and toxic erythema. Among birthmarks, Mongolian spots and salmon patch were the most prevalent. When taking into account ethnic factors, studies indicated that Mongolian spots, genital hyperpigmentation, and transient neonatal pustular melanosis (TNPM) were more frequent in Africans. On the other hand, palatine cyst, salmon patch, and toxic erythema were more prevalent in Caucasians [1, 2, 4]. Furthermore, when taking into account environmental factors, a greater number of newborns with miliaria were found in countries where high temperatures are predominant, whereas newborns exposed to lower temperatures have greater frequency of acrocyanosis and physiologic cutis marmorata [5].

Physiologic Aspects of Newborn Skin

The newborn presents at birth a skin structure similar to that of an adult; it is divided into three layers (epidermis, dermis, and subcutaneous cellular tissue) and already presents cutaneous annexes. However, the dermis is thinner (40–60% less than that of an adult), the dermoepidermal junction is more fragile, and the collagen fibers are smaller. The vascular and nervous structures are immature, and the sweat glands only become functional from the third week of life owing to the newborn's immature autonomic nervous system. Sebaceous secretion increases during the first month of life, since the gland is stimulated through the mother's hormones [3, 6, 7]. In addition, the lower the gestational age, the greater the immaturity of the skin barrier, resulting in greater transepidermal water loss, greater permeability, and higher risk of absorption of substances applied over the skin [6].

The newborn's skin is sterile at birth; however, directly after birth it becomes colonized by coagulase-negative *Staphylococcus*, in particular *Staphylococcus epidermidis*. Other genera such as *Micrococcus*, *Peptococcus*, *Coryneobacterium*, *Propiniobacterium*, and *Streptococcus* will later become part of the resident microbiota, appearing gradually weeks after birth. The average skin pH at birth is 6.34; however, after a few days this decreases to 4.95 [6, 8]. Maintenance of an acidic skin pH is part of the defense system of the body to prevent the penetration of microorganisms. Most newborns remain at the hospital for only a short period and therefore do not acquire nosocomial microbiota. Nevertheless, newborns who are hospitalized, in particular those in the intensive care unit, may become colonized by pathogenic bacteria such as *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Serratia* spp., and *Acinetobacter* spp. [6 , 8].

Dermatosis

Vernix Caseosa

Vernix caseosa is a biofilm synthesized by the newborn during the last quarter of gestation and covers most of the body surface directly after birth. It is a white, greasy substance comprising epithelial cells, sebum, and sometimes lanugo. In the intrauterine environment, vernix forms a protective barrier for the fetus against the maceration effect of the amniotic fluid, in addition to having antibacterial function. The lubrication function of vernix is very important because it facilitates the passage of the fetus through the birth canal. In addition, after birth it functions in the thermal control of the newborn [3]. Vernix color may reflect a potential intrauterine problem, with brownish yellow color being

frequent in post-term babies and greenish color being associated with fetal distress or hemolytic disease. Vernix may be colonized by bacteria during intrauterine infections, in which case it acquires a characteristic foul smell, which is a symptom of neonatal sepsis. Meconium is a secretion produced by fetal intestine, and when excreted in the amniotic fluid may be a sign of fetal distress. Meconium has a dark green color and may impregnate the vernix, skin, nails, and the umbilical cord [6, 7]. In a study carried out in India, vernix caseosa was found in 92.8% of full-term newborns, 5.9% in preterm newborns, and 1.5% in post-term newborns [9].

Physiologic Desquamation

Physiologic desquamation is a thin, furfuraceous desquamation, observed with greater frequency on the hands and feet during the first 2 weeks of life. The frequency of physiologic desquamation is greater between the 40th and 42nd weeks of gestation [6]. Few studies have evaluated the incidence of physiologic desquamation in newborns [1]. Haveri and Inamadar [9] observed that physiologic desquamation was present in 92.3% of full-term newborns, 4.7% in preterm newborns, and 2.88% in post-term newborns. Other studies showed that the frequency of physiologic desquamation varied between 40% and 65% of neonates in India and Australia, respectively [2, 5]. Zagne and Fernandes [10] found that physiologic desquamation was more prevalent in newborns born through cesarean section (24.7%, $p < 0.05$). They also reported that newborns presenting with a greater amount of vernix caseosa at birth were subsequently predisposed to greater desquamation.

Generalized Redness and Acrocyanosis

Redness and acrocyanosis in newborns are physiologic findings that represent vasomotor instability. The redness is persistent hyperemia in the first hours or days of life and reflects peripheral vasodilation in addition to excess circulating hemoglobin. It tends to disappear along with the physiologic decrease in hemoglobin levels [3, 7]. The extremities (hands and feet) may present with a bluish color when the baby cries, breastfeeds, or feels cold, a phenomenon called acrocyanosis. This phenomenon appears to be associated with the increase in tonus of peripheral arterioles, which produces arteriolar vasoconstriction with secondary dilation of the venous vessels [8].

Physiologic Cutis Marmorata

Cutis marmorata is a phenomenon that occurs with greater frequency in newborns with fair skin [10]. It is characterized by the presence of reticulated, erythematous, violet-colored skin that affects the upper body and extremities of the newborn when he or she is cold. The phenomenon has no pathologic significance and disappears quickly when the baby is warmed. In some patients with more exuberant and persistent lesions, differential diagnosis should be performed for cutis marmorata telangiectatica congenita, and capillary vascular malformation [3].

Lanugo

Lanugo is thin hair with little pigmentation and without medulla. Before birth the fetus is covered with lanugo, which usually appears during the second quarter of gestation and may be seen in preterm babies [6]. This lanugo falls during the third quarter of gestation and is replaced by shorter lanugo, still during the intrauterine period, and may cover most of the newborn's body. Lanugo is more frequent in non-Caucasian newborns, and the most common locations are the face, shoulders, posterior trunk, auricular pavilions and scalp [3, 6, 8]. After birth, the first synchronized shedding of lanugo starts after the second week of life and lasts until the third month, beginning on the frontoparietal region and ending on the occipital region. Lanugo hair will be replaced by vellus hair, in the body, while terminal hair will grow from the

scalp. After the third month of life lanugo on the scalp will be replaced by vellus and terminal hair, which lengthens and falls between 12 and 24 months of life, and after this shedding, most of hair will be terminal in the scalp. During the first year of life occurs the transitioning from a synchronized shedding model to a model in which each follicle has its own rhythm [6]. Most studies do not mention the frequency of presence of lanugo in newborns. In two studies, this frequency varied from 25.7% to 35.3% [9, 11].

Mini Puberty

Mini puberty results from the hormonal transference of mother's hormones to the newborn through the placenta [7], and occurs in both male and female newborns. It includes hyperpigmentation of the genitals and the medium line and increased mammary turgescence in male and female infants; sometimes it includes lactic secretion, popularly known as "witch milk." The mammary ingurgitation decreases at the end of the second week of life and tends to disappear in the first month; it is discreet or absent in preterm newborns. The action of testosterone on the skin may result in hyperplasia and increased secretion of sebaceous glands, similar to what occurs in puberty. In girls the genitals become edematous, the clitoris may be increased in size and enclosed, and vaginal discharge may occur (which may be mucoid or a mucus-bloody discharge). In boys the testicles are also increased in size [8]. Two studies performed in India found a frequency of 5.6–13.3% in newborns [5, 9].

"Harlequin" Color

Harlequin color refers to the different hemicorporal color in newborns, secondary to a vascular phenomenon, resembling harlequin clothes. It results from a transient deficiency in the central regulation of the peripheral vascular tone (vasomotor immaturity). Erythema (vasodilation) occurs on the side on which the baby is lying, and pallor (vasoconstriction) occurs on the other side of the body [6, 7]. The face and genitals are not affected. The harlequin color may last a few seconds or minutes (20 min or more) and disappears after changing the position or warming the body of the newborn [3]. This vascular phenomenon does not present a risk to newborns, usually disappearing after the third week of life. It is estimated to occur in 0.4–15% of newborns; however, there is a lack of studies that assess this characteristic [7, 9].

Suction Blisters

These are blisters with serous content (surrounded by normal skin), erosions, or scabs up to 2 cm in diameter that may be present at birth or subsequently, and are due to vigorous oral suction by newborns on a site [3, 12]. The prevalence has not yet been defined, but two studies detected blisters caused by suction in 1% and 9.8% of newborns in Brazil and Australia, respectively [2, 10]. The blisters are located on the radial side of the forearms, fists, hands, fingers, or any other part of the body that the baby's mouth can reach. It resolves spontaneously and without sequelae [3, 8]. The use of topical antibiotics on erosions is recommended to avoid secondary infections [8, 12].

Gingival and Palatine Epidermal Cyst

As many studies on the prevalence of dermatoses in newborns do not focus on the oral cavity, the frequency among different populations is unknown. Some studies have detected gingival and palatine epidermal cysts in 61–64% of newborns [1, 3, 5]. These are benign cysts considered to originate during epidermal enclosure. They are called Epstein pearls or papules when they form in the transition between the hard and soft palate, on the midline [10]. The frequency of Epstein pearls varies from 54% to 89% [1, 9, 11]. These are single or multiple yellowish white papules, varying from 1 to 2 mm in diameter. They are considered the equivalent of milia mucosa and are called Bohn nodules when the cysts are located in the gums [3, 6].

Milia

Milia are white, millimeter-sized cysts (1–2 mm) found mainly on the face and scalp of newborns, and may exist as single or multiple cysts [12]. The areas most affected are the nose, cheeks, mentum, and forehead. In most cases the lesions disappear spontaneously after the first month of life but in some infants may remain until the third month of life. Histologically, milia comprise cysts of epidermal enclosure at the infundibulum of the pilosebaceous follicle and contain many concentric layers of keratinized stratum corneum. Treatment is not required because milia usually disappear spontaneously in the first months of life [3]. Incidence varies, with 7.5% in Iran, 8% in the United States, and 86% in Australia [3, 9, 11].

Miliaria

Miliaria is a common dermatosis during the neonatal period and may manifest as miliaria rubra or crystallina (Fig. 33.1). It is caused by the obstruction of the excretory duct of the eccrine sudoriferous glands, which may lead to the rupture of the ducts [13]. It occurs more frequently in children born in countries with tropical weather [6, 12]. In a study from India, miliaria crystallina was present in 3% of newborns, 76.6% of whom were full-term infants [9]. Miliaria was present in 1.3% of newborns in Iran [11] and in 2% of newborns in Brazil [10]. Clinically, miliaria rubra is characterized by multiple erythematous papules, with punctiform shape, in regions with greater concentration of eccrine sudoriferous glands as well as intertriginous areas such as the scalp, face, and upper body [12]. In miliaria crystallina, the lesions resemble water droplets on the skin; they burst easily and comprise sweat droplets trapped in the corneal layer [13]. From the histopathologic viewpoint, miliaria rubra shows spongiosis and formation of vesicles inside the eccrine duct, whereas miliaria crystallina shows intracorneal and subcorneal vesicles [12].

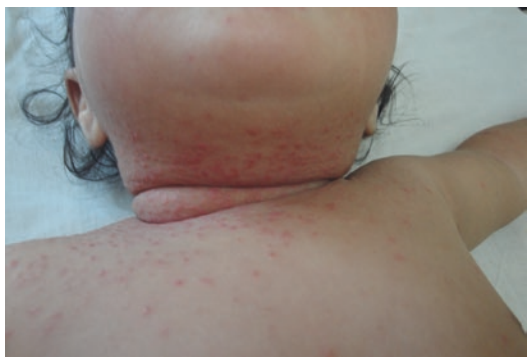

Fig. 33.1 Miliaria

Hyperplasia of Sebaceous Glands

This dermatosis comprises yellowish papules that result from the dilation of sebaceous glands in the cheeks and nasal, frontal, and perioral regions. It tends to recede spontaneously in the first weeks of life [6]. The relation between these lesions and gestational age, sex, or ethnic group remains unclear. Hyperplasia of sebaceous glands is frequently associated with milia. Sebaceous hyperplasia occurs during the last month of gestation, as a result of the stimulation of the pilosebaceous follicles by maternal androgens, resulting in an increase in the number and volume of sebaceous glands. From the epidemiologic viewpoint, its frequency varies among studies, with reports of 30% of newborns in India, 42.6% newborns in the United States, 43.7% of newborns in Iran, 60% of newborns in Mexico, and 75% of newborns in Spain being affected [1, 11, 14].

Neonatal Acne

Neonatal acne is characterized by the appearance of open or closed comedones, associated or not with papules and pustules that may occur from the first weeks until the third month of life (Fig. 33.2). It is more frequent on the cheeks, mentum, nose, and scalp [6]. Lesions result from the stimulation of sebaceous glands by maternal

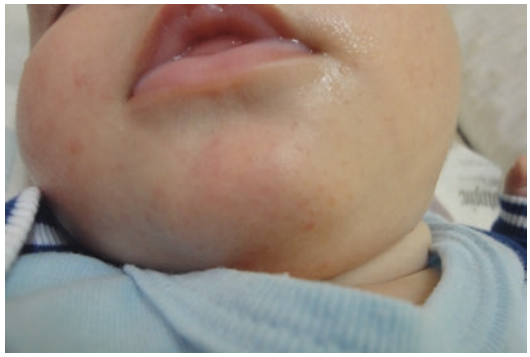

Fig. 33.2 Neonatal acne

and newborn androgens. It may either recede or progress to infant acne [6, 12, 13].

Neonatal Cephalic Pustulosis

Neonatal cephalic pustulosis is a cutaneous eruption comprising inflammatory papules and pustules affecting the face and scalp of newborns in the first weeks of life (Fig. 33.3). Characteristically there are no comedones. Some authors consider it a manifestation of a primary infection caused by *Malassezia sympodialis* [3, 15, 16]. Others suggest that *Malassezia* spp. may be involved in the etiopathogenesis of neonatal acne and neonatal cephalic pustulosis [6, 13]. The lesions disappear spontaneously after 4 weeks of life.

Toxic Erythema

Toxic erythema is a benign and self-limited condition that appears in the first days of life [6]. Its clinical manifestation is a maculopapular eruption comprising white or yellowish papules, 1–3 mm in diameter, on the erythematous macula (Fig. 33.4). The lesions occur most frequently on the anterior and posterior areas of the upper body, but may also frequently affect the proximal regions of limbs (arms and thighs) and face. The lesions evolve to outbreaks of new lesions during a period of 5–7 days, without hypochromia or scars [6, 8, 12]. It does not require any specific treatment. The etiology is unknown; however,

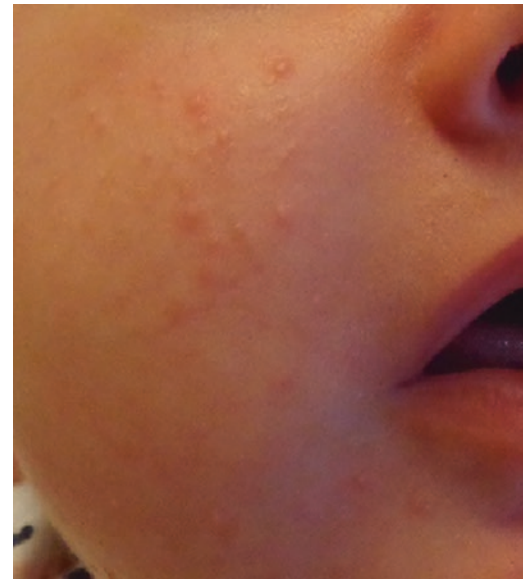

Fig. 33.3 Neonatal cephalic pustulosis

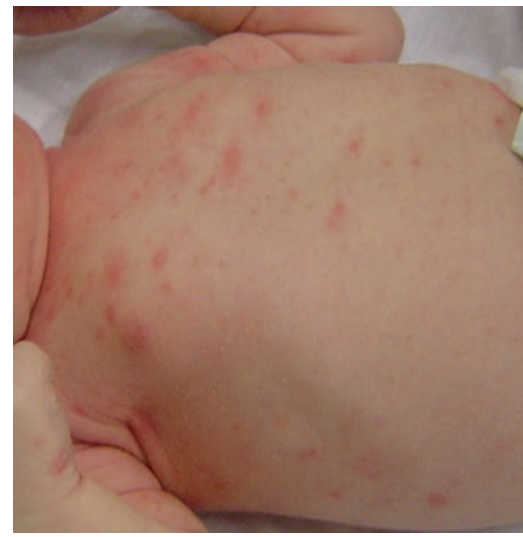

Fig. 33.4 Toxic erythema

several hypotheses have been proposed, such as hypersensitivity to allergens, transient reactions of the skin to thermal or mechanical stimulation of skin, and graft-versus-host reaction induced by maternal lymphocytes transferred before or during delivery. However, the most recent hypothesis indicates a possible inflammatory response to bacteria that penetrate the pilosebaceous follicle [17]. The diagnosis can be done through Tzanck examination with Giemsa staining, in

which numerous eosinophils can be identified. Peripheral eosinophilia may be found in 15–18% of cases. Skin biopsy is not required to confirm the diagnosis, and characteristic findings are subcorneal pustules rich in eosinophils [13]. According to the study by Kanada et al. [14], the incidence of toxic erythema in the United States was 7%. In other countries, incidence varies: 12% in Mexico, 23% in India, 43.6% in China, and 45% in Australia [9, 14, 18]. The frequency in preterm infants is lower than in full-term infants [14]. In another study, the prevalence was greater in term infants, those born through vaginal delivery, those from first gestation, and those fed with formula [18]. Another study found a greater incidence in newborns with greater gestational age and weight at birth [9]. There is a lower incidence in preterm newborns, possibly due to lower inflammatory and immune response. Whether toxic erythema is specific to an ethnic group is not yet known [12].

Transient Neonatal Pustular Melanosis (TNPM)

TNPM is characterized by the appearance of sterile pustules or vesicles without erythematous halo, which are distributed in any part of the body; however, they occur more frequently on the chin, neck, upper chest, and lower chest. Lesions vary up to 0.3 cm in diameter and burst easily (Fig. 33.5). After rupture, they leave a collarette of white scale and residual hyperchromic macula that may vary from 0.5 to 1 cm in diameter [6, 8]. This dermatosis affects both sexes equally, but is more frequent in newborns with African ancestry. Cultures are negative. Histopathologic examination of pustules indicates subcorneal and intraepidermal pustules with content rich in neutrophils and, rarely, eosinophils. The lesions may be present at birth or in the first weeks of life, or even occur inside the uterus. Macules recede spontaneously until 3 months [12]. The frequency of TNPM in newborns was reported as 0.2% in Caucasians, 0.9% in Iranians, and 4.4% in Africans [11, 12].

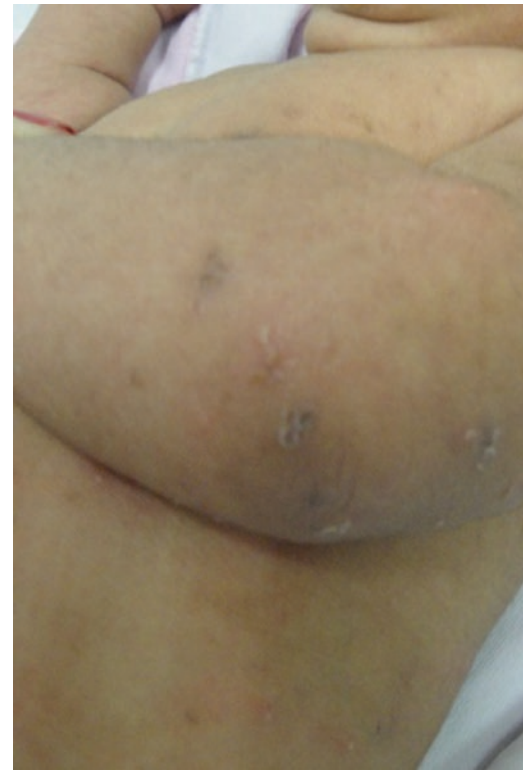

Fig. 33.5 Transient neonatal pustular melanosis

Infantile Acropustulosis

Infantile acropustulosis is characterized by the presence of recurring outbreaks of pruriginous vesiculopustular lesions with acral distribution (Fig. 33.6), affecting the hands (with predominance of palms) and feet (with predominance of soles) [3]. It mainly affects children with African ancestry and boys [3, 13]. The lesions last from 5 to 10 days, and outbreaks occur again at intervals of 2–4 weeks. The lesions may be present at birth, but normally develop in the first weeks or months of life and may continue until 3 years old [3]. The lesions are usually very pruriginous [6, 13]. The etiology is still unknown, and some authors suggest that it may be due to a reaction pattern in individuals predisposed to infection or infestation. A history of scabies before the diagnosis of infantile acropustulosis is frequent. Results from laboratory studies are generally normal, but cases of peripheral eosinophilia have been reported. Tzanck test or Gram

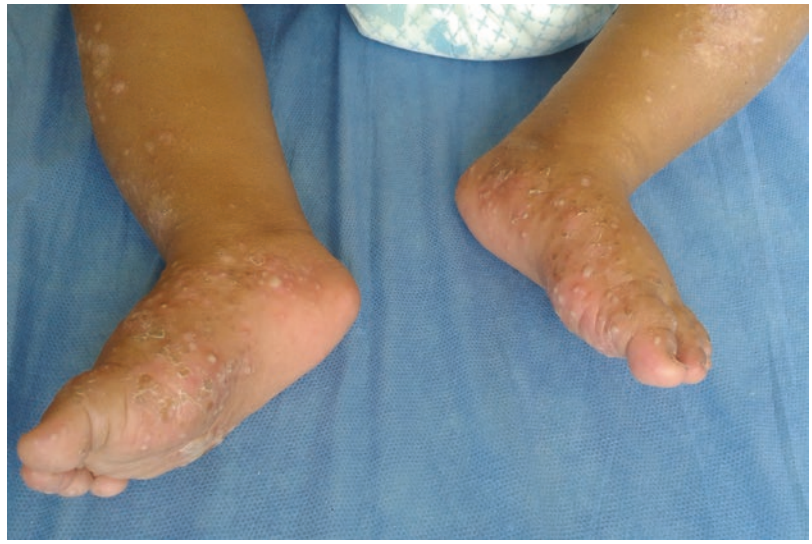

Fig. 33.6 Infantile acropustulosis

staining of the pustule content usually reveals numerous neutrophils, some eosinophils, and absence of bacteria. Skin biopsy shows intraepidermal or subcorneal pustules with neutrophils and eosinophils. Scabies is the most important differential diagnosis because infantile acropustulosis usually occurs after scabies. In addition, scabies in infants usually progresses with pustules on the soles, and the soles are very similar to those observed in cases of infantile acropustulosis [3, 6]. Other differential diagnoses include toxic erythema and TNPM, both asymptomatic and transient.

Birthmarks

One of the most prevalent vascular birthmarks is the salmon patch, and one of the most prevalent pigmentary birthmarks is Mongolian spot. The frequency of these marks varies among ethnic groups, with the former being more frequent in Caucasians and the latter more frequent in Asians, Native Americans, and black-skinned persons [9, 14]. Hemangioma and capillary vascular malformation as well as congenital melanocytic nevus and café-au-lait spots are other examples of vascular birthmarks and pigmentary birthmarks, respectively, and are frequently found in newborns (see later discussion).

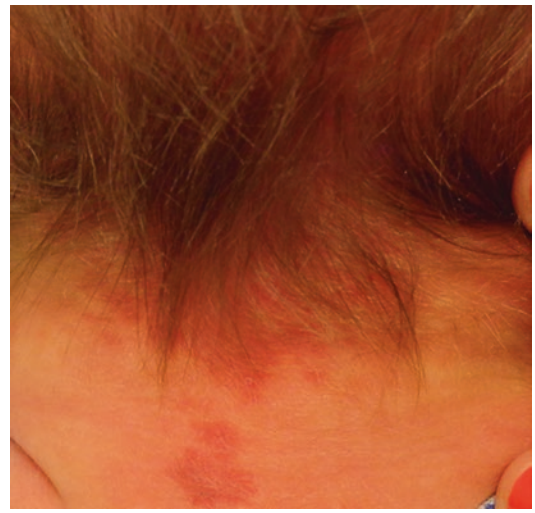

Fig. 33.7 Salmon patch

Salmon Patch or Nevus Simplex

Salmon patch on the nape is popularly known as "stork's bite," whereas that on the glabella is known as "angel's kiss." These are vascular patches of reddish or rose color (salmon) located on the occipital and nape regions, glabella, forehead, upper eyelids, and nasolabial regions that disappear when pressed with a finger (Fig. 33.7). It is distributed mostly on the occipital region (10.6–37%), glabella (20%), and eyelids (15–90.8%) [8, 9, 19]. Overall, lesions become more

evident when the child cries or after a bath. Histologically the lesions comprise ectatic dermal capillaries. The lesions on the eyelids tend to disappear after the third month of life. Glabellar lesion, in general, disappears after the first year of life. Occipital patch may persist in 50% of adults. In the United States, Kanada et al. [14] observed that the most common lesion was the salmon patch, affecting up to 83% of newborns and being more frequent in Caucasians and less frequent in African Americans. Moreover, they observed that the salmon patch was less frequent in preterm infants. Other studies showed that the incidence of the salmon patch varied from 1.7% to 55.5% in different countries [11, 14, 19].

Mongolian Spots

This dermatosis comprises a grayish blue patch, sometimes greenish or bluish, of varied sizes and forms, with diameter varying between 3 and 10 cm (Fig. 33.8). In the majority of cases it is located on the gluteal, sacral, and lumbar regions. In some cases, the patch may be more extensive (ectopic Mongolian spots) and affect the shoulders and upper and lower limbs. It presents racial variation and has a tendency to recede spontaneously. Spontaneous receding is expected in the majority of cases with typical locations [16]. This is enough to distinguish Mongolian spots from other dermal melanocytosis. Histologically, in the area of the spot, dermal melanocytes are found in the deep and middle layers of the dermis. The destruction of the melanocytes begins during fetal life and is maintained in the child's first years of life. In the case of persistent Mongolian spots, formation of dermal fibrosis and vascular proliferation near the dermal vessels may occur. Mongolian spots may be due to blockage of migration of melanocytes from the neural crest and thus being retained in the dermis. The greater the intensity of the color in children at 1 year old, the greater size of the patch will be at 2 years of age [8]. Mongolian spots are observed in all ethnic groups, but it is more prevalent in African descendants, Asians (Pacific Ocean coast), and Native Americans. The second most frequent lesion found by Kanada et al. [14] in North America was Mongolian spots (20% of cases), which was more frequent in children with Asian, African American, Native, and Hispanic ancestries [14]. The prevalence described in the different countries was 86% in China, 81% in Japan, 77% in Mexico, 71.3% in Iran, 60.2% in India, and 45% in Brazil [5, 8, 14, 11].

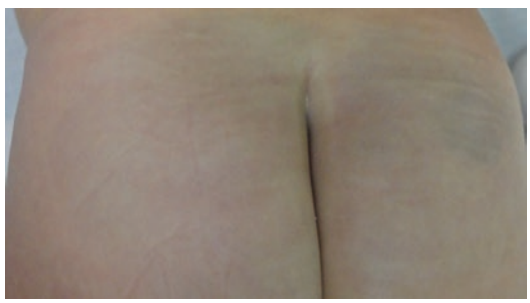

Fig. 33.8 Mongolian spot

Vascular Lesions

Knowledge of vascular lesions has progressed in the last decades, and since its first publication by Mulliken in 1982, who divided vascular lesions into two major categories (vascular hemangioma and malformations), much information has been gathered. In 1996 this classification was revised, and vascular lesions were divided in tumors and malformations [20]. Hemangioma is a vascular tumor characterized by a proliferative and an involution phase. Malformations are defects in development that cause dilation of the capillary, venous, arterial, or lymphatic vessels [16, 21]. Hemangioma varies in frequency from 0.2% to 4.5% until the third month of life, whereas capillary vascular malformation may be found in 0.3% of newborns [11, 12]. Pigmentary birthmarks are common in newborns, and its frequency may vary among different studies (congenital melanocytic nevus, 0.6–2.4%; café-au-lait spots, 0.4–1.3%) [9, 11, 14].

Hemangioma

Infantile hemangiomas are the most common tumors in childhood (Fig. 33.9). Infantile

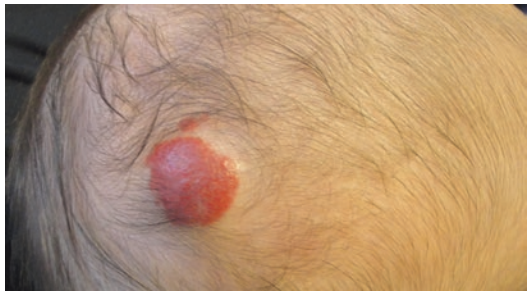

Fig. 33.9 Infantile hemangioma

hemangioma may be present at birth, but generally develops during the first weeks of life as precursor lesions that develop over normal skin. In 90% of cases, hemangiomas are observed during the first month of life [8, 21]. The most frequent precursor lesions are anemia spot, telangiectasia, and macula or patch. Histologically, the proliferative phase comprises clusters of tumoral cells (endothelial) that express *GLUT1* and *CD35* [20]. In infantile hemangioma, the angiomatous lesion has accelerated growth in the first 6–10 months [8, 20]. The natural history of infantile hemangioma is specific and may be divided into six phases: nascent, early proliferative, late proliferative, plateau, involution, and abortive [20]. The prevalence of infantile hemangioma in Caucasian newborns has varied among studies, from 3% to 12% [21–23]. Anderson et al. [21] found that the incidence of hemangioma in Olmsted County (Minnesota, USA) increased in the last three decades from 1.64 per 100 person-years to 1.97 per 100 person-years. A study in Iran has shown that infantile hemangioma was present in 1.3% of 1000 newborns [11]. Most cases of infantile hemangioma are self-limited and recede partially or totally up until 5 years of age. Nevertheless, some hemangiomas may result in significant complications such as disfigurement, transient or permanent functional alterations, and pain (in the presence of ulceration). Several studies indicated patient-related factors involved with hemangioma such as female sex, Caucasian, low birth weight, and erythropoietin therapy. Maternal factors may also increase the risk, such as mother's advanced age, antenatal vaginal bleeding, pre-eclampsia, amniocentesis, multiple gestation, and in vitro fertilization [11, 21–23]. Haggstrom et al. [22] found in their study that a family history of hemangioma did not significantly differ between infants with hemangiomas and the general population.

Capillary Vascular Malformation

Vascular malformations are alterations in the vascular development present at birth and do not present a tendency for involution. Frequently, these vascular patches have unilateral segmental presentation and respect the midline [8]. The capillary vascular malformations are also called port-wine stains or nevus flammeus (Fig. 33.10). Histologically they are characterized by capillary vessels or ectatic superficial dermal venules and absent vascular proliferation [8, 24]. The growth of these lesions occurs throughout the child's growth, and the most common areas are the face, neck, and limbs. During infancy the color varies from rose to erythematous, and during adulthood

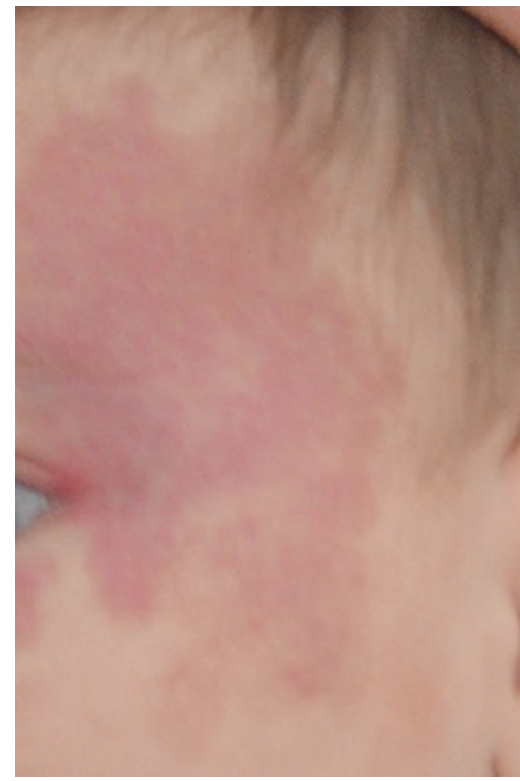

Fig. 33.10 Port-wine stain

it becomes wine colored, with the macular component being replaced by nodular surface plaques. They occur in approximately 0.3–1.2% of the population [8, 14, 19, 24].

Congenital Melanocytic Nevus

Congenital melanocytic nevus is a benign melanocytic proliferation that may be present at birth or appear before the first years of life. The majority of melanocytic nevi grow proportionally with the child's growth. Depending on the size they reach during adulthood, they may be small (<1.5 cm), medium (1.5–19.9 cm), and giant (≥20 cm) (Fig. 33.11). There are no significant differences regarding frequency among sexes [25–27]. The estimated frequency of giant congenital melanocytic nevus is 1:20,000 [26]. Meanwhile, the reported frequency of small melanocytic nevus varied among studies, with 0.6% in Taiwan, 1–2.4% in the United States, 2% in India, 2.1% in Australia, and 2.46% in Brazil [1, 2, 5, 10, 19, 27]. The variation found in these studies may be explained by the different follow-up durations of newborns (late congenital melanocytic nevus may not be detected in a short-duration follow-up), examination performed by a nondermatologist doctor, and diagnostic method (clinical versus histologic) [25]. In addition, there are variations in the prevalence of congenital melanocytic nevus among different ethnic groups (fair versus dark skin). Some studies showed that newborns of non-European origin have approximately twice more congenital melanocytic nevus than Caucasian newborns of European origin (2.2–5.3% in European newborns versus 7–12.5% in non-European newborns) [25]. Furthermore, at the end of the first decade of life, melanocytic nevi range from 15 to 30 lesions in Caucasian children and between 5 and 10 lesions in children from other ethnic groups (Africans, Native Americans, and Asians) [28].

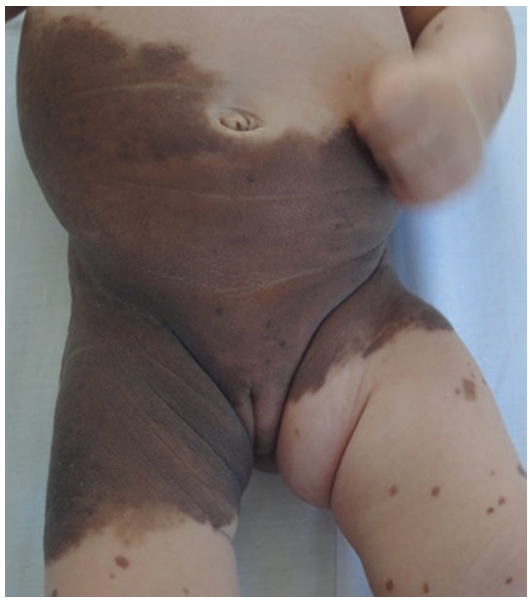

Fig. 33.11 Giant congenital melanocytic nevus

Café-au-Lait Spots

These macules are patches of light coffee color, similar to the drink café-au-lait. The lesions present uniform tonality and well-defined limits, with sizes varying from few millimeters to centimeters (50 cm) in diameter (Fig. 33.12). The lesions may be present at birth or appear afterward. Studies have shown that single café-au-lait spots are common and have a frequency from 2.5% to 25% in healthy children from different ethnic groups. The frequency of café-au-lait spots varies among different ethnic groups and differs when the study is conducted with newborns or children at school. The frequency in newborns was 0.4% in Taiwan, 0.4% in China, 1.3% in

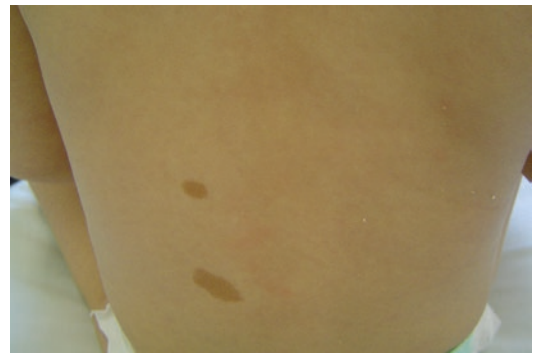

Fig. 33.12 Café-au-lait spots

India, 0.04% in Finland, 1.7% in Finland, 0.3% in Iran, and 3.45% in Brazil [9, 10, 11, 14, 19, 29–31]. In the United States, a study showed the presence of at least one café-au-lait spot in 2% of Caucasian newborns, 2% in Hispanic, and 7% in African Americans [14]. Studies have evaluated the frequency of more than one café-au-lait spot in healthy children, reporting that two or more café-au-lait spots were present in 0.7–6.9% of children and three spots in 0.2–0.3% of healthy children [32, 33]. Multiple café-au-lait spots may be present in various genodermatoses. Neurofibromatosis type 1 (NF1) is the main genodermatosis associated with café-au-lait spots, and these spots usually increase in number and size in the first decade of life. The diagnostic criteria for NF1 were established in 1988 by the National Institutes of Health Consensus Conference and were revised in 1997 [34]:

1. Six or more spots >0.5 cm in diameter in children younger than 5 years or six or more spots greater than 1.5 cm in diameter in children older than 5 years
2. Two or more neurofibromas of any type or one plexiform neurofibroma
3. Axillary ephelides
4. Optic glioma
5. Two or more Lisch nodules
6. Characteristic bone lesions, including sphenoid dysplasia or thinning of long bone cortex with or without pseudarthrosis
7. First-degree relative with confirmed diagnosis of NF1

The presence of two or more criteria enumerated above is required for the clinical diagnosis of NF1

Glossary

Comedo A clogged hair follicle resulting in infundibular dilation and thinning of the follicular wall. It possesses a plug composed of loosely arranged keratinized cells and sebum.

Erythema Redness of the skin, caused by increased blood flow in superficial capillaries. It occurs with any skin injury, infection, or inflammation. Erythema disappears on finger pressure (blanching), while purpura or bleeding in the skin and pigmentation do not.

Melanosis Abnormally dark pigmentation of the skin or other tissues, resulting from a disorder of pigment metabolism.

Pustulosis A highly inflammatory skin condition resulting in large fluid-filled blister-like areas, or pustules. Many neutrophils are present within the cavity of a pustule. The epidermis surrounding the pustule shows slight acanthosis, and an inflammatory infiltrate can be seen beneath the pustule.

References

1. Monteagudo B, Labandeira J, León-Muiños 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.
2. Rivers JK, Frederiksen PC, Dibdin C. A prevalence survey of dermatoses in the Australian neonate. J Am Acad Dermatol. 1990;23:77–81.
3. Lobo I, Machado S, Selores M. Alterações cutâneas fisiológicas e transitórias do recém-nascido. Nascer e Crescer. 2009;18:19–24.
4. Boccardi D, Menni S, Ferraroni M, Stival G, Bernardo L, La Vecchia C, et al. Birthmarks and transient skin lesions in newborns and their relationship to maternal factors: a preliminary report from northern Italy. Dermatology. 2007;215:53–8.
5. Sachdeva M, Kaur S, Nagpal M, Dewan SP. Cutaneous lesions in new born. Indian J Dermatol Venereol Leprol. 2002;68:334–7.
6. Giraldi S, Bau AEK. Dermatoses Comuns do Recém-Nascido. In: Araújo BF, Nader SS, editors. Cuidado Integral do Recém-Nascido: Prevenção e Condutas Terapêuticas. Rio de Janeiro: Editora Rubio; 2015. p. 213–8.
7. Eichenfield L, Larralde M. Neonatal skin and skin disorders. In: Schachner L, Hansen R, editors. Pediatric dermatology. Philadelphia: Mosby; 2003. p. 2015–262.
8. Pereira LB, Gontijo B, Silva CMR. Dermatosis of the newborn. An Bras Dermatol. 2001;76:505–37.
9. Haveri FT, Inamadar AC. A cross-sectional prospective study of cutaneous lesions in newborn. ISRN Dermatol. 2014;2014:1–8.
10. Zagne V, Fernandes NC. Dermatoses in the first 72 h of life: a clinical and statistical survey. Indian J Dermatol Venereol Leprol. 2011;77:470–6.
11. Moosavi Z, Hosseini T. One-year survey of cutaneous lesions in 1000 consecutive Iranian newborns. Pediatr Dermatol. 2006;23:61–3.
12. Thomas J. Neonatal dermatoses: an overview. Indian J Dermatol Venereol Leprol. 1999;65:99–103.

13. de Araújo T, Schachner L. Erupções vesicopustulosas benignas no neonato. An Bras Dermatol. 2006;81:359–66.
14. Kanada KN, Merin MR, Munden A, Friedlander SF. A prospective study of cutaneous findings in newborns in the United States: correlation with race, ethnicity, and gestational status using updated classification and nomenclature. J Pediatr. 2012;161:240–5.
15. Niamba P, Weill FX, Sarlangue J, Labrèze C, Couprie B, Taïeh A. Is common neonatal cephalic pustulosis (neonatal acne) triggered by Malassezia sympodialis? Arch Dermatol. 1998;134:995–8.
16. Conlon JD, Drolet BA. Skin lesions in the neonate. Pediatr Clin N Am. 2004;51:863–88.
17. Marchini G, Nelson A, Edner J, Lonne-Rahm S, Stavréus-Evers A, Hultenby K. Erythema toxicum neonatorum is an innate immune response to commensal microbes penetrated into the skin of the newborn infant. Pediatr Res. 2005;58:613–6.
18. Liu C, Feng J, Qu R, Zhou H, Ma H, Niu X, et al. Epidemiologic study of the predisposing factors in erythema toxicum neonatorum. Dermatology. 2005;210:269–72.
19. 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.
20. Jinnin M, Ishihara T, Boye E, Olsen BR. Recent progress in studies of infantile hemangioma. J Dermatol. 2010;37:283–98.
21. Anderson KR, Schoch JJ, Lohse CM, Hand JL, Davis DM, Tollefson MM. Increasing incidence of infantile hemangiomas (IH) over the past 35 years: correlation with decreasing gestational age at birth and birth weight. J Am Acad Dermatol. 2016;74:120–6.
22. Haggstrom AN, Drolet BA, Baselga E, Chamlin SL, Garzon MC, Horii KA, et al. Prospective study of infantile hemangiomas: demographic, prenatal, and perinatal characteristics. J Pediatr. 2007;150:291–4.
23. Kim EJ, Park HS, Yoon HS, Cho S. Maternal and perinatal factors of importance for occurrence and severity of infantile haemangioma. Acta Derm Venereol. 2015;95:696–9.
24. Redondo P, Aguado L, Martínez-Cuesta A. Diagnosis and management of extensive vascular malformations of the lower limb: part II. Systemic repercussions [corrected], diagnosis, and treatment. J Am Acad Dermatol. 2011;65:909–23.
25. Monteagudo B, Labandeira J, Acevedo A, Ramírez-Santos A, Cabanillas M, Corrales A, et al. Prevalence and clinical features of congenital melanocytic nevi in 1,000 Spanish newborns. Actas Dermosifiliogr. 2011;102:114–20.
26. Viana AC, Gontijo B, Bittencourt FV. Giant congenital melanocytic nevus. An Bras Dermatol. 2013;88:863–78.
27. Makkar HS, Frieden IJ. Congenital melanocytic nevi: an update for the pediatrician. Curr Opin Pediatr. 2002;14:397–403.
28. Schaffer JV. Update on melanocytic nevi in children. Clin Dermatol. 2015;33:368–86.
29. Tsai FJ, Tsai CH. Birthmarks and congenital skin lesions in Chinese newborns. J Formos Med Assoc. 1993;92:838–41.
30. Hidano A, Purwoko R, Jitsukawa K. Statistical survey of skin changes in Japanese neonates. Pediatr Dermatol. 1986;3:140–4.
31. Karvonen SL, Vaajalahti P, Marenk M, Janas M, Kuokkanen K. Birthmarks in 4346 Finnish newborns. Acta Derm Venereol. 1992;72:55–7.
32. Shah KN. The diagnostic and clinical significance of café-au-lait macules. Pediatr Clin N Am. 2010;57:1131–53.
33. Nunley KS, Gao F, Albers AC, Bayliss SJ, Gutmann DH. Predictive value of café au lait macules at initial consultation in the diagnosis of neurofibromatosis type 1. Arch Dermatol. 2009;145:883–7.
34. Gutmann DH, Aylsworth A, Carey JC, Korf B, Marks J, Pyeritz RE, et al. The diagnostic evaluation and multidisciplinary management of neurofibromatosis 1 and neurofibromatosis 2. JAMA. 1997;278:51.