

## A Birthmark Survey in 500 Newborns: Clinical Observation in Two Northern Taiwan Medical Center Nurseries

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**Background:** The prevalence of birthmarks in Taiwanese newborns has not been well studied. How gender and maturity of newborns affect presentation and prevalence of vascular birthmarks, in particular, has not been well documented. The aim of this survey was to catalog the above-mentioned problems.

**Methods:** From May 9 through July 14, 2000, 500 newborns in Linkou and Taipei Chang Gung Memorial Hospital nurseries were examined for the presence of birthmarks. The data were collected and stored in Excel<sup>®</sup> software and analyzed using  $\chi^2$ -test and Fisher's exact test for statistical association.

**Results:** The most common pigmentary birthmark was the Mongolian spot (61.6%), followed by congenital melanocytic nevi (0.6%), café-au-lait spots (0.4%), and nevi depigmentosus (0.4%). Vascular birthmark frequency was: salmon patch (27.8%), Port-Wine stain (0.6%), and hemangioma (0.2%). Other miscellaneous changes included preauricular sinus (0.6%), skin tag (0.6%), and accessory auricle (0.2%). Prevalence of the vascular salmon patch birthmarks in female infants and male infants was 31.0% and 26.6%, respectively, but the difference was not statistically significant ( $p = 0.51$ ). The prevalence of vascular salmon patch birthmarks in full-term infants was 28.0%, and 25.8% in preterm infants. However, there was also no statistical difference ( $p = 0.96$ ) between the two. The two nevus depigmentosus cases were isolated types and neither of these were distributed along the Blaschko lines.

**Conclusions:** The Mongolian spot was the most common birthmark in Taiwanese newborns, followed by the salmon patch. All of the other birthmarks had prevalence of less than 1%. The prevalence of vascular salmon patch birthmarks was noted in 31.0% of female infants and in 26.6% of male infants. The prevalence of vascular salmon patch birthmarks in full-term infants was 28.0% versus 25.8% in preterm infants. However, the findings regarding vascular birthmarks were not statistically significant between the differing gender and maturity groups.

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**Key words:** birthmark survey, Mongolian spot, nevus depigmentosus, salmon patch

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**B**irthmark prevalence varies between races,<sup>(1-10)</sup> however, there has been only limited data available about birthmarks in Taiwanese newborns.<sup>(7,10)</sup> Some authors have mentioned higher prevalence of vascular birthmarks in female infants than male infants,<sup>(1)</sup> and preterm babies were also more likely to present with vascular birthmark.<sup>(8)</sup> However, these reports were descriptive and had no statistical analysis. A study was thus undertaken to determine the frequency of birthmarks in a cohort of 500 newborns admitted to the nurseries in two northern Taiwan hospitals.

## METHODS

From May 9 through July 14, 2000, 500 newborns admitted to Taipei and Linkou Chang Gung Memorial Hospital nurseries were examined. Neonates born in these two hospitals but transferred to intensive care unit (I.C.U.) were not included in this study. Infants without complete prenatal medical records were also excluded.

All subjects were examined during their stay in the nurseries, most of them within 48 hours of birth. All examinations were performed by either dermatologist Jing-Yi Lin or I-Hsin Shih. The oral cavities were not examined. All diagnoses were made on clinical bases and no skin biopsy was done. We used the strict definition regarding the Mongolian spot,<sup>(2)</sup> only the definite cases could be included. The lesions with faint bluish hue of the skin were excluded. The maturity of the neonates was determined by the prenatal and obstetric medical records. Preterm was defined as less than 37 weeks of gestational age, while full-term was between 37 to 42 weeks and post-term more than 42 weeks. The data were collected and documented using an Excel® worksheet. The  $\chi^2$ -test was applied to assess the statistical association between two gender groups, while the Fisher's exact test was used for the different maturity groups.<sup>(11)</sup> A  $p$  value  $< 0.05$  was taken as statistically significant. Nevus depigmentosus (Fig. 1) was defined as a congenital nonprogressive hypopigmented macule or patch that was stable in its relative size and distribution.<sup>(12)</sup> Nevus anemicus also was pale in appearance, but rubbing test and diascopy helped differentiate nevus anemicus from nevus depigmentosus.<sup>(13)</sup> Salmon patch appeared as flat, pink to light-red macule or patch of forehead, glabella,



**Fig. 1** Nevus depigmentosus on right preauricular area.

la, nape of the neck (Fig. 2) or upper eyelids (Fig. 3).<sup>(10,19)</sup> Café-au-lait spots were flat, uniform, tan-brown patch or oval macule with distinct margins and variable border contours.<sup>(10)</sup>

## RESULTS

Among the 500 newborns there were 271 male (54.2%) and 229 female (45.8%), and 467 (93.4%) of them were full-term (37-42 weeks), 31 (6.2%) preterm ( $< 37$  weeks) and 2 (0.4%) post-term ( $> 42$  weeks).



**Fig. 2** Salmon patch on occipital scalp (nuchal area).



**Fig. 3** Salmon patch on left upper inner eyelid. Eyelids are the most common site of involvement.

Mongolian spots were the most common birthmarks. A total of 308 (61.6%) infants had at least one Mongolian spot and 192 (38.4%) infants had none. Among the infants who had Mongolian spots, 195 (39%) had one, 76 (15.2%) had two, 24 (4.8%) had three, three (0.6%) had four, and 10 (2%) had five or more than five Mongolian spots.

Most of the Mongolian spots occurred on the sacrococcygeal area and buttocks, and rarely on other sites including back, shoulders, and extremities.

The other pigmentary birthmarks included three cases of congenital melanocytic nevi (0.6%), two cases of café-au-lait spots (0.4%), and two cases of nevi depigmentosus (0.4%). Neither nevus of Ota, nevus of Ito nor nevus spilus was seen in this survey. The two cases of nevus depigmentosus were all isolated types and no associated systemic abnormalities was found.<sup>(12,13)</sup> The congenital melanocytic nevus was small, and no giant congenital melanocytic nevus (> 2 cm) was found.

Salmon patches were the most frequently found vascular birthmark, and 139 cases (27.8%) had at least one salmon patch. Among the 139 infants who had salmon patch, 98 cases (19.6%) occurred on the eyelids, 53 cases (10.6%) on the occipital scalp

(nuchal area) and 18 cases (3.6%) on the forehead (Table 1).

Other vascular birthmarks included three cases of Port-wine stains (0.6%) and one case of hemangioma (0.2%).

Seventy of 271 male infants got salmon patch birthmarks (26.6%) versus 69 of 229 female infants (31%), thus the female gender entailed a higher prevalence, but the difference was not statistically significant ( $p = 0.51$ ).

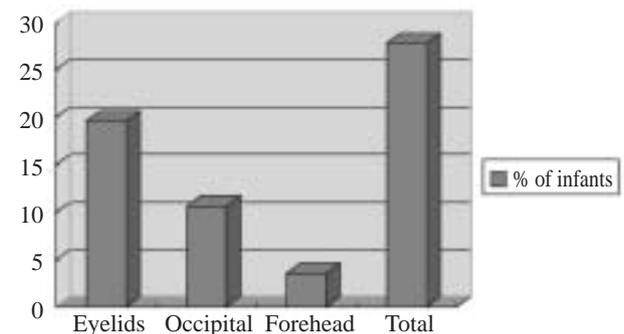
Of 467 full-term babies, 131 had salmon patch birthmarks (28%) versus eight of 31 pre-term babies (25.8%). Although prevalence of the salmon patch was higher in full-term babies than pre-term babies, there was also no statistically significant difference ( $p = 0.96$ ).

Other miscellaneous skin changes included three cases of preauricular sinus (0.6%), three cases of skin tag (0.6%), and one case of accessory auricle (0.2%). All three skin tags occurred on the breast, especially on the areola of the nipple.

## DISCUSSIONS

There have been various reports on the birthmarks among different races and countries.<sup>(1-10)</sup> Mongolian spots have been shown to be a good examples of inter-racial differences. The prevalence of Mongolian spots has been as high as 80 to 90% in Asians,<sup>(1,2)</sup> and it has been as low as 3 to 10% in Caucasians.<sup>(3,4,6)</sup> An Indian study reported 62.2% of Indian newborns had Mongolian spots.<sup>(5)</sup> Two earlier Taiwanese studies revealed 87.7% and 86.3% of infants had Mongolian spots, respectively.<sup>(7,10)</sup> In our study, 61.6% of newborns had this birthmark. The

**Table 1.** Salmon Patch Location and Percentage of Infants Involved



lower prevalence of Mongolian spots in our survey might be attributed to the strict definition we used.<sup>(2)</sup> Most of the Mongolian spots were noted in the sacrococcygeal area and buttocks, and one to two (54.2%) was the most common number count of concurrent Mongolian spots in one individual.

Other pigmentary birthmarks recorded were congenital melanocytic nevus (0.6%), café-au-lait spot (0.4%) and nevus depigmentosus (0.4%). The former two were comparable to other neonatal surveys, but nevus depigmentosus had not been previously reported.<sup>(1-7,10)</sup> Occasionally seen in the dermatology clinics, nevus depigmentosus is a noteworthy depigmented birthmark since segmental or linear nevus depigmentosus has been reported to be associated with systemic abnormalities.<sup>(12,14)</sup> Nevus of Ota, nevus spilus and nevus of Ito, however, were not found in the present survey, nor in the two earlier Taiwanese studies of 992 and 3345 infants,<sup>(7,10)</sup> respectively. In Japanese reports, however, nevus of Ota was found in 0.1-0.2% and up to 0.5-1% of general population,<sup>(15-17)</sup> and it was said to occur in up to 0.8% of dermatologic outpatients in Japan<sup>(18)</sup> or affect 0.014-0.034% of the Asian population in a Hong Kong report.<sup>(19)</sup> We were not able to speculate the prevalence of Ota nevus based on available Taiwanese data and our clinical observation.

Salmon patch prevalence also varied among different reports. It could be as high as 40-70% in Caucasians,<sup>(3,4,20)</sup> 22.6% in one Taiwanese study,<sup>(10)</sup> 22.3% in a Japanese study,<sup>(1)</sup> and 28.4% in one Indian study.<sup>(5)</sup> We found that 27.8% of Taiwanese infants had salmon patches. Eyelids were the most common sites of involvement, followed by occipital scalp (nuchal) and forehead. Our observations differed from those of Osburn et al. and Freeberg et al. whose reports indicated most salmon patches appeared on the nuchal area then followed by the head and face.<sup>(6,21)</sup>

Enjoras and Mulliken<sup>(8)</sup> stated that pre-term neonates were more prone to present with vascular birthmarks than full-term neonates, and female preponderances in vascular birthmarks were also noted in Japanese and American surveys.<sup>(1,21)</sup> None of the reports has focused on the gender or maturity of infants as a variable or studied them statistically. In our study, female infants had higher prevalence (31%) with regard to salmon patches than did male infants (26.6%), however, there was no statistically

significant difference ( $p = 0.51$ ). More cases may be needed to determine the gender factor. In contrast to prior reports, in analyzing our patients in terms of maturity, a greater prevalence of salmon patches occurred in full-term babies (28%) than pre-term babies (25.8%), although this was not statistically significant ( $p = 0.96$ ). The difference may have risen in our case collection, because we excluded the infants in the I.C.U. where many pre-term infants were sent. The early examination timing (within 48 hours of birth) might also have had some influence on the prevalence of vascular birthmarks.<sup>(8)</sup> A birthmark survey of central Taiwan newborns under 48 hours of age also mentioned the limitation of timing on observation.<sup>(10)</sup> Salmon patches, when present and persistent in nuchal area, were called nevus Unna,<sup>(21)</sup> the incidence of nevus Unna was reported to move dynamically from age to age.<sup>(23)</sup>

Skin tags were seen in 0.6% of infants in our survey, and they were also found in 1.5% of Taiwanese infants,<sup>(7)</sup> 4.1% of Japanese infants,<sup>(1)</sup> and 0.5% of American infants.<sup>(6)</sup> Most of these skin tags occurred around the nipple, and 0.6% of our cases had preauricular sinus, compared with 0.2% of Japanese infants,<sup>(1)</sup> and 1% of Australian infants.<sup>(9)</sup>

In our study, neither epidermal nor sebaceous nevus was found. Reviewing reports in the literature, 0.3% of infants had sebaceous nevus in three large series,<sup>(1,3,7)</sup> including a previous Taiwanese survey in 992 infants. Sebaceous nevus was found in 0.1% of infants in a survey of central Taiwan newborns.<sup>(10)</sup> Nevus depigmentosus is also uncommon. It has been reported that only 20% of nevus depigmentosus were present at birth, though up to 92.5% of them were discovered before the age of 3 years in a Korean study.<sup>(12)</sup> Thus, the prevalence of nevus depigmentosus (0.4%) may be increased if we had followed these cases longer. However, the exact prevalence of nevus depigmentosus remains unknown. A more extensive and comprehensive survey with long-term follow-up would help determine the prevalence of these common birthmarks such as salmon patches and Port-wine stains<sup>(22,23)</sup> as well as uncommon birthmarks such as epidermal nevus, nevus depigmentosus<sup>(12,14)</sup> or Ota nevus.<sup>(15-19)</sup>

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# 五百名新生兒之胎記調查： 北台灣兩所醫學中心嬰兒室之臨床觀察

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**背景：** 台灣新生兒之胎記盛行率並未被充分研究；血管性胎記發生率與新生兒之性別及成熟度間的差異亦不清楚。本調查之目的即嘗試歸類上述問題。

**方法：** 從2000年5月9日至7月14日，500名在林口及臺北長庚紀念醫院嬰兒室的新生兒接受皮膚胎記檢查，檢查資料收集儲存於Excel<sup>®</sup>軟體，並以卡方檢定及費氏精確檢定作統計關連分析。

**結果：** 最常見的色素性胎記是蒙古斑(61.6%)，其次為先天性黑色素細胞痣(0.6%)，咖啡牛奶色斑(0.4%)，脫色母斑(0.4%)。血管性胎記發生率為鮭魚色斑(27.8%)，酒色斑(0.6%)，血管瘤(0.2%)。其他變化包括有耳前凹陷(0.6%)，垂疣(0.6%)，及副耳(0.2%)。血管性胎記鮭魚色斑在女性新生兒發生率為(31.0%)，男性新生兒發生率為(26.6%)，但統計上無關連( $p = 0.51$ )；足月產新生兒血管性胎記鮭魚色斑發生率為(28.0%)，而早產兒鮭魚色斑發生率為(25.8%)，統計上亦無關連( $p = 0.96$ )。兩例脫色母斑為單獨型病例，兩例皆未沿Blaschko氏線分佈。

**結論：** 蒙古斑是台灣新生兒最常見的色素性胎記，其次為鮭魚色斑，其他胎記發生率皆少於百分之一。血管性胎記鮭魚色斑在女性新生兒發生率為(31.0%)，男性新生兒發生率為(26.6%)；足月產新生兒血管性胎記鮭魚色斑發生率為(28.0%)，早產兒發生率為(25.8%)；但性別及新生兒成熟度與血管性胎記鮭魚色斑發生率間並無統計上的差異。

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**關鍵詞：** 胎記調查，蒙古斑，脫色母斑，鮭魚色斑

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