World Journal of Clinical Cases

Online Submissions: http://www.wjgnet.com/esps/
bpgoffice@wjgnet.com
doi:10.12998/wjcc.v1.i8.230

World J Clin Cases 2013 November 16; 1(8): 230-232
ISSN 2307-8960 (online)

EDITORIAL

Mongolian spots: How important are they?

Divya Gupta, Devinder Mohan Thappa

Divya Gupta, Devinder Mohan Thappa, Department of Skin and STD, JIPMER, Puducherry 605006, India
Author contributions: Gupta D collected the articles and wrote the manuscript; Thappa DM initiated the idea for this article, and in addition, edited, revised and provided crucial critical inputs to the manuscript.
Correspondence to: Dr. Devinder Mohan Thappa, MD, DHA, MNAMS, Professor, former Head, Department of Skin and STD, JIPMER, Dhanvantri Nagar, Gorimedu, Puducherry 605006, India. dmthappa@gmail.com
Telephone: +91-413-2271250
Received: July 15, 2013 Revised: October 7, 2013
Accepted: November 2, 2013
Published online: November 16, 2013

Abstract

Mongolian spots (MS) are congenital birthmarks seen most commonly over the lumbosacral area. They are bluish-green to black in color and oval to irregular in shape. They are most commonly found in individuals of African or Asian ethnic background. Although these lesions resolve by one to two years of age, widespread, extrasacral and dark colored MS sometimes persist into adulthood. Aberrant MS over occiput, temple, mandibular area, shoulders and limbs may be confused with other dermal melanocytoses and bruises secondary to child abuse, thus necessitating documentation at birth. Although traditionally believed to be benign in nature, they have now been shown to co-exist with inborn errors of metabolism, most commonly GM1 gangliosidosis and mucopolysaccharidosis type Ⅰ (Hurler's disease), followed by mucopolysaccharidosis type Ⅱ (Hunter's syndrome), mucolipidosis, Niemann-Pick disease and mannosidosis. They have also been seen to co-exist with various vascular or other pigmented birthmarks like café-au-lait macules. Co-existing Mongolian spots and vascular birthmarks like nevus flammeus, nevus anemicus or nevus spilus is termed as phakomatosis pigmentovascularis. This review focuses on the important associations of Mongolian spots and stresses upon the importance of screening babies with extensive MS.

Key words: Mongolian spot; Inborn errors of metabolism

Core tip: Though earlier considered to be benign birthmarks, it has been shown now that Mongolian spots (MS) are often associated with co-existent anomalies like inherited disorders of metabolism, vascular birthmarks and occult spinal dysraphism. Babies with extensive MS should be screened for the same.

Gupta D, Thappa DM. Mongolian spots: How important are they? *World J Clin Cases* 2013; 1(8): 230-232 Available from: URL: http://www.wjgnet.com/2307-8960/full/v1/i8/230.htm
DOI: http://dx.doi.org/10.12998/wjcc.v1.i8.230

INTRODUCTION

Mongolian spots (MS) are non-blanching hyperpigmented patches over the gluteal region that usually present at birth or in the first few weeks of life. These lesions are most prominent at the age of one year and start regressing thereafter, with most of them disappearing by early childhood.

The blue color of MS is secondary to the Tyndall effect, a phenomenon where light is scattered by particles of matter in its path. Dermal pigmentation appears gray, grayish-blue or grayish black because these colors have a shorter wavelength and are reflected to the skin surface. Colors with a longer wavelength, such as yellow, orange or red, are not reflected and continue into the deeper parts of the skin. The amount of melanin in the dermal melanocytes, the number of dermal melanocytes and their depth in the dermis, are important determinants of color[1,2].

A unique feature of MS is the ethnic difference with regards to prevalence in different racial communities, which has been the subject of much research. They are

most commonly seen in Asians and Africans, and less commonly so in the Caucasians. On average, prevalence of MS is around ten percent in White infants, 50% in Hispanics and 90%-100% in Asians and Africans[3]. Kikuchi observed that although racial differences were present in the expression of MS, microscopically, dermal melanocytes were found in the buttocks of all the newborns, irrespective of race. According to him, the only difference was in the number of melanocytes, which was less in normal appearing bottoms, as compared to pigmented bottoms. Also melanocytes in the white children contained inactive, incompletely melanised melanosomes. Kikuchi[1], in his paper, mentioned an earlier hypothesis of Morooka that the difference might also be due to the duration of dermal melanocyte production, which was longer in Asians as compared to Caucasians. As a result of this, the birthmark would still be present at birth in the former, but would have disappeared in the latter, thus giving rise to a higher prevalence at birth in Asians.

Historically, MS have been regarded as benign and parents are reassured that they will eventually fade away with time. Recent data, however, suggest that MS may be associated with other conditions like various inborn errors of metabolism and neurocristopathies. The term "neurocristopathy" refers to a disorder characterised by abnormalities in neural crest migration, growth and differentiation. A close relationship between central nervous system and melanocyte population, due to their common origin from neural crest, is well known. This explains why these conditions sometimes occur together[4].

Inborn errors of metabolism

Weissbluth was the first to recognize an association between generalized MS and various storage disorders but termed it as being co-incidental[5]. Given the high prevalence of MS in Asians and Africans, the association of these two conditions may be a chance occurrence, but over the last thirty years numerous case reports have been published linking the two[6]. The most common lysosomal storage disorder associated with MS is Hurler's disease followed by GM1 gangliosidosis 1[4]. Apart from GM1 gangliosidosis and mucopolysaccharidosis type I (Hurler's disease), MS have been reported in association with mucopolysaccharidosis type Ⅱ (Hunter's syndrome), mucolipidosis, Niemann-Pick disease and mannosidosis[7,8].

Human keratinocytes and dermal fibroblasts express nerve growth factor (NGF), which is an important signal for transdermal melanocyte migration. NGF exerts its action *via* the Trk protein (tyrosine kinase-type receptor) as well as *via* receptors present on melanocytes. In inborn errors of metabolism (IEMs), accumulated metabolites bind to the Trk protein *via* glycosylation, resulting in an abnormal increase in NGF activity. Since melanocytes also have receptors for NGF, metabolite-Trk binding will lead to abnormal melanocyte migration. Also, metabolite-Trk binding acts as a trigger for melanin-synthesizing pathways in dormant melanocytes[4,9].

MS in IEMs show a generalized distribution involving dorsal and ventral trunk in addition to sacral region and extremities. These lesions are persistent and may also progress over time. The pigmentation is deeper as compared to the common MS[10].

Recognition of extensive MS can help a physician identify these related serious disorders early. The mucopolysaccharidoses respond well to stem cell transplantation or enzyme replacement therapy if instituted at an early stage, before irreversible organ damage occurs. Early palliative care decisions can be made for gangliosidoses. It also helps in identification of at risk families and prevention of complications[9].

Vascular birthmarks

Co-existing MS (a type of pigmented birthmark) and vascular birthmarks have been described. The term "phakomatosis pigmentovascularis (PPV)" has been coined to denote the association of widespread, persistent and aberrant nevus flammeus and pigmentary abnormalities. PPV has been classified into four types[11]: (1) Type Ⅰ, Nevus flammeus plus nevus pigmentosus et verrucosus; (2) Type Ⅱ, Nevus flammeus plus MS with or without nevus anemicus; (3) Type Ⅲ, Nevus flammeus plus naevus spilus with or without nevus anemicus; and (4) Type Ⅳ, Nevus flammeus plus MS and nevus spilus with or without nevus anemicus. Each condition is further divided into type a and b, denoting a co-existing cutaneous and systemic disease respectively. PPV is due to "twin-spotting", a phenomenon in which there are two genetically different clones of neighboring cells in a background of normal cells, thus giving rise to paired nevoid skin lesions occurring in close proximity to each other. This results in homozygous cell populations in different body areas, which lead to MS and nevus flammeus. The above defect may also be caused by abnormal neural crest migration of melanocytes and angiogenic cells adversely affecting each other[12].

MS have been described in association with non-involuting congenital hemangioma, Sturge-Weber syndrome, Klippel-Trenaunay syndrome, cutis marmorata telangiectatica congenita and segmental café-au-lait macules[12-14]. In these cases persistent MS carry a worse prognosis and may be associated with underlying neurological defects[12].

Child abuse

In recent years, documentation of the MS has assumed medico-legal importance, as they can sometimes be confused with bruises, especially if present over atypical sites. This leads to a mistaken diagnosis of child abuse or battered child syndrome. MS can be distinguished from a bruise in that it is not tender, does not change color or evolve with time and may take several months to disappear[15].

Miscellaneous

MS have been reported to occur with Sjögren-Larsson syndrome and leptomeningeal melanocytoma involving

the spinal cord[16,17]. They may also represent a marker of occult spinal dysraphism. Whether these represent true or chance associations remains to be seen.

CONCLUSION

MS can no longer be considered as always benign congenital birth spots. A possible relationship between these birthmarks and IEMs has led to renewed interest in MS. A recent study has shown that extrasacral spots, diameter > 10 cm, dark color (blue/blue-black) and multiple patches are markers of persistence of MS beyond one year[18]. Further research is needed to establish the association between these markers and presence of inborn errors of metabolism.

REFERENCES

1 **Kikuchi I**. What is a Mongolian spot? *Int J Dermatol* 1982; **21**: 131-133 [PMID: 7085164]
2 **Leung AK**, Robson WL. Superimposed Mongolian spots. *Pediatr Dermatol* 2008; **25**: 233-235 [PMID: 18429787 DOI: 10.1111/j.1525-1470.2008.00641.x]
3 **Cordova A**. The Mongolian spot: a study of ethnic differences and a literature review. *Clin Pediatr* (Phila) 1981; **20**: 714-719 [PMID: 7028354]
4 **Hanson M**, Lupski JR, Hicks J, Metry D. Association of dermal melanocytosis with lysosomal storage disease: clinical features and hypotheses regarding pathogenesis. *Arch Dermatol* 2003; **139**: 916-920 [PMID: 12873889]
5 **Weissbluth M**, Esterly NB, Caro WA. Report of an infant with GM1 gangliosidosis type I and extensive and unusual mongolian spots. *Br J Dermatol* 1981; **104**: 195-200 [PMID: 6783061]
6 **Leung AK**, Robson WL. Mongolian spots and GM1 gangliosidosis type one. *J R Soc Med* 1993; **86**: 120-121 [PMID: 8433304]
7 **Silengo M**, Battistoni G, Spada M. Is there a relationship between extensive mongolian spots and inborn errors of metabolism? *Am J Med Genet* 1999; **87**: 276-277 [PMID: 10564887]
8 **Ochiai T**, Ito K, Okada T, Chin M, Shichino H, Mugishima H. Significance of extensive Mongolian spots in Hunter's syndrome. *Br J Dermatol* 2003; **148**: 1173-1178 [PMID: 12828746]
9 **Ashrafi MR**, Shabanian R, Mohammadi M, Kavusi S. Extensive Mongolian spots: a clinical sign merits special attention. *Pediatr Neurol* 2006; **34**: 143-145 [PMID: 16458829]
10 **Ochiai T**, Suzuki Y, Kato T, Shichino H, Chin M, Mugishima H, Orii T. Natural history of extensive Mongolian spots in mucopolysaccharidosis type II (Hunter syndrome): a survey among 52 Japanese patients. *J Eur Acad Dermatol Venereol* 2007; **21**: 1082-1085 [PMID: 17714129]
11 **Larralde M**, Santos-Muñoz A, Rodríguez Cáceres M, Ciardiullo A. Phacomatosis pigmentovascularis type Va in a 3-month old. *Pediatr Dermatol* 2008; **25**: 198-200 [PMID: 18429779 DOI: 10.1111/j.1525-1470.2008.00633.x]
12 **Hall BD**, Cadle RG, Morrill-Cornelius SM, Bay CA. Phakomatosis pigmentovascularis: Implications for severity with special reference to Mongolian spots associated with Sturge-Weber and Klippel-Trenaunay syndromes. *Am J Med Genet A* 2007; **143A**: 3047-3053 [PMID: 17937434]
13 **Torrelo A**, Zambrano A, Happle R. Large aberrant Mongolian spots coexisting with cutis marmorata telangiectatica congenita (phacomatosis pigmentovascularis type V or phacomatosis cesiomarmorata). *J Eur Acad Dermatol Venereol* 2006; **20**: 308-310 [PMID: 16503893]
14 **Wolf R**, Wolf D, Davidovici B. Phacomatosis pigmentopigmentalis: aberrant Mongolian spots and segmental café au lait macules. *Pediatr Dermatol* 2009; **26**: 228-229 [PMID: 19419484 DOI: 10.1111/j.1525-1470.2009.00890.x]
15 **AlJasser M**, Al-Khenaizan S. Cutaneous mimickers of child abuse: a primer for pediatricians. *Eur J Pediatr* 2008; **167**: 1221-1230 [PMID: 18661148]
16 **Kawara S**, Takata M, Hirone T, Tomita K, Hamaoka H. [A new variety of neurocutaneous melanosis: benign leptomeningeal melanocytoma associated with extensive Mongolian spot on the back]. *Nihon Hifuka Gakkai Zasshi* 1989; **99**: 561-566 [PMID: 2585771]
17 **Willemsen MA**, Rotteveel JJ. Mongolian spots in Sjögren-Larsson syndrome. *Pediatr Dermatol* 2008; **25**: 285 [PMID: 18429810 DOI: 10.1111/j.1525-1470.2008.00660.x.PubMed]
18 **Gupta D**, Thappa DM. Mongolian Spots-A Prospective Study. *Pediatr Dermatol* 2013 Jul 9; Epub ahead of print [PMID: 23834326 DOI: 10.1111/pde.12191]

P- Reviewers: Guarneri F, Sadighha A, Tey HL
S- Editor: Wen LL **L- Editor:** A **E- Editor:** Ma S

百世登
Baishideng®

Published by **Baishideng Publishing Group Co., Limited**
Flat C, 23/F., Lucky Plaza,
315-321 Lockhart Road, Wan Chai, Hong Kong, China
Fax: +852-65557188
Telephone: +852-31779906
E-mail: bpgoffice@wjgnet.com
http://www.wjgnet.com