Giant Congenital Melanocytic Nevi Successfully Treated with Combined Laser Therapy

Abstract
Congenital melanocytic nevi are benign proliferations of cutaneous melanocytes that arise as a result of abnormal growth, development, or migration of melanoblasts. Clinically, the giant congenital nevus is greater than 20 cm in size, pigmented and often hairy. The risk of malignant melanoma for the giant nevus is almost 6%. Fifty percent of the melanomas develop by the age of 2 years and, 80% of the melanomas develop by the age of 7 years. Hence, early management is of paramount importance. Herein, we present a case of giant nevi along with a review of the literature in order to bring awareness among clinicians towards this rare albeit significant entity.

Keywords: Congenital melanocytic nevi, giant congenital melanocytic nevi, malignant melanoma

Introduction
The congenital melanocytic nevi (CMN) are benign proliferations of cutaneous melanocytes occurring normally within nests in the epidermis, dermis, or in other tissue. Giant congenital melanocytic nevi (GCMN) of sizes which are larger than 20 cm diameter are rare and, its occurrence rate is 1 per 500,000 newborns. GCMN have irregular margins and are dark brown to black in color, with verrucous surfaces, with or without satellite lesions which are present beyond the periphery of the central lesion. Lesions of GCMN are classified as bathing trunk, coat-sleeve, or stocking nevi, depending on their distribution. A giant congenital melanocytic nevi (GCMN) has an elevated risk for complications, such as malignant melanoma, neurofibroma, lipoma and other central nervous system involvement. Here, we report a case of a GCMN in a 2-year-old girl and discuss its clinical and histopathological features along with review the pertinent literature.

Case Report
A 2-year-old girl who was born out of a non-consanguineous marriage by a natural vaginal delivery at term to a primigravida, with an uneventful antenatal history, presented with chief complaint of large black color skin patches with hair over a face, scalp, and nape of neck region since birth. There was no family history of any similar lesion. General examination was normal. Cutaneous examination revealed an extensive black hyperpigmented patch covering 30% of the skin surface including the region of face, scalp and nape of the neck. On examination of the face, there was a large pigmented patch of size 12-15 cm present over the left side, covering nearly half of the face, including left forehead, left eyebrow, glabella, nose, cheek, upper lip and a little bit of the lower lip and right ear. On examination of the scalp, there was a pigmented patch of size 8-12 cm present over the temporal and occipital regions and, nape of the neck region was presented with pigmented patches of size 7-11 cm [Figures 1a, 2a, 3a]. Tufts of coarse and lusterless hair were scattered all over the lesion. In addition, no other satellite lesions were seen. There were no other associated congenital anomalies. A computed tomography scan of the head showed no central nervous system (CNS) extension. Ultrasound of the abdomen, X-ray of the spine and the fundus examination was normal. No evidence of a malignant transformation was observed. The biopsy of the patient was taken and, the histopathological examination with hematoxylin and eosin stain revealed a melanocytic neoplasm consisting of melanocytes arranged predominantly in nests in the epidermis, dermis, or in other tissue. Giant congenital melanocytic nevi successfully treated with combined laser therapy. Indian Dermatol Online J 2020;11:79-82.

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The neoplasm showed maximum pigmentation in the uppermost dermis. The melanocytes showed a preference for appendages with features of maturation with increasing depth. With maturation, melanocyte showed feature of neural differential resembling nerve twigs. The occasional solitary melanocyte was seen at the dermo-epidermal junction and, these were arranged at regular intervals [Figure 4]. These histopathological findings were consistent with those of congenital melanocytic nevi. After the definite diagnosis of GCMN, subsequent treatment using the distinct type of lasers was planned. The patient was treated with a combination of the diode (810 nm), fractional CO\textsubscript{2} (10,600 nm) and Q switched Nd: YAG (1064 nm) lasers. In first three sessions, a combination of the diode and fractional CO\textsubscript{2} laser was performed. In the next three sessions, Q switched Nd: YAG was combined with fractional CO\textsubscript{2} laser and, after that the last four sessions were repeated with the combination of the diode and fractional CO\textsubscript{2}. In all these sessions, initially, diode or Q switched Nd: YAG laser was used after that treated with fractional lasers. The laser parameter of the diode was spot size 12\(\times\)12, fluence set between 18 and 24 J/cm\textsuperscript{2} along with pulse duration 100 or 30 ms with chilled tip. The laser parameter for fractional CO\textsubscript{2} laser was the density of 12\(\times\)12, area 3\(\times\)3, and energy ranging from 30 to 60 mJ. The laser parameter for Q-switched Nd: YAG laser was spot size of 4 or 8 mm and energy ranging from 2 J to 6 J along with the frequency of 10 Hz. The interval between sessions was not uniform as patient was not regular in follow up. Treatment was performed under general anaesthesia and, at the end of treatment significant cosmetic improvement in the skin was observed as evident in [Figures 1b, 2b, 3b]. After each session, the treated area was covered by dressing after applying soframycin cream. The dressing was removed after 24 hours and, soframycin cream along with hyaluronic acid gel was advised topically for 5 to 7 days. Tablet Cefum (250 mg twice a day, oral) and syrup Combiflame (5 ml thrice a day, oral) were prescribed for 7 days. The patient is still under our regular follow up.

**Discussion**

The congenital melanocytic nevi are pigmented cutaneous lesions which consists of combination of epidermally and dermally derived naevus cells, occurring in about 1% of the newborns.\cite{7} Presence at birth, tendency to increase in size and the risk of malignant transformation differentiate CMN from the acquired form of melanocytic neuvs.\cite{8,9} Based on the size of the lesions, CMN has been classified by many authors. This originates from the fact that the risk of complications is proportional to the maximum diameter of the nevus.\cite{10,11} Of all the classifications of CMN put forth, the most universally accepted is that described by Kopf et al. They proposed three distinct

**Figure 1:** Extensive black hyperpigmented patch over the face region (a) before treatment (b) significant cosmetic improvement after treatment

**Figure 2:** Extensive black hyperpigmented patch over the scalp region (a) before treatment (b) significant cosmetic improvement after treatment

**Figure 3:** Extensive black hyperpigmented patch over the nape of the neck region (a) before treatment (b) significant cosmetic improvement after treatment

**Figure 4:** Intradermal nevus with neural differentiation (H and E, \(\times\)5)
types of CMN based on the largest diameter of the nevus: small (<1.5 cm), medium (from 1.5 to 19.9 cm), and last, large or GCMN (≥20 cm) to which our patient belonged.[10]

With respect to epidemiology, the incidence of the small nevi is 1 in 100 births, that of the medium nevi are 6 in 1000 births, and that of GCMN which are larger than 20 cm in diameter is 1 per 500,000 newborns.[12,13] In addition, an equal predilection exists in males and females.

Genetic mutations are central in the pathogenesis of CMN. According to, reported results by Roh et al. and Charbel et al., CMN especially the medium and giant (94.7%) forms, frequently harbour NRAS mutations and to a lesser extent BRAF mutations.[14,15] The NRAS gene, located on the short arm of chromosome one at position 13.2, regulates the synthesis of a protein called N-Ras that is involved primarily in regulating cell division.[15] A mutation of this gene thus leads to a morphological error in the neuro-ectoderm during the fourth and sixth weeks of gestation with uncontrolled growth of melanocytes precursor cells known as melanoblasts, leading to the formation of CMN.[8,11] Furthermore, there is also a molecular component in this pathogenesis, involving the hepatocyte growth factor or scatter factor, a cytokine partially associated with the control of the development of melanocytes.[8,11]

Classically, GCMN is an asymptomatic disease but, some patients may complain of pruritus and xerosis. The findings on physical examination are variable, but, affected persons usually present with brownish to black, flat or nodular, well-defined lesions, associated with hypertrichosis. The surface of the nevus may be papular, warty, cerebriform, or rough, as in our case.[11,15] GCMN can affect any region of the skin but, it is mostly located on the trunk.

GCMN can be associated with several complications. Disfiguring character of GCMN may have psychosocial implications with deleterious effects on the self-esteem of affected individuals, especially females.[7,11] This psychological trauma may culminate in social segregation as was nearly the case in our patient. Malignancy should be suspected when there is a focal growth, pain, bleeding, ulceration, significant pigmented changes or pruritus. Fifty percent of the melanomas develop by the age of 2 years and, 80% of the melanomas develop by the age of 7 years. In our case, there was no indication of melanoma. The risk of malignancy is also increased by the presence of larger nevi (>50 cm), axial locations, such as on the trunk, head, and neck, the presence of multiple satellite lesions and the existence of nodules, dark patches, junctional activity, deep dermal neurogenic elements, or a blue naevoid component.[16-18] Radiographic imaging, which includes magnetic resonance imaging (MRI), is warranted to evaluate the melanocytic deposition in the CNS. The baseline MRI should be obtained when the patient is aged 46 months. Serial MRIs are frequently required in patients with meningeal melanocytosis.

Finally, the management of patients with GCMN remain controversial. No arbitrary guidelines can be recommended. Treatment interventions may include full-thickness excisions, partial-thickness excisions, dermabrasions, curettage, laser treatment, and chemical peels. Improving the cosmetic appearance frequently requires the practice of incorporation of distinct treatment interventions.[19] The carbon dioxide laser, the Er: YAG, and the Q-switched ruby laser have all been recently used for resurfacing and for selectively treating the deep pigmentation.[20] Treatment should be individualized, taking into consideration the age of the patient, the size and location of the lesions, the risk of melanoma, the possibility of non-cutaneous melanomas, and the presence of other congenital abnormalities or comorbidities. The prognosis depends on all of these factors. With our knowledge and experience, we used a diode, fractional CO₂ and Q-switched Nd: YAG lasers together for GCMN therapy.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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