

# Efficacy of Cultured Epithelial Autograft after Curettage for Giant Melanocytic Nevus of the Head

Tamami Maeda, MD  
Naoki Morimoto, MD, PhD  
Natsuko Kakudo, M.D., Ph.D  
Kenji Kusumoto, MD, PhD

**Summary:** Cultured epithelial autograft (CEA) is an epithelial sheet prepared from a patient's own skin using cell culture. In Japan, CEA (JACE; Japan Tissue Engineering Co., Ltd., Gamagori, Japan) was approved and covered by public health care insurance for use in the treatment of giant congenital melanocytic nevus (GCMN) in 2016. There are several treatment options for GCMN; however, the complete removal of a GCMN is usually difficult due to the lack of skin. In this report, we describe a case of GCMN in the occipital region that was treated using CEA after curettage. A 2-month-old boy had a GCMN of 13×21 cm in his occipital region. We used full-thickness skin taken from the back of the right auricle to prepare CEA under general anesthesia at 4 months of age. Three weeks after preparing CEA, we performed curettage of the right half of the GCMN, and CEA was grafted onto the wound afterward. CEA took completely, and epithelization was observed at 10 days after surgery. We then performed curettage with subsequent grafting of CEA on the left half of the GCMN at 7 months of age. CEA took completely, and epithelization was observed in this procedure as well with no hair loss at 8 months of age. Whether or not curettage can reduce the risk of malignant transformation into malignant melanoma of GCMN is unclear; however, the application of CEA after curettage may be a promising option for obtaining early epithelization. (*Plast Reconstr Surg Glob Open* 2018;6:e1827; doi: 10.1097/GOX.0000000000001827; Published online 19 June 2018.)

Congenital melanocytic nevus (CMN) is defined as a melanocytic nevus present at birth and is present in 1–6% of all neonates.<sup>1–4</sup> Giant congenital melanocytic nevus (GCMN) occurs in approximately 1 in 20,000 live births.<sup>1–4</sup> By definition, GCMN is more than 20 cm in diameter, with ≥ 6 cm on the body or ≥ 9 cm on the head in neonates.<sup>1,2</sup> Larger CMN is reported to have an increased risk of transformation to melanoma.<sup>3,4</sup> Nevus cells are present throughout the entire layer of the dermis histologically, so full-thickness excision of GCMN is necessary for its complete removal. However, it is often difficult to reconstruct such large, full-thickness skin defects using skin grafting or the skin expansion method.

Curettage was first described by Moss<sup>5</sup> in 1987, who reported that nevi could be separated with a sharp curette naturally above the “cleavage plane” that existed between the upper dermis containing the majority of the nevus and the deeper dermis relatively poor in nevus cells.<sup>1,3,5,6</sup> Moss<sup>5</sup> stated that curettage should be performed before 6 months of age, as nevus cells lie mainly in the upper dermis in newborns before migrating to deeper tissue as the lesion matured.<sup>5,6</sup> After curettage, the remaining wound is usually epithelialized within 2 weeks by conservative treatment, but healing is retarded in some cases and results in hypertrophic scarring or alopecia in the head region.

In Japan, cultured epidermal autograft (CEA; JACE; Japan Tissue Engineering Co., Ltd., Gamagori, Japan) has been approved for the treatment of GCMN patients.<sup>7</sup> In the present case, we applied CEA after curettage of GCMN in the occipital region to accelerate its epithelization.

From the Department of Plastic and Reconstructive Surgery, Kansai Medical University, Hirakata, Japan.

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### CASE REPORT

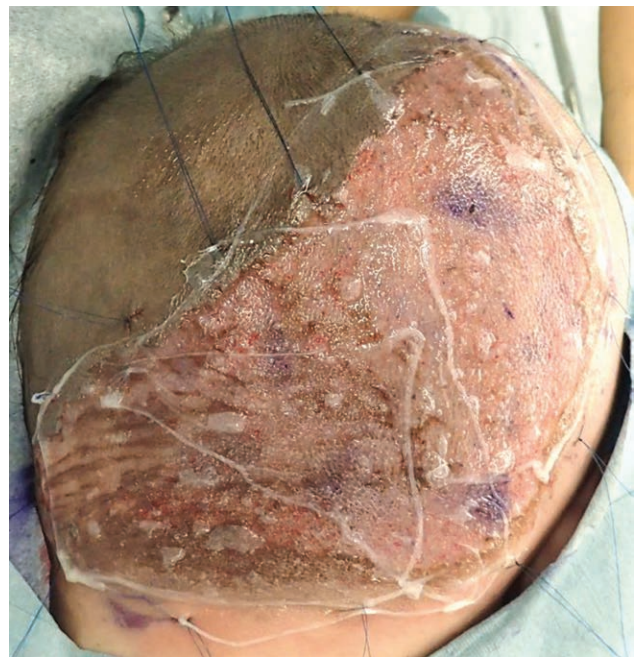
A 2-month-old boy had GCMN 13×21 cm in diameter in his occipital region (Fig. 1). The nevus was large, so we planned a 2-stage surgery using the application of CEA. We took full-thickness skin 15×5 mm in size from the back of the right ear to prepare CEA at 4 months of age under general anesthesia. It takes 3 weeks to prepare CEA, so we performed the first curettage on the right half of the GCMN. The nevus was removed above the cleavage plane easily using a sharp curette from its center to the periphery (Fig. 2). Then, CEA was applied (Fig. 3) and fixed using a silicone-faced wound dressing (SI-Mesh and SI-AID; ALCARE Co., Ltd., Tokyo, Japan) as the contact layer and tie-over dressing. The patient was discharged the day after surgery. The exudate was little, and the tie-over dressing was removed at 10 days postoperatively (see figure, **Supplemental Digital Content 1**, which displays 10 days after first surgery. We could observe epithelization, <http://links.lww.com/PRSGO/A782>). CEA took completely, and the complete epithelization was observed, so wound dressings were not required after that (see figure, **Supplemental Digital Content 2**, which displays 15 days after first surgery. CEA took completely, and the complete epithelization was observed, <http://links.lww.com/PRSGO/A783>). We performed the second curettage for the left half of his nevus at 7 months of age and applied CEA (see figure, **Supplemental Digital Content 3**, which displays 84 days after first surgery and at the time of second surgery, <http://links.lww.com/PRSGO/A784>). Again, CEA took completely (see figure, **Supplemental Digital Content 4**, which displays 8 days after second surgery. Again, CEA took completely, <http://links.lww.com/PRSGO/A785>). Slight erosion was observed on the 15th postoperative day, but it healed



**Fig. 1.** A gross photograph before treatment. A 2-month-old boy had a GCMN 21×13 cm in size in his occipital region.



**Fig. 2.** A gross photograph during the first surgery. The nevus was removed and separated above the cleavage plane easily.



**Fig. 3.** A gross photograph after the application of CEA during the first surgery. CEA was applied after curettage (first operation in the right half of the GCMN).

conservatively promptly (see figure, **Supplemental Digital Content 5**, which displays 15 days after second surgery. Slight erosion was observed, but it healed conservatively within 1 week, <http://links.lww.com/PRSGO/A786>).

At 8 months of age, 117 days after the first surgery and 33 days after the second surgery, no recurrence of the nevus color was observed, with no hair loss observed (Fig. 4).

### DISCUSSION

CEA is prepared using Green's technique; in brief, a small skin biopsy was taken, and keratinocytes were separated and cultured with irradiated 3T3 cells.<sup>8,9</sup> CEA has been widely used for the treatment of severely burned pa-





**Fig. 4.** A gross photograph at 8 months of age. Most of the nevus was removed, and no hair loss was observed. Portions of the nevus remained at the peripheral area.

tients for decades.<sup>9</sup> In Japan, CEA was approved and covered by public health care insurance for the treatment of GCMN in 2016. Whang et al.<sup>1</sup> reported that the time to wound healing using CEA after curettage was faster than in patients treated without CEA. Furthermore, patients treated with CEA experienced less hypertrophic scarring and textural changes than those not treated with CEA, and the pigmentation was almost equivalent between 2 groups. The disadvantages of CEA application are its relatively high cost, 2–3 weeks' delay in operation owing to cultivation<sup>1</sup> and the unpredictable clinical outcomes, with take rates ranging widely from 15% to 85%.<sup>10</sup> However, the take rate of CEA applied after curettage of CGMN is satisfactory, as curettage achieves the removal of the superficial layer of the nevus, and CEA is grafted onto the autologous dermis, which is a desirable wound bed for CEA.<sup>10</sup>

This is the first report of the application of CEA after curettage in the head region. The grafting procedure of CEA is not difficult, and complete epithelization was confirmed after removal of the tie-over dressing. However, CEA was fragile over the next few days after removing that, so we must take care to prevent scratching or other physical stimuli during this period. Hair loss is 1 of the severe issues of concern in the treatment of GCMN in the head region; however, no hair loss was observed in our case. This is probably because the nevus was removed above the cleavage plane atraumatically, thereby preserving the hair roots, and the early epithelization prevented scarring that might cause hair loss. Other issues associated with curettage are delayed wound

healing, hypertrophic scarring, and repigmentation. Delayed wound healing could be prevented by CEA, as we previously reported.<sup>7</sup> This can also prevent hypertrophic scarring. Repigmentation is often observed, as only the nevus cells above the cleavage plane are removed. Although curettage cannot remove all nevus cells, it can remove nevus cells less traumatically than dermabrasion using dermatome.<sup>5</sup>

Whether or not curettage can reduce the risk of malignant transformation is unclear at present.<sup>3,5</sup> However, the decreased number of nevus cells may reduce the risk. It is difficult to remove the nevus in the peripheral area (Fig. 4). To remove this, CO<sub>2</sub> laser irradiation or dermal abrasion should be considered. Repigmentation was not severe in our case; however, careful follow-up will be needed.

## CONCLUSIONS

The application of CEA after curettage in the head region can obtain early epithelization without hair loss.

## PATIENT CONSENT

The patient provided written consent for the use of the images.

Naoki Morimoto

2-5-1 Shin-machi

Hirakata City 573-1010, Japan

E-mail: morimotn@hirakata.kmu.ac.jp

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