

Conservative Surgery for Subungual Melanoma *In Situ* Using Matriderm®

Mariane Campagnari¹, Helio Alberto Carneiro², Andrea Schiavinato Jafelicci²,
Heidy Carmecide da Silva Reis¹, Elimar Elias Gomes¹, Eduardo Bertolli^{1*},
João Pedreira Duprat Neto¹

¹Skin Cancer Department, AC Camargo Cancer Center, São Paulo, Brazil

²Surgical Oncology Residence, AC Camargo Cancer Center, São Paulo, Brazil

Email: *ebertolli@hotmail.com

How to cite this paper: Campagnari, M., Carneiro, H.A., Jafelicci, A.S., Reis, H.C.S., Gomes, E.E., Bertolli, E. and Duprat Neto, J.P. (2017) Conservative Surgery for Subungual Melanoma *In Situ* Using Matriderm®. *Journal of Cancer Therapy*, 8, 861-866.

<https://doi.org/10.4236/jct.2017.810075>

Received: June 28, 2017

Accepted: October 10, 2017

Published: October 13, 2017

Copyright © 2017 by authors and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Standard treatment for subungual melanoma is wide local excision including digit amputation in order to obtain safety margins. Level of amputation has been discussed in order to achieve appropriate oncological results along with preservation of limb function wherein local excision of subungual melanoma *in situ* without amputation is an option. **Methods:** We report two cases of subungual melanoma *in situ* treated by using a conservative approach. Both cases were treated with local excision with the resected tumor defect covered with an artificial dermis, Matriderm®. One case was of a 65-year-old male with a left thumb subungual melanoma *in situ* and another of a 41-year-old female with the same type of melanoma in the left hallux. Full-thickness skin graft was used for reconstruction after 7 weeks from the first surgery in the latter, and in the former case re-epithelization occurred within 90 days after surgery. To date, no clinical signs of recurrence have been found, and finger/toe functions were completely preserved with a minimized scar and little graft bed sensitivity. Follow-up time is two years and ten months for the left thumb case, and one year and six months for the left hallux subungual melanoma *in situ*. **Conclusion:** We present two cases of subungual melanoma *in situ* treated with digit sparing surgery including excision of the periosteum followed by the use of an artificial dermal template to guarantee coverage of the tumor bed defect, providing good functional and cosmetic outcome.

Keywords

Melanoma, Amputation, Artificial Skin

1. Background

Subungual melanoma consists approximately of 0.7% to 3.5% of all melanoma

subtypes [1] and accounts for only 1% - 2% of cutaneous melanoma in caucasians and 15% - 35% in dark-skinned ethnic groups [2] [3].

An uncommon variant of the acral lentiginous melanoma, the subungual melanoma arises from nail matrix and usually presents as a dark-pigmented, black or brown, longitudinal stripe under the nail plate, and may spread to the surroundings of the nail unit [4] [5]. Treatment for subungual melanoma is wide local excision [6] including amputation of fingertip or tip of a toe. Delayed diagnosis frequently results in poor prognosis together with advanced stage of subungual melanoma, requiring amputation of the affected digit [5]. In this manner, digit amputation has been the standard treatment to obtain the safety margins established by the depth of tumor invasion (Breslow) as well as to prevent recurrence and metastasis.

Level or extent of amputation has been discussed throughout decades for accomplishment of both better prognosis and maximum function preservation. In 1992, Park *et al.* reviewed patients with subungual malignant melanoma from The Scottish Melanoma Group database. Patient survival was independent of amputation level along with absence of recurrences reported in seven patients who had undergone local excision [7].

In 2002, Clarkson *et al.* proposed local excision for subungual melanoma *in situ* as an alternative approach [8].

The thumb being the most prevalent site of nail unit melanoma [3] makes functional reconstruction after surgical resection important. Even though no standard surgical treatment has been established for this type of melanoma, radical surgery in a narrow surgical margin with the total thickness skin graft is generally performed. Nevertheless, after this kind of procedure (total-thickness skin graft) or second intention healing, patients often complain about cutaneous sensitivity and scar pain. Although skin grafts and either local or distant flaps offer adequate coverage, they often fail to provide good aesthetic results and may require additional revisions to correct abnormalities [9]. Use of a biosynthetic dermal substitute may decrease donor-site morbidity and help improve limb function and scar quality.

2. Objectives

Demonstrate the use and utility of artificial dermal template as a tool for reconstruction in tumor resection defects in two cases of conservative surgery for nail unit melanoma *in situ*.

3. Case Report

We report two cases of subungual melanoma *in situ* that underwent reconstruction with artificial dermal template following tumor resection in the Skin Cancer Department of AC Camargo Cancer Center. Patients presented diagnosis of subungual melanoma *in situ* comprised one male, Caucasian, 65 years old, former smoker; and one female, also Caucasian, 41 years old, with hypothyroidism.

Anatomic sites and localizations were left thumb and left hallux. A written informed consent was provided for both of them.

Both cases underwent local excision; both with removal of the entire nail apparatus—including periosteum—to provide adequate peripheral and deep excision margins. Following resection, reconstruction was performed with Matri-derm[®] (Dr. Suwelack Skin & Health Care AG, Billerbeck, Germany)—which can be placed over the exposed bone, followed by a full thickness skin graft. Matri-derm[®] 2 mm was attached to the wound margins by sutures to achieve better engraftment and adequate hemostasis improving healing.

A compressive Brown dressing was placed on the area for 5 to 7 days after surgery. Dressing wound was changed every two days with Mepilex AG[®] (Mölnlycke Health Care, Göteborg, Sweden) until skin grafting or complete granulation. No record of contamination or infection was found by the clinical inspection during follow-up.

In the case of the left thumb, no second procedure for reconstruction was required as re-epithelialization occurred within 90 days after surgery (**Figure 1**). In the other case, full-thickness skin graft taken from the inguinal area was used for reconstruction after 7 weeks of the first surgery in the left hallux defect since the area of the defect was larger in that case in comparison with the thumb (**Figure 2**). Histological clearance was achieved for both cases, and at this time of outpatient follow-up, no clinical signs of recurrence were presented, and finger/toe functions were completely preserved with a minimized scar and little graft bed sensitivity. Follow-up time is three years and eleven months for the left thumb case and two years for the left hallux subungual melanoma *in situ*.



Figure 1. Left thumb subungual melanoma *in situ*, (A) clinical aspect before surgery, (B) after wide local excision with exposed periosteum, (C) Matri-derm[®] on the surgical bed, (D) after Brow's dressing, (E) clinical aspect one week after surgery, (F) clinical aspect one month after surgery and (G) clinical aspect after seven months without a second surgery for skin graft.



Figure 2. Left hallux subungual melanoma *in situ*, (H) clinical aspect before surgery, (I) after wide local excision with exposed periosteum, (J) Matriderm® on the surgical bed, (L) after Brow's dressing, (M) clinical aspect one week after surgery, (N) clinical aspect 50 days after surgery, (O) clinical aspect one week after skin graft, (P) clinical aspect 40 days after skin graft and (G) clinical aspect after six months.

4. Discussion

Compared to other melanomas, the nail unit melanoma is generally more advanced at the time of diagnosis. As a consequence, treatment for this type of malignancy has advocated radical surgery *i.e.* phalanx amputation [5] [7]. Conservative treatment of subungual melanoma with non-amputative wide excision of the nail unit [8] [10] followed by a skin graft has been considered an option for the treatment of subungual melanoma diagnosed at an early stage, thus, ensuring a safe and functionally efficient alternative to amputation. Finger function is an important aspect to value.

Wide local excision with safety margins in nail unit melanoma *in situ*, followed by a skin draft to cover surgical defect was first described by Clarkson *et al.* in 2002 [8]. Use of an artificial dermis is an alternative approach to cases of *in situ* subungual melanoma removed with wide margins including the periosteum. The artificial template consists of a three-dimensional structure composed of bovine collagen and elastin fibers. Most of the experience with artificial dermis was obtained in the management of acute burns. In the oncologic population, advantages include fewer problems with hypertrophic scarring and less need for multiple operations and scar contractures [9].

Patients in the report were treated with surgical removal of the entire ungueal apparatus down to the periosteum and wounds were covered in a first step with an artificial dermis (Matriderm®). In one case, total-thickness skin grafting was not needed. Neither case has presented any sensitivity disorder or changes in nerve stimulation of the area treated. These symptoms are very common in cases treated directly with skin-grafted area. By means of localization (fingertip and tip of the toe) and small area of the wound, negative-pressure wound therapy (NPTW) using a vacuum dressing was not needed. Brown compressive dressing was sufficient to avoid hematoma and to make a good integration of the matrix

in the surgical bed possible within the first 5 to 7 days. Changing of dressings with Mepilex AG® is fundamental to avoid contamination or wound infection until skin grafting or complete granulation and further re-epithelization.

Management of melanoma of the nail unit requires consideration of both oncological and reconstructive surgical principles in order to improve chances of cure and quality of life [11]. Conservative surgical treatment for *in situ* melanoma of the nail unit is not a consensus in surgical literature [10]. Use of an artificial dermis e.g. Matriderm® enables a more aggressive approach in cases of *in situ* subungual melanoma removing the lesion down to periosteum, which is not achievable when immediate skin graft is the intended surgical reconstruction. In this matter, use of artificial dermis contributes to a gain in thickness of the removed area, ensuring a longer disease-free recurrence. To date, no recurrences or complications were found in the cases presented. Minimal donor site morbidity has been presented in the patient who underwent total thickness skin graft, and no pain or abnormal nerve stimulation of the wound area has been reported.

5. Conclusion

Tissue repair with dermal skin substitutes appears to be a useful tool for the reconstruction of surgical defects. Although no consensus to conservative treatment of *in situ* subungual melanoma is reached, our so far experience instigates us to continue the study. Further oncological studies on histological evidence to *in situ* melanoma of the nail matrix regarding disease progression and recurrence are required.

Acknowledgements

All authors have contributed significantly and they are all in agreement with the content of the manuscript.

Conflict of Interest Statement

None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

References

- [1] Brodland, D. (2001) The Treatment of Nail Apparatus Melanoma with Mohs Micrographic Surgery. *Dermatologic Surgery*, **27**, 269-273.
- [2] Eedy, D. (2003) Surgical Treatment of Melanoma. *British Journal of Dermatology*, **149**, 2-12. <https://doi.org/10.1046/j.1365-2133.149.s64.8.65.x>
- [3] Phan, A., et al. (2006) Acral Lentiginous Melanoma: A Clinicoprognostic Study of 126 Cases. *British Journal of Dermatology*, **155**, 561-569. <https://doi.org/10.1111/j.1365-2133.2006.07368.x>
- [4] Cochran, A., et al. (2014) Subungual Melanoma. *Plastic and Reconstructive Surgery*, **134**, 259-273. <https://doi.org/10.1097/PRS.0000000000000529>
- [5] Park, S., et al. (2015) Scattered Atypical Melanocytes with Hyperchromatic Nuclei in the Nail Matrix: Diagnostic Clue for Early Subungual Melanoma *In Situ*. *Journal*

- of Cutaneous Pathology*, **43**, 41-52. <https://doi.org/10.1111/cup.12634>
- [6] Chow, W., et al. (2013) *In Situ* Subungual Melanoma: Digit Salvaging Clearance. *Journal of Plastic, Reconstructive & Aesthetic Surgery*, **66**, 274-276. <https://doi.org/10.1016/j.bjps.2012.06.022>
- [7] Park, K., Blessing, K. and Kernohan, N. (1992) Surgical Aspects of Subungual Malignant Melanomas. *Annals of Surgery*, **216**, 692-695. <https://doi.org/10.1097/0000658-199212000-00012>
- [8] Clarkson, J., et al. (2002) Subungual Melanoma *In Situ*: Two Independent Streaks in One Nail Bed. *British Journal of Plastic Surgery*, **55**, 165-167. <https://doi.org/10.1054/bjps.2001.3782>
- [9] Tufaro, A., Buck, D. and Fischer, A. (2007) The Use of Artificial Dermis in the Reconstruction of Oncologic Surgical Defects. *Plastic and Reconstructive Surgery*, **120**, 638-646. <https://doi.org/10.1097/01.prs.0000270298.68331.8a>
- [10] Duarte, A., et al. (2010) Nail Matrix Melanoma *In Situ*: Conservative Surgical Management. *Dermatology*, **220**, 173-175. <https://doi.org/10.1159/000266038>
- [11] Wagner, A., et al. (2007) Subungual Melanoma. *Annals of Plastic Surgery*, **59**, 344-348. <https://doi.org/10.1097/SAP.0b013e31802c54db>