



# A revised modified LICAP flap as a novel oncoplastic breast-conserving surgery technique for Mammary Paget's disease

Timothy Nario<sup>a,b,\*</sup>, Joseph Do Woong Choi<sup>a,c</sup>, Sara Wu<sup>a,d</sup>, Thomas Oh<sup>a,d</sup>, Jeremy Hsu<sup>a,d</sup>

<sup>a</sup> Blacktown Mount Druitt Hospital, Australia

<sup>b</sup> Western Sydney University, Australia

<sup>c</sup> University of Sydney, Australia

<sup>d</sup> Breast Cancer Institute, Westmead Hospital, Australia

## ARTICLE INFO

### Keywords:

Breast-conserving surgery

Modified LICAP

Oncoplastic

Paget's disease

## ABSTRACT

Mammary Paget's disease is a rare form of breast cancer that presents a unique challenge to surgeons for patients who opt for breast-conserving surgery. Due to oncoplastic techniques, the options for breast-conserving surgery have diversified and allow for improved cosmetic outcomes. We present a 68-year-old lady with Mammary Paget's disease who underwent a modified lateral intercostal artery perforator flap with a skin paddle to reconstruct the new areolar region. With this technique, we achieved complete oncological resection with excellent cosmetic outcome.

## 1. Introduction

Mammary Paget's disease (MPD) occurs in 1%–3% of all primary breast cancer. [1] It is a cutaneous intraepithelial malignancy with the presence of large epidermal adenocarcinoma cells, called Paget's cells, within the squamous epithelium of the nipple. [2] These Paget's cells may extend into the areola and adjacent skin. [2].

Currently, the two primary surgical treatments for MPD are total mastectomy or breast-conserving surgery (BCS). [3,4] Patients who elect for BCS have historically been treated with a central lumpectomy including excision of the nipple areolar complex (NAC) [5,6] and primary closure of the anterior defect of the skin. This results in a cosmetically inferior result, with a change in breast contour. However, oncoplastic techniques have expanded the surgical options for BCS with improved cosmetic outcomes. [7] These include volume displacement techniques using local skin flaps (such as the modified Grisotti flap) and volume replacement techniques using pedicle flaps (such as the latissimus dorsi myocutaneous flap). [5,7,8] Although volume displacement techniques reasonably address the oncological resection of the NAC, they can be associated with suboptimal cosmesis. These include breast asymmetry, contour deformities by local retraction, breast animation deformities and fat necrosis. [9].

We report a 68-year-old female with MPD. She was treated with BCS using a revised modified lateral intercostal artery perforator (m-LICAP)

flap described by Meybodi et al. [10] By employing a volume replacement technique, the authors hypothesised to address contour changes associated with other BCS approaches for MDP.

## 2. Case presentation

A 68-year-old lady presented with right nipple pruritus, with core biopsy demonstrating MPD of her right breast. She had no personal or family history of breast cancer. Her background history included type 2 diabetes mellitus. On examination, there were eczematous changes to the right nipple, with nipple retraction, without any palpable masses. There was no palpable axillary lymphadenopathy. A mammogram, ultrasound and magnetic resonance imaging did not identify any underlying mass in the breast, or pathological axillary lymph nodes. Following discussion at the breast multidisciplinary meeting (MDM), she consented for BCS.

To achieve volume replacement and maintain breast symmetry, we employed the m-LICAP flap, coupled with a distal skin paddle to fill the cutaneous defect made after excision of the NAC and underlying tissue. Following marking of the LICAP vessels in their anatomical location within the 'triangle of plenty' (Fig. 1a), a circumareolar incision was made to excise the NAC down to pectoralis major (Fig. 1b). Next, two "lazy S" incisions were made along the lateral mammary fold toward the lower axilla as is the standard approach of the m-LICAP technique, and

\* Correspondence to: Mount Druitt Hospital, NSW, 2770, Australia.

E-mail address: [timothynario@gmail.com](mailto:timothynario@gmail.com) (T. Nario).

<https://doi.org/10.1016/j.sycrs.2024.100020>

Received 6 April 2024; Accepted 27 April 2024

Available online 30 April 2024

2950-1032/© 2024 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

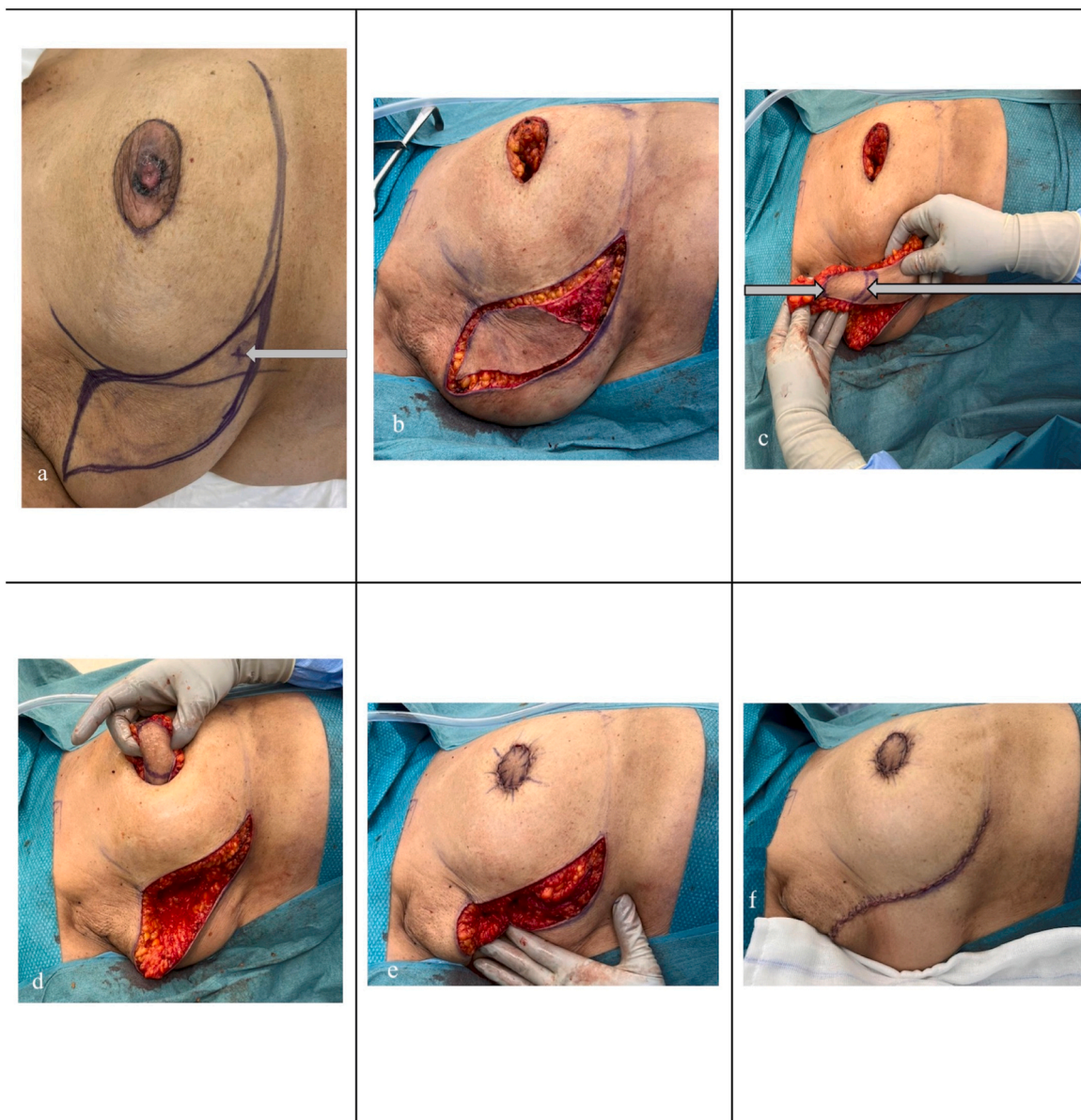
the skin overlying the proximal m-LICAP pedicle was de-epithelialized, leaving a distal skin paddle with which to create a neo-areola (Fig. 1c). A radial tunnel was created without resecting breast tissue, between the excised NAC defect and the lateral mammary fold adjacent to the pedicle of the flap. The tunnel can be created by either dissecting in a straight line through the breast parenchyma, or by excising a cylinder of tissue. The flap was mobilised while preserving the perforators, then rotated medially and passed through the radial tunnel for optimal filling of the NAC defect (Fig. 1d). The flap was able to reach the central defect without tension. The skin paddle of the flap was formally trimmed into a circle of the neo-areola and secured into the new position within the central defect with 3/0 monocryl deep dermal suture and 4/0 non-absorbable V-Loc suture (Fig. 1e). The “lazy S” incision was closed with 3/0 monocryl, and 4/0 absorbable V-Loc suture (Fig. 1f).

This achieved an excellent cosmetic outcome (Fig. 2, Fig. 3). Histopathology demonstrated Paget’s disease within the epidermis, with high-grade ductal carcinoma in situ (DCIS), and clear oncological

margins. There was no evidence of invasive carcinoma. The MDM consensus was for adjuvant radiotherapy, and annual surveillance for five years with mammogram and ultrasound.

### 3. Discussion

With its central location, MPD requires resection of the entire NAC. Although total mastectomy is an acceptable treatment option [11], a systematic review and meta-analysis from Lin et al. demonstrated that when comparing mastectomy with BCS + radiotherapy for MPD with DCIS (as was this case), there was no significant difference in local recurrence rates (2.7% vs 7%,  $P = 0.068$ ). [12] However, appropriate patient selection is required as certain patient and tumour factors are associated with poorer prognosis, including; MPD with palpable mass, positive lymph node status, and histology demonstrating invasive breast cancer. [12] Patients with these factors may benefit greater from a total mastectomy rather than BCS with or without radiotherapy. [11]



**Fig. 1.** (a) Preoperative mapping of the m-LICAP flap. Arrow indicates where the lateral intercostal artery gives perforators to the flap ('triangle of plenty'); (b) Post-lumpectomy of the NAC with de-epithelialization along the LICAP flap and the distal skin paddle preserved; (c) Intraoperative mobilisation of the LICAP flap with distal skin paddle preserved. Arrows indicate the markings of the new areola; (d) m-LICAP flap and skin paddle mobilised through the radial tunnel to replace the NAC cavity; (e) skin paddle supported to new areolar location and (f) Immediate post-procedure wound.



Fig. 2. Wound at postoperative day seven.



Fig. 3. Wound ten weeks postoperatively.

Developments in oncoplastic surgery have expanded the potential options for breast-conserving treatment in MPD without affecting local recurrence or survival rates. [5] Reported oncoplastic techniques include plug-flap or pedicle techniques such as the Grisotti flap mammoplasty or Wise-Pattern mammoplasty. [5,6,11].

Cosmetic sequelae of volume displacement techniques such as the Grisotti flap can affect up to 17% of patients who undergo breast oncoplastic procedures. [9] These include breast asymmetry, contour deformities by local retraction, breast animation deformities and fat necrosis. [9] On the other hand, our revised m-LICAP technique offers volume replacement as a BCS alternative for MPD. It effectively replaces breast volume, as the radial tunnel allows the flap tissue to adequately fill the central defect. This addresses cosmetic concerns such as breast contour changes, obviating the need for additional symmetrizing surgery on the contralateral breast. [10] Another advantage is the resulting surgical scar located in the lateral mammary fold. This is less visible and more cosmetically pleasing when compared to anterior chest wall scars seen in other forms of BCS. [10] Furthermore, the distal skin paddle can be trimmed to accurately match the NAC excision defect, resulting in an aesthetically pleasing new areolar region. In our case, the pigment of skin where the LICAP was harvested closely matched the original areola pigment. Postoperatively, patients may elect to have dermatography to produce symmetrical and colour matched NACs. [10].

#### 4. Conclusion

MPD is a rare form of breast cancer with treatment involving either mastectomy or BCS. [5,11] The authors report a revised m-LICAP flap in MPD, a novel BCS volume replacement technique that provides cosmetic advantages over current volume displacement techniques, without compromising oncological outcomes.

#### Funding statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

#### Patient consent

Written informed consent for the publication of their information and images was obtained from the patient included in the study.

#### Author contributions

SW and JH conceived the study. SW, TO, JC and TN performed the surgery. TN, JC and SW drafted the manuscript, TO and JH revised it critically. All authors read and approved the final manuscript.

#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Data availability

No data was used for the research described in the article.

#### References

- [1] Berg JW, Hutter RV. Breast cancer. *Cancer* 1995;75(1 Suppl):257–69.
- [2] Ooi PS, Draman N, Yusoff SSM, Zain WZW, Ganasagaran D, Chua HH. Mammary Paget's disease of the nipple: relatively common but still unknown to many. *Korean J Fam Med* 2019;40(4):269–72.
- [3] Helme S, Harvey K, Agrawal A. Breast-conserving surgery in patients with Paget's disease. *Br J Surg* 2015;102(10):1167–74.

- [4] Marcus E. The management of Paget's disease of the breast. *Curr Treat Options Oncol* 2004;5(2):153–60.
- [5] Pelorca RJF, de Oliveira-Junior I, da Costa Vieira RA. Oncoplastic surgery for Paget's disease of the breast. *Front Oncol* 2023;13:1151932.
- [6] Kijima Y, Yoshinaka H, Shinden Y, Hirata M, Nakajo A, Arima H, et al. Oncoplastic breast surgery for centrally located breast cancer: a case series. *Gland Surg* 2014;3(1):62–73.
- [7] Canturk NZ, Simsek T, Ozkan Gurdal S. Oncoplastic breast-conserving surgery according to tumor location. *Eur J Breast Health* 2021;17(3):220–33.
- [8] Buller M, Heiman A, Davis J, Lee TJ, Ajkay N, Wilhelmi BJ. Immediate breast reconstruction of a nipple areolar lumpectomy defect with the L-Flap skin paddle breast reduction design and contralateral reduction mammoplasty symmetry procedure: optimizing the oncoplastic surgery multispecialty approach. *Eplasty* 2017;17:e14.
- [9] Acea-Nebril B, Garcia-Novoa A, Cereijo-Garea C. Cosmetic sequelae after oncoplastic breast surgery: long-term results of a prospective study. *Breast J* 2021;27(1):35–43.
- [10] Meybodi F, Cocco AM, Messer D, Brown A, Kanesalingam K, Elder E, et al. The modified lateral intercostal artery perforator flap. *Plast Reconstr Surg Glob Open* 2019;7(2):e2066.
- [11] Markarian S, Holmes DR. Mammary Paget's disease: an update. *Cancers* 2022;14(10).
- [12] Lin CW, Chiang MH, Tam KW. Treatment of mammary Paget disease: a systematic review and meta-analysis of real-world data. *Int J Surg* 2022;107:106964.