

Case Report



Recurrence of Breast Carcinoma as Paget's Disease of the Skin along the Core Needle Biopsy Tract after Skin-Sparing Mastectomy

Soojeong Choi , Eun Key Kim , Joonseog Kong , Gyungyub Gong ,
Hee Jung Shin , Young Joo Lee , Byung Ho Son , Sei Hyun Ahn , Jong Won Lee

Department of Surgery, Asan Medical Center, College of Medicine, University of Ulsan, Seoul, Korea

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Correspondence to

Jong Won Lee

Department of Surgery, Asan Medical Center,
College of Medicine, University of Ulsan, 88
Olympic-ro 43-gil, Songpa-gu, Seoul 05505,
Korea.

E-mail: jijongwr@hanmail.net

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ORCID iDs

Soojeong Choi

<https://orcid.org/0000-0003-3094-3651>

Eun Key Kim

<https://orcid.org/0000-0002-3986-6886>

Joonseog Kong

<https://orcid.org/0000-0003-4151-4617>

Gyungyub Gong

<https://orcid.org/0000-0001-5743-0712>

Hee Jung Shin

<https://orcid.org/0000-0002-3398-1074>

Young Joo Lee

<https://orcid.org/0000-0001-5352-8093>

Byung Ho Son

<https://orcid.org/0000-0002-6757-0388>

Sei Hyun Ahn

<https://orcid.org/0000-0002-6705-7867>

Jong Won Lee

<https://orcid.org/0000-0001-7875-1603>

ABSTRACT

We report a case of recurrence as Paget's disease at the core needle biopsy (CNB) entry site in a patient with microinvasive ductal carcinoma who underwent nipple-areola-skin sparing mastectomy (NASSM) and autologous reconstruction. Clinically diagnosed recurrences associated with previous needle procedures for malignant breast lesions are rare and usually occur in patients who have not received radiation therapy. The present case involved local recurrence at the skin puncture site of a patient diagnosed based on CNB findings who underwent NASSM without receiving radiation therapy. Although the removal of the CNB tract with resected breast tissue is not always emphasized, the skin puncture site should be recorded to detect abnormal skin changes after surgery for the timely detection and management of complications.

Keywords: Biopsy, large-core needle; Breast neoplasms; Mastectomy, radical; Paget's disease, mammary; Recurrence

INTRODUCTION

Core needle biopsies (CNBs) have become the routine procedure for the preoperative evaluation of malignant breast lesions. The risk of local recurrence after needle track seeding has received long-standing interest [1-4]. However, because its low prevalence in clinical practice [4], clinicians who perform this procedure tend to underestimate its clinical significance. In addition, as skin preservation procedures followed by immediate reconstruction are increasingly preferred for cosmetic reasons, surgeons have more difficulty drawing incision lines including the biopsy puncture site. The reality is that in patients who undergo surgery after needle biopsy, certain tracts are retained, which could be incorporated into the excised tissue by more radical surgeries. We report the case of a patient who underwent nipple-areola-skin sparing mastectomy (NASSM) and autologous reconstruction for microinvasive ductal carcinoma and subsequently had a recurrence of Paget's disease of the skin at the entry site of the original CNB tract.

Conflict of Interest

The authors declare that they have no competing interests.

Author Contributions

Conceptualization: Choi S, Gong G, Lee YJ, Lee JW; Data curation: Choi S, Kim EK, Kong J, Gong G, Shin HJ, Lee YJ, Lee JW; Formal analysis: Choi S, Kim EK, Kong J, Gong G, Shin HJ, Lee JW; Investigation: Kim EK, Lee JW; Methodology: Lee JW; Project administration: Lee JW; Supervision: Kim EK, Gong G, Shin HJ, Son BH, Ahn SH, Lee JW; Writing - original draft: Choi S, Lee JW; Writing - review & editing: Choi S, Kim EK, Kong J, Shin HJ, Son BH, Ahn SH, Lee JW.

CASE REPORT

A 54-year-old woman was diagnosed with hormone receptor-negative and human epidermal growth factor receptor 2 (HER2)-positive ductal carcinoma *in situ* in the right inner quadrant of the breast on March 31, 2016 and underwent a successful conservation surgery followed by radiotherapy. After a 20-month disease-free period, breast tumor recurrence was suspected on routine breast ultrasonography of the right outer quadrant; recurrence was confirmed by performing 14-gauge semiautomatic gun biopsy (Stericut; TSK Laboratory, Tochigi-ken, Japan) using the standard method with a mean of five core samples (range, 4–7) per lesion. The needle entered the breast at an approximately 7 o'clock direction. On November 20, 2017, she underwent NASSM with immediate reconstruction using a latissimus dorsi flap. The skin of the previous needle biopsy site was also preserved. The final pathology revealed ductal carcinoma in situ with lesions measuring 1.5 × 6 cm and only one focus of microinvasion (T1mic N0 M0). The superficial and deep margins and the three sentinel nodes of the mastectomy specimen were free of carcinoma. The patient had been receiving tamoxifen as adjuvant endocrine therapy since the second operation because the invasive focus was weakly positive for estrogen receptor (ER), negative for progesterone receptor (PR), and positive for HER2 (3+).

At the routine 6-month follow-up, physical examination and mammography revealed no abnormal findings, but around 1 year after the NASSM, the patient observed a lesion on the lower outer surface of the right preserved breast skin. The lesion gradually increased in size and measured up to 1.8 × 1.5 cm at the time of outpatient clinic follow-up visit. This site was not close to the mastectomy incision scar but was at the same site as the previous CNB entry point (Figure 1). At first sight, the skin change appeared to be related to chronic inflammation of the CNB area and was initially treated in accordance with the standard wound care protocol, including debridement. Although the lesion decreased in size, it persisted for 5 weeks; thus, we decided to perform a pathology test on February 1, 2019. Skin punch biopsy revealed tumor cells limited to the epidermis (i.e., Paget's disease). The entire area of the affected skin was excised, with a total size of 2.5 × 1.5 cm (Figure 2). Primary closure was performed with



Figure 1. Photograph taken by the plastic surgeon when the patient visited the outpatient clinic. Around 1 year after nipple areolar skin-sparing mastectomy with immediate reconstruction using a latissimus dorsi flap, the lesion on the lower outer surface of the right preserved breast skin was not close to the mastectomy incision scar but coincided exactly with the previous core needle biopsy entry point. The lesion gradually increased in size and measured up to 1.8 × 1.5 cm.

negative margins. On microscopic examination, the area involving the carcinoma was 0.8×0.8 cm and confined to the epidermis. In addition, fibrous changes indicating the prior CNB tract were observed originating from the skin lesion (**Figure 3**). The carcinoma was negative for ER and PR and positive for HER2. No evidence of ectopic nipple, residual breast tissue, or apocrine glands was observed. Therefore, the most reasonable explanation was the iatrogenic displacement of the tumor cells to the epidermis of the breast during the previous CNB. The patient has been followed up without further treatment.

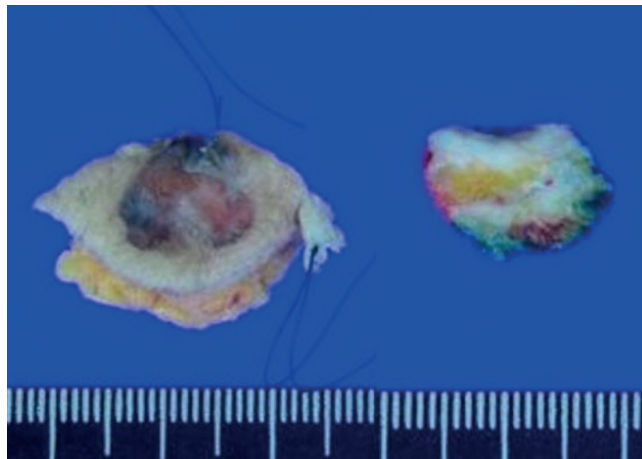


Figure 2. A lump of breast tissue with attached skin excised, with a total size of 2.5×1.5 cm. No resection margins were involved.

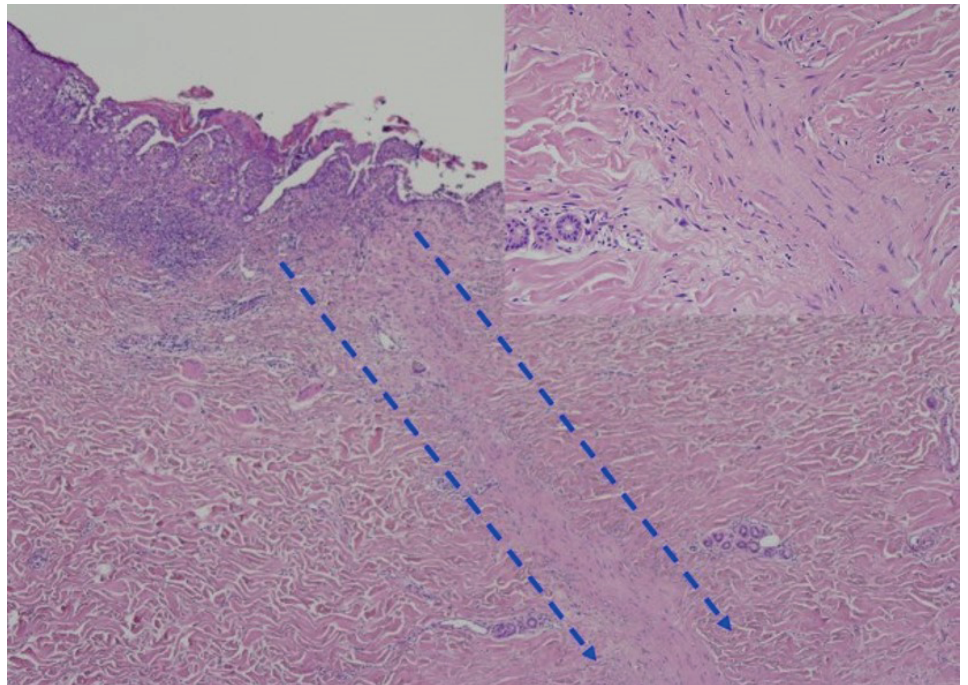


Figure 3. No dermal invasion and evidence of ectopic nipple, apocrine glands, or eccrine gland involvement. Fibrous changes indicating the prior core needle biopsy tract can be observed originating from the skin lesion. (hematoxylin-eosin staining, original magnification $\times 40$; inset, original magnification $\times 200$).

DISCUSSION

The possibility of iatrogenic displacement of epithelial cells during preoperative invasive procedures such as CNB has been demonstrated, although the reported rates range from 4% [1] to 38% [3]. However, whether displaced tumor cells can survive in the long term remains controversial. The analysis of 352 surgically removed breast specimens by Diaz et al. revealed that the incidence and amount of tumor displacement were inversely related to the interval between core biopsy and surgical excision, which suggests that tumor cells do not survive displacement [3]. With a more clinical approach, Chen et al. [4] compared local recurrence rates between the stereotactic CNB and excisional biopsy groups and concluded that cancers diagnosed by means of stereotactic CNB were not associated with an increased incidence of local recurrence after breast conservation surgery and radiotherapy. Although the clinical implications are yet to be resolved, the rarity of clinically diagnosed recurrence at the CNB track supports the viewpoint that routine skin removal and CNB at the expense of compromised cosmesis is not required, especially for women undergoing radiotherapy.

The removal of skin including CNB site has been adopted based on the expert opinion that the removal of the needle track as a part of the planned surgical resection or as a separate excision is not mandatory when the benefits are weighed against the risks. The reduction in recurrence risk brought about by the elimination of residual tumor cells is likely to be much smaller than the increase in cosmetic impairment associated with this maneuver. However, recent modifications in the recommended surgical techniques for breast cancer suggest that clinicians need to review their preferences. The use of skin preservation techniques for facilitating immediate reconstruction following total mastectomy has been increasing, but the use of post-mastectomy radiotherapy in these patients is less common. The oncological safety of skin-sparing mastectomy has been demonstrated [5-9], but reports focusing on tract seeding and its clinical impact are scarce and mainly comprise case reports [10-12]. In a relatively recent case report by Calvillo et al. [11], erythema and a scaling crust developed on the right breast skin 18 months after bilateral skin-sparing mastectomies, progressed over several months, and was pathologically proven to be a recurrence as Paget's disease of the breast skin at the previous CNB site. The authors commented that delayed detection was due to the failure to recognize a skin lesion at the original needle entry site. Our patient was suspected to have recurrence after 5 weeks of close observation, which was confirmed pathologically by skin punch biopsy.

According to the 13 cases summarized in the literature review by Calvillo et al. [11], needle tract recurrence seemed to have no definite risk factors such as biopsy type, primary carcinoma histology, immunohistochemical subtype, or adjuvant systemic treatment. However, postoperative radiotherapy may play a role in preventing displaced tumor cells from achieving the potential for settling, growing, and metastasizing [4,11]. None of these patients underwent radiotherapy. In our case, adjuvant radiotherapy was performed after the initial conservative surgery but was not possible after the NASSM. Although a prospective randomized controlled trial has been undertaken to confirm the prophylactic role of radiotherapy in the prevention of procedure-tract metastases in malignant pleural mesothelioma [13], most reported needle tract recurrences occurred in radiotherapy-naive patients with breast carcinoma [5,10,11,14].

It is interesting that the ER expression differed among initial, in-breast recurrent, and recurrent tumors at the puncture site (ER expression: negative, weakly positive, and negative,

respectively). If the intra-tumoral heterogeneous characteristics of breast carcinoma are considered, this finding should not be regarded as supporting evidence against recurrence at the true puncture site [15].

In conclusion, clinically detected recurrence associated with prior needle procedures for malignant breast lesions is rare, but cases predominantly involve patients who have not received radiotherapy. We present a case of local recurrence at the skin puncture site involving a patient who underwent NASSM and was diagnosed through CNB. Although we do not emphasize the removal of the CNB tract along with the excised breast tissue in all cases, we suggest that the skin puncture site must be checked and recorded in the patient's operation notes during surgery so that postoperative abnormal skin changes can be easily investigated, detected early, and managed in a timely manner. In addition, patients undergoing skin-sparing mastectomy, as in our case, should be given more attention during physical examination and be educated about self-examination to facilitate early detection of recurrence at the biopsy site.

REFERENCES

1. Grabau DA, Andersen JA, Graversen HP, Dyreborg U. Needle biopsy of breast cancer. Appearance of tumour cells along the needle track. *Eur J Surg Oncol* 1993;19:192-4.
[PUBMED](#)
2. Youngson BJ, Cranor M, Rosen PP. Epithelial displacement in surgical breast specimens following needling procedures. *Am J Surg Pathol* 1994;18:896-903.
[PUBMED](#) | [CROSSREF](#)
3. Diaz LK, Wiley EL, Venta LA. Are malignant cells displaced by large-gauge needle core biopsy of the breast? *AJR Am J Roentgenol* 1999;173:1303-13.
[PUBMED](#) | [CROSSREF](#)
4. Chen AM, Haffty BG, Lee CH. Local recurrence of breast cancer after breast conservation therapy in patients examined by means of stereotactic core-needle biopsy. *Radiology* 2002;225:707-12.
[PUBMED](#) | [CROSSREF](#)
5. Agrawal A, Sibbering DM, Courtney CA. Skin sparing mastectomy and immediate breast reconstruction: a review. *Eur J Surg Oncol* 2013;39:320-8.
[PUBMED](#) | [CROSSREF](#)
6. Patani N, Mokbel K. Oncological and aesthetic considerations of skin-sparing mastectomy. *Breast Cancer Res Treat* 2008;111:391-403.
[PUBMED](#) | [CROSSREF](#)
7. Kim HJ, Park EH, Lim WS, Seo JY, Koh BS, Lee TJ, et al. Nipple areola skin-sparing mastectomy with immediate transverse rectus abdominis musculocutaneous flap reconstruction is an oncologically safe procedure: a single center study. *Ann Surg* 2010;251:493-8.
[PUBMED](#) | [CROSSREF](#)
8. Lim W, Ko BS, Kim HJ, Lee JW, Eom JS, Son BH, et al. Oncological safety of skin sparing mastectomy followed by immediate reconstruction for locally advanced breast cancer. *J Surg Oncol* 2010;102:39-42.
[PUBMED](#) | [CROSSREF](#)
9. Lee SB, Lee JW, Son BH, Eom JS, Kim EK, Lee TJ, et al. Oncologic safety of skin-sparing mastectomy followed by immediate reconstruction in young patients with breast cancer. *Asian J Surg* 2019;42:274-82.
[PUBMED](#) | [CROSSREF](#)
10. Uriburu JL, Vuoto HD, Cogorno L, Isetta JA, Candas G, Imach GC, et al. Local recurrence of breast cancer after skin-sparing mastectomy following core needle biopsy: case reports and review of the literature. *Breast J* 2006;12:194-8.
[PUBMED](#) | [CROSSREF](#)
11. Calvillo KZ, Guo L, Brostrom V, Schnitt SJ, Hong X, Raza S, et al. Recurrence of breast carcinoma as Paget disease of the skin at a prior core needle biopsy site: case report and review of the literature. *Int J Surg Case Rep* 2015;15:152-6.
[PUBMED](#) | [CROSSREF](#)

12. Kawasaki T, Ishida M, Tada T, Matsuya H, Saitoh M, Sato A, et al. Well-differentiated neuroendocrine tumor of the breast with recurrence due to needle tract seeding. *Virchows Arch* 2015;466:479-81.
[PUBMED](#) | [CROSSREF](#)
13. Clive AO, Taylor H, Dobson L, Wilson P, de Winton E, Panakis N, et al. Prophylactic radiotherapy for the prevention of procedure-tract metastases after surgical and large-bore pleural procedures in malignant pleural mesothelioma (SMART): a multicentre, open-label, phase 3, randomised controlled trial. *Lancet Oncol* 2016;17:1094-104.
[PUBMED](#) | [CROSSREF](#)
14. Thurffjell MG, Jansson T, Nordgren H, Bergh J, Lindgren A, Thurffjell E. Local breast cancer recurrence caused by mammographically guided punctures. *Acta Radiol* 2000;41:435-40.
[PUBMED](#) | [CROSSREF](#)
15. Shi YJ, Tsang JY, Ni YB, Tse GM. Intratumoral heterogeneity in breast cancer: a comparison of primary and metastatic breast cancers. *Oncologist* 2017;22:487-90.
[PUBMED](#) | [CROSSREF](#)