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## Potential of Tumor Cell Seeding and Clinical Impact on Percutaneous Breast Biopsy Tracks: A Literature Review

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### Abstract

**Introduction.** Based on its effectiveness, a percutaneous breast biopsy was chosen because it has minimum side effects and fewer complications, does not distort the breast tissue architecture, and can be performed on an outpatient basis. However, the biopsy can damage the integrity of tumor cells, creating seeding at the site of the track made. Therefore, core biopsy is the method of choice for breast lesion sampling using a 14G needle that provides greater sensitivity. This study aims to explain whether the percutaneous biopsy track has the potential for the formation of tumor cell seeding and its clinical impact.

**Methods.** Literature searches were conducted in online databases, including Cochrane Library, MEDLINE (PubMed), ScienceDirect, CINAHL (EBSCOhost), and Google Scholar.

**Results.** Eight articles were selected after a literature search and review.

**Conclusion.** The potential of tumor seeding formation in the percutaneous breast biopsy tracks varies statistically in number. Overall, the potential of tumor seeding in the percutaneous breast biopsy tracks varies, and the clinical impact is insignificant. Variations in the prevalence of tumor seeding still inconclusive the potential for tumor seeding formation in the percutaneous breast biopsy pathway, particularly core biopsy. Tumor seeding is only found microscopically and does not have a significant clinical impact.

**Keywords:** Percutaneous biopsy, core biopsy tracks, tumor seeding, clinical impact

### Introduction

The diagnostic process is one of the most critical processes in managing breast cancer. It can be performed using two approaches: an open biopsy approach (incision and excision biopsy) or percutaneous biopsy, which consists of fine-needle aspiration, core, and vacuum-assisted biopsies.<sup>1,2</sup> The accuracy of percutaneous biopsy is around 86%, especially in patients with suspected malignant lesions.<sup>3</sup> Core biopsy is the method of choice for breast lesions sampling. In the core biopsy, the needle was 14G to take more tissue for the specimen.<sup>3</sup> The procedure of percutaneous biopsy may injure normal breast cells. This is because the needle passes through normal cells and penetrates cancer cells may increase the risk of tumor seeding. Tumor seeding is a condition in which malignant cells are deposited along the track or path of entry of the biopsy needle, which is used in Fine Needle Aspiration Biopsy (FNAB) or core biopsy.<sup>4</sup> The biopsy can damage the integrity of tumor cells because it can cause tumor seeding at the site of the track made. Therefore, the interval between biopsy and definitive surgery should not be too long—meanwhile, dr. Cipto Mangunkusumo General Hospital (CMGH) has a long waiting time between biopsy and definitive surgery, so it is essential to determine whether there is a possibility of tumor seeding in the biopsy track and to what extent the seeding has occurred. If tumor seeding occurs, it will affect the patient's clinical course, mainly if changes in the staging impact the selection of appropriate therapy.<sup>5,6</sup> This study aims to determine whether the percutaneous biopsy track has the potential for the formation of tumor cell seeding and its clinical impact.

### Method

This study was conducted at the Department of Surgery, FMUI-CMGH, from February to May 2020. The study design is a literature review that discusses the potential of tumor cell seeding and its clinical impact on the percutaneous breast biopsy track. Literature searches were conducted in The Cochrane Library, MEDLINE (PubMed),

ScienceDirect, CINAHL (EBSCOhost), and Google Scholar using the keywords (“percutaneous breast biopsy track” or “core breast biopsy track”) and (“seeding tumor”). The selection criteria followed their relevance to the topic based on the title, abstract, or full-text contained in the study. Therefore, the eligibility criteria were articles focused on percutaneous biopsy, available in full text. In contrast, those that were not a percutaneous biopsy were excluded.

### Results

Out of fifteen articles found in the search, eight studies were selected. The selection process is drawn in figure 1.

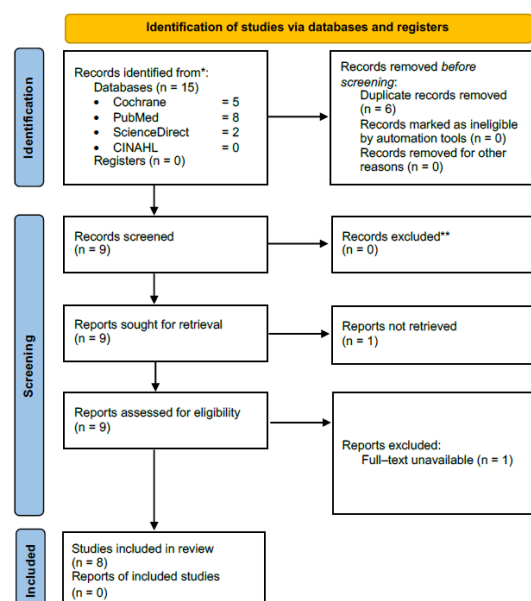


Figure 1. Literature search following Prisma flow 2020.

No	Author / Year	Sample Size	Study design	Level of evidence	Outcome	Notes
1	Brenner et al., 2011	1644	Case series	4	2 cases (0,7%) associated with core biopsy	No specific parameter about needle size, lesion type, or histology found
2	Uematsu et al., 2007	207	Retrospective Cohort	2b	One hundred thirty-four positive cases (65%) from seeding risk and 160 cases (77%) of needle-track shift risk.	-
3	Fitzal et al. 2006	719	Retrospective cohort	2b	Patients with pre-operation core biopsy had a local recurrence rate of 1,1%, while patients without core biopsy were about 2,1%.	No significant differences between both groups of patients statistically.
4	Hooftjea et al. 2004	64	Prospective cohort	2b	The biopsy track was founded on 22 specimens from 64 cases. Tumor seeding was founded in 11 of them (50%).	The interval between core biopsy and surgery was 21 days.
5	Knight, et al. 2002	398	Retrospective cohort	2b	11 (3,7%) patients from the IGCNB group who took the breast-conserving therapy experienced local recurrence.	No significant differences statistically.
6	Thurjell et al. 2000	303	Prospective cohort	2b	3 (9%) patients experienced local recurrence, which was suspected due to tumor seeding on the biopsy track.	-
7	Diaz et al. 1999	352	Prospective cohort	2b	Tumor cell shifting found in 114 cases (32%) Generally, tumor seeding occurs in all three types of procedures. Sixty-five patients (58%) had a tumor spread in 2 weeks, and 11 patients (10%) had a tumor spread in more than four weeks post-procedure.	Parameters evaluated microscopically were no spread, minimal spread, and extensive spread.
8	Lawrence et al. 1992	1	Case report	4	The consideration of tumor seeding formation might not be relevant.	-

## Discussion

Tumor seeding is a condition in which malignant cells are deposited along the track of insertion of the biopsy needle, either in FNAB or core biopsy.<sup>4</sup> Inflammatory reactions and the tumor's invasive nature can trigger tumor seeding growth. Tumor seeding in percutaneous breast biopsy is still controversial, especially in the core needle biopsy. This study found that tumor seeding was associated with the percutaneous biopsy track in all journals but with varying amounts. Uematsu et al. explained that the incidence of tumor seeding could reach 77%. Still, no detailed information about the outcome was described, and this study focused on the tissue taken by core needles.<sup>7</sup> Each article presents the various numbers of tumor seeding events. James et al. explained that the incidence of small tumor seeding was 0.7% of the case number obtained. However, no information about needle size, lesion type, or histology describes tumor seeding.<sup>8</sup>

Hooftjea et al. stated that 50% of the cases studied had a tumor seeding process.<sup>9</sup> The study indicated that the time interval from the tissue collection process to the first surgery was 21 days on average. This study explicitly uses a 14G needle. Additionally, Diaz et al. stated that 58% of patients had tumor spread within two weeks and 10% within four weeks ( $p < 0.005$ ).<sup>10</sup> This is of interest because, in both studies, a time parameter was evaluated for the formation of a tumor seeding. According to Diaz et al., the duration between biopsy and surgery is related to the spreading of tumor cells.<sup>10</sup>

Other studies stated that the potential of tumor seeding was not more than 10%, so there was no relationship between tumor seeding and biopsy track.<sup>5,11,12</sup> In conclusion, from the articles we reviewed, there

remains controversy about whether the core biopsy track can cause tumor seeding.

None of the articles reviewed explained in detail the clinical impact of tumor seeding on the biopsy track. Only Diaz et al. specifically assessed this impact. The parameters evaluated in that study were microscopical, divided into no spread, minimal spread, and extensive spread.<sup>10</sup> Based on this study, tumor seeding is only found microscopically and does not have a significant clinical impact.

Thus, we have the potential of tumor seeding in the percutaneous breast biopsy track statistically varies. The clinical impact of tumor seeding on the biopsy tracks was limited to the microscopic tumor seeding and did not affect clinical changes. However, the interval between biopsy and surgery is influential because the longer the interval between the biopsy and the surgery, the less clinical impact can appear because the tumor cells cannot survive in the new microenvironment. In addition, the microenvironment of the tumor cells has not appropriately formed in tumor seeding, so the tumor cells are vulnerable and can be destroyed by the immune system.<sup>10,13</sup>

## Conclusions

The tumor seeding found in the percutaneous breast biopsy track varies in number, and it is still inconclusive whether percutaneous breast biopsy could cause seeding. The tumor seeding in the literature review was still microscopically changed, and the clinical impact is insignificant. The longer the interval between biopsy and surgery, the more possible clinical changes will occur. The choice of the diagnostic procedure still prioritizes the interests of the patient.

## Disclosure

The authors declare no conflict of interest.

## Role of authors

Author1 Conceptualization Data curation Formal analysis Funding acquisition Investigation Methodology Project administration Resources Software Supervision Validation Visualization Writing

## References

1. Wibisana IG. Biopsi Tumor Payudara. In: Sobri FB, Azhar Y, Wibisana IG, Rachman A, editors. Manajemen Terkini Kanker Payudara. II. Jakarta: Sagung Seto; 2018. p. 122–43.
2. Łukasiewicz E, Ziemięcka A, Jakubowski W, Vojinovic J, Boguevska M, Dobruch-Sobczak K. Fine-needle versus core-needle biopsy – which one to choose in preoperative assessment of focal lesions in the breasts? Literature review. *J Ultrason*. 2017;17:267–74.
3. Lee AHS, Denley HE, Pinder SE, Ellis IO, Elston CW, Vujovic P, et al. Excision biopsy findings of patients with breast needle core biopsies reported as suspicious of malignancy (B4) or lesion of uncertain malignant potential (B3). *Histopathology*. 2003;42(July 1998):331–6.
4. Shyamala K, Girish HC, Murgod S. Risk of tumor cell seeding through biopsy and aspiration cytology. *J Int Soc Prev Community Dent*. 2014;4(1):5–11.
5. Cheung KJ, Ewald AJ. A collective route to metastasis: Seeding by tumor cell clusters. *Science* 2016 Apr 8;352(6282):167-9. doi: 10.1126/science.aaf6546
6. Comen E, Norton L, Massagué J. Clinical implications of cancer self-seeding. *Nat Publ Gr*. 2011;8(6):369–77.
7. Uematsu T, Masako K. Risk of needle track seeding of breast cancer: cytological results derived from core wash material. 2008;51–5.
8. Brenner RJ, Gordon LM. Malignant Seeding Following Percutaneous Breast Biopsy: Documentation With Comprehensive Imaging and Clinical Implications. *Breast J*. 2011;17(6):651–656.
9. Hootmte LE, Schipper MEI, Kaya A, Verkooijen HM, Klinkenbijnl JG, Rinkes IHMB. Tumor cell displacement after 14G breast biopsy. 2004;520–5.
10. Diaz LK, Wiley EL, Venta LA. Are Malignant of the Breast? Needle Displaced by Core Biopsy. 1999;1303–13.
11. Knight R, Horiuchi K, Parker SH, Ratzner ER, Fenoglio ME. Risk of Needle-track Seeding After Diagnostic Image-guided Core Needle Biopsy in Breast Cancer. *JSLs*. 2002;6:207–9.
12. Thurffjell MG, Jansson T, Nordhgren H, Bergh J, Lindgren A, Thurffjell E. Local Breast Cancer Recurrence caused by Mammography Guided Puncture. *Acta radiol*. 2015;41(2000):435–40.
13. Fitzal F, Spom EP, Draxler W, Mittlbo M, Taucher S, Rudas M, et al. Preoperative core needle biopsy does not increase local recurrence rate in breast cancer patients. *Breast Cancer Res Treat*. 2006;97:9–15.