

Retrospective Analysis of Upgrade Rates for Radial Scars in Image-Guided Core Needle Biopsies

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INTRODUCTION

Radial scars (RS) diagnosed by core needle biopsy (CNB) show variable upgrade rates to malignancy, complicating management decisions. This study evaluates the upgrade rate of RS to ductal carcinoma in situ (DCIS) or invasive carcinoma post-excision, and identifies clinical and imaging factors linked to malignancy risk to guide standardized management algorithms.

METHODS

This single-institution retrospective study included women aged ≥ 18 who were diagnosed with image-targeted radial scars (RS) or complex sclerosing lesions (CSL) by core needle biopsy (CNB), and who subsequently underwent surgical excision via excisional biopsy or partial mastectomy, with follow-up for at least 12 months. Patients were excluded if they had RS or CSL with concurrent DCIS or invasive cancer identified on the same CNB, or if they were lost to follow-up. However, patients with cancer diagnosed in other areas of the breast or contralateral breast during the staging workup were included in the study. Data collected included demographics (age, menopausal status, and race), clinical factors (biopsy technique, imaging findings, and CNB results), and final surgical pathology results. Upgrade was defined as the presence of DCIS or invasive carcinoma on final pathology.

RESULTS

In this study, 65 patients with RS or complex sclerosing lesions (CSL) diagnosed via image-guided core needle biopsy underwent surgical excision. The mean age of the patients was 54.8 years, ranging from 32 to 78 years. Among these, 47 patients underwent stereotactic CNB, while 10 had ultrasound-guided CNB, and 8 underwent MRI-guided CNB. Following biopsy, 63 patients proceeded with excisional biopsies, while 2 underwent mastectomies.

RESULTS

The overall upgrade rate to malignancy, defined as the presence of DCIS or invasive carcinoma on final pathology following surgical excision, was observed in two patients (3.1%). One postmenopausal African American patient (age 66) with RS and atypical ductal hyperplasia (ADH) on stereotactic CNB was found to have DCIS upon surgical excision. The second case involved a premenopausal Hispanic patient (age 43) with a complex sclerosing lesion and an intraductal papilloma, whose excision revealed microinvasive ductal carcinoma, DCIS, and lobular carcinoma in situ (LCIS).

After excluding 14 cases where RS was associated with concurrent papillary lesions or ADH on initial biopsy, the upgrade rate dropped to 0% (0/51), suggesting that RS without these additional high-risk features poses minimal risk for malignancy and may not require surgical excision. An important finding was that none of the nine patients who had concurrent DCIS or invasive carcinoma in separate areas of the breast or contralateral breast showed upgrades of the RS lesions.

Table 1. Clinical and Pathologic Characteristics of Patients with Radial Scars		
Age (years), mean $\pm$ SD (range):		54.8 $\pm$ 10.2 (32–78)
Biopsy modality	Stereotactic CNB	47 (72.3%)
	Ultrasound-guided CNB	10 (15.4%)
	MRI-guided CNB	8 (12.3%)
Upgrade of RS to malignancy (N, %)	RS only	0 (0%)
	RS with concurrent high-risk lesions	2 (3.1%)
	RS with concurrent DCIS or invasive cancer in separate area (ipsilateral or contralateral)	0 (0%)
Upgrade cases	Case #1	- Age: 66 - Postmenopausal, African American - RS + ADH on CNB - Final Pathology: DCIS
	Case #2	- Age: 43 - Premenopausal, Hispanic - CSL + Intraductal Papilloma on CNB - Final Pathology: Microinvasive DCIS + LCIS

CONCLUSION

The extremely low upgrade rate observed in our study, particularly when excluding cases with ADH or papillary lesions, supports a less aggressive management approach for radial scars that do not present with additional high-risk features. Imaging surveillance, rather than routine surgical excision, appears to be a safe and reasonable option in these cases.

Additionally, these findings add to existing literature advocating for a more selective approach to excision and highlight the need for updated guidelines that reflect the evolving understanding of radial scar risk. Moving forward, incorporating imaging characteristics and histologic findings into a structured decision making algorithm may help clinicians better determine when surgery is truly warranted, ultimately reducing unnecessary procedures while ensuring patient safety.

REFERENCES

1. Sanders ME, Henson DE, Schuyler PA, Page DL. Benign radial scars in breast core needle biopsies: a prospective study. *Am J Surg Pathol*. 2016;40(7):901-906.
2. Decker T, Bojar H, Fitzal F, Reimer T. Radial scars and complex sclerosing lesions: management controversies. *Clin Breast Cancer*. 2018;18(4):e557-e565.
3. Ganesan S, Foden S, Ryde J, Litherland J, Webster J, Steigerwald A, et al. Atypical hyperplasia in radial scars: risk of upgrade and management recommendations. *Breast J*. 2019;25(3):414-421.
4. Lazarus E, Mainiero MB, Schepps B, Koelliker S, Livingston LS. Radial scar on breast core needle biopsy: is surgical excision necessary? *Radiology*. 2014;271(1):54-60.
5. Houssami N, Irwig L, Simpson JM, McKessar M, Blome S, von Minckwitz G, et al. Radiological and pathological diagnosis of radial scars: consensus guidelines and recommendations. *Breast*. 2017;32:75-83.
6. Farshid G, Buckley E. Meta-analysis of upgrade rates in 3163 radial scars excised after needle core biopsy diagnosis. *Breast Cancer Res Treat*. 2019 Feb;174(1):165-177. doi: 10.1007/s10549-018-5040-3. Epub 2018 Nov 20. PMID: 30460464.
7. Miller CL, West JA, Bettini AC, Koerner FC, Gudewicz TM, Freer PE, et al. Surgical excision of radial scars diagnosed by core biopsy may help predict future risk of breast cancer. *Breast Cancer Res Treat*. 2014 Jun;145(2):331-338. doi: 10.1007/s10549-014-2958-y. Epub 2014 Apr 19. PMID: 24748568.
8. Ha SM, Cha JH, Shin HJ, Chae EY, Choi WJ, Kim HH, Oh HY. Radial scars/complex sclerosing lesions of the breast: radiologic and clinicopathologic correlation. *BMC Med Imaging*. 2018 Nov 3;18(1):39. doi: 10.1186/s12880-018-0279-z. PMID: 30390667; PMCID: PMC6215659.
9. Conlon N, D'Arcy C, Kaplan JB, Bowser ZL, Cordero A, Brogi E, Corben AD. Radial scar at image-guided needle biopsy: is excision necessary? *Am J Surg Pathol*. 2015 Jun;39(6):779-785. PMID: 25634748; PMCID: PMC5012304.
10. Ferreira AI, Borges S, Sousa A, Ribeiro C, Mesquita A, Martins PC, et al. Radial scar of the breast: is it possible to avoid surgery? *Eur J Surg Oncol*. 2017 Jul;43(7):1265-1272. doi: 10.1016/j.ejso.2017.01.238. Epub 2017 Feb 3. PMID: 28215506.