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Pathologic findings of follow-up surgical excision for radial scar on breast core needle biopsy☆

Zaibo Li MD, PhD*, Aditi Ranade MD[1], Chengquan Zhao MD

Department of Pathology, Magee-Women's Hospital of UPMC, Pittsburgh, PA, 15213

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Summary The data regarding radial scar (RS) as a risk factor for breast cancer are conflicting, and it is unclear whether an excision is warranted for patients with RS identified on core needle biopsy (CNB). In this study, we investigated the follow-up excisional results for patients with RS on CNB with no history of or concurrent breast cancer or atypical proliferative lesions. The study cohort was composed of 403 such cases, and follow-up excision (FUE) was performed in 220 (54.6%). There was no significant difference in the radiologic findings in cases with and without FUE. Of the 220 cases with FUE, only 2 (0.9%) were upgraded to malignancy (1 invasive carcinoma and 1 ductal carcinoma in situ), whereas 44 cases (20.0%) were upgraded to atypical ductal hyperplasia and 13 cases (5.9%) to lobular neoplasia. Upgrades were associated with greater age but not with any other variable. This is one of the largest studies to evaluate excisional findings in patients with RS identified on CNB but no history of or concurrent breast cancer or atypical proliferative lesions, and the extremely low malignancy-upgrade rate indicates that conservative follow-up with imaging rather than surgical excisions may be more appropriate for these patients.

1. Introduction

Radial scar (RS) is a pathologic entity first described by Hamperl [1] in 1975 that is characterized by a stellate fibroelastic core with entrapped ducts and lobules. It is also referred to as *radial sclerosing lesion* or *complex sclerosing lesion* and is similar to *sclero-elastotic lesion* frequently seen on screening mammography [2]. Most RSs are microscopic and incidental findings on core needle biopsies (CNBs), although some large lesions can be detected clinically by palpation or by mammogram. RS has been associated with both benign proliferative lesions (usually ductal hyperplasia) and atypical/malignant lesions with broad and overlapping ranges of frequency [3–8]. Although various studies have investigated the association between RS and breast cancers, data from the literature are still conflicting in regard to whether these lesions are independent risk factors for malignancy or a marker of higher risk [3–26]. Some studies also investigated whether surgical excision is necessary for patients with RS identified on CNB and attributed the associated risk to accompanying proliferative lesions, especially those with atypia [12,13,15,16]. The majority of previous studies included all cases with RS identified on either radiology or breast core biopsy without a careful history review. In some cases, the patients may have had a history of breast cancer or atypical proliferative lesions (APLs), which by themselves pose a higher risk of future

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* Corresponding author at: Department of Pathology, The Ohio State University Wexner Medical Center, Columbus, OH, 43210.
E-mail address: Zaibo.Li@osumc.edu (Z. Li).
[1] Current address: Department of Pathology, UHS Binghamton General Hospital, Binghamton, NY, 13903.

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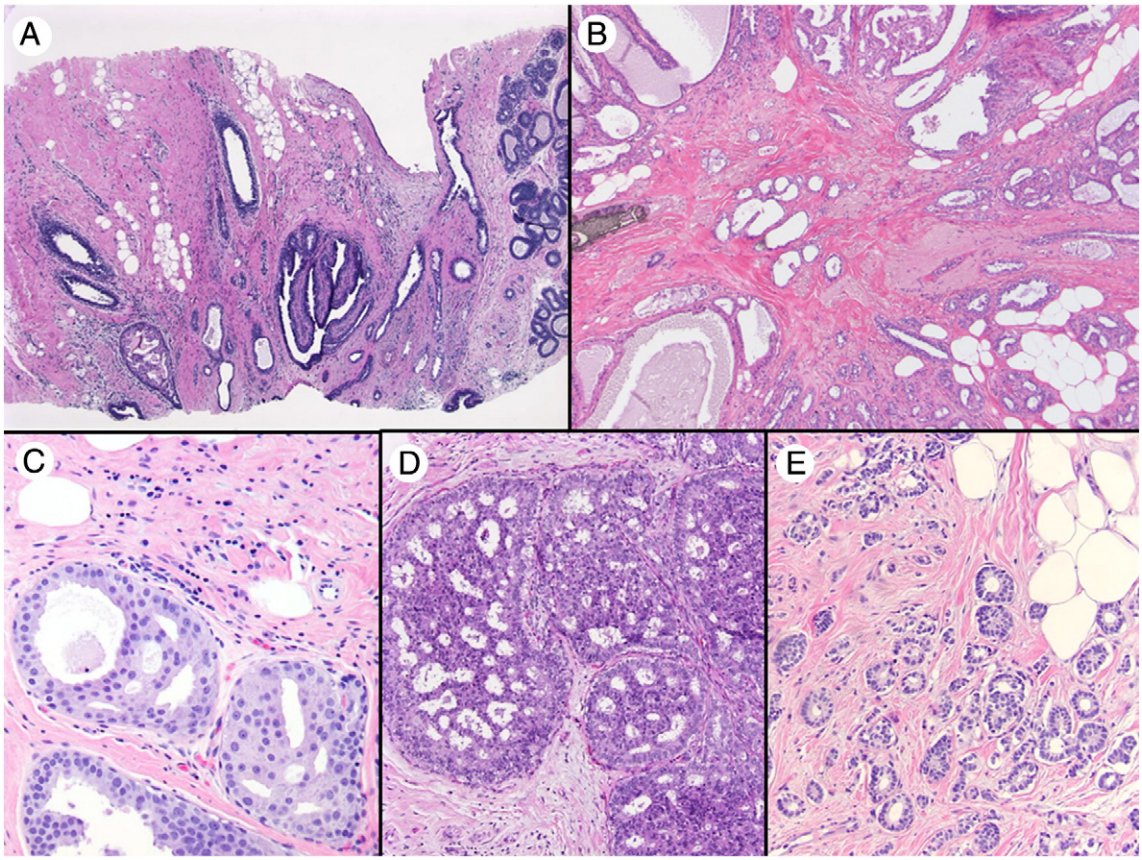

Fig Representative hematoxylin and eosin images of RS, ADH, DCIS, and IC. A and B, Radial scars. C, Atypical ductal hyperplasia. D, Ductal carcinoma in situ. E, Invasive ductal carcinoma. A, B, and E, original magnification ×40; C and D, ×100.

breast carcinoma development [27,28]. In the current study, we investigated the follow-up excision (FUE) results in patients having RS on CNB who were without any history of or concurrent breast cancer or APL.

Table 1 Cases excluded because of concurrent or history of atypical proliferative lesions or carcinoma

Diagnosis	Concurrent	Prior
FEA	6	0
ADH	92	2
ADCIS	44	2
DCIS	67	2
LCIS	42	2
IDC	66	19
ILC	5	0
Metaplastic Ca	1	0
Other	1	2
Total	324	29

Abbreviations: ADH, atypical ductal hyperplasia; ADCIS, atypical DCIS; DCIS, ductal carcinoma in situ; Ca, carcinoma; FEA, flat epithelial atypia; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; LCIS, lobular carcinoma in situ.

2. Materials and methods

2.1. Patient selection and data collection

After Institutional Review Board approval at the University of Pittsburgh, a pathology archive database was searched for a period of 14 years (January 2000-December 2013). During this time, 14-gauge needles were used in the majority of ultrasound-guided biopsies with 3 to 5 passes, and 9-gauge needles were used in magnetic resonance imaging–or stereotactic-guided biopsy with 6 to 9 passes. Biopsy specimens were received in formalin, and the tissues were embedded in paraffin. Five levels of sections for each tissue block were obtained and stained with standard hematoxylin and eosin. Surgical excision specimens were fixed in 10% formalin, and most excisional specimens were submitted in their entirety for histologic examination.

An RS was diagnosed based on the following criteria: a stellate lesion with a central fibroelastotic zone of basophilic elastic material and radiating fibrous bands and dilated or compressed tubular structures with 2 cell layers (Fig. A and B). Cases were considered to be upgraded if FUE showed flat epithelial atypia (FEA); atypical ductal hyperplasia (ADH; Fig. C); lobular neoplasia (LN), including atypical lobular