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Surgical excision outcome after radial scar without atypical proliferative lesion on breast core needle biopsy: a single institutional analysis☆

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ABSTRACT

Radial scar (RS) has been recognized as a risk factor for developing breast cancer, and excision is recommended for patients with RS identified on core needle biopsy (CNB). However, recent literatures suggest that the increased risk may be caused by concurrent proliferative lesions on the biopsy, rather than radial scar itself. In this study, we investigated the follow-up excision (FUE) results for patients with RS on CNB with no history of a prior or a concurrent breast cancer or atypical proliferative lesions (APLs). A total of 113 RS cases including 32 cases with APLs or carcinoma and 81 cases without APLs on CNB were included in this study. Forty cases (49%) without APLs had FUE. No significant difference in radiologic and clinical findings was identified between cases with FUEs and cases without FUEs. Of the 40 cases with FUE, 9 cases (22.5%) were upgraded including 3 atypical ductal hyperplasias, 4 lobular neoplasias, 1 flat epithelial atypia, and 1 atypical apocrine adenosis. However, no case was upgraded to invasive carcinoma or ductal carcinoma in situ. All cases with mammotome CNBs were not upgraded. Our data suggest that conservative follow-up with imaging rather than surgical excisions may be more appropriate for patients with only RS on biopsy, especially for patients with mammotome CNBs.

1. Introduction

Radial scar (RS) is characterized by a stellate configuration of fibroelastic core with entrapped ducts and lobules and is also referred as radial sclerosing lesion or complex sclerosing lesion [1,2]. The radiologic appearance of RS overlaps that of invasive carcinoma (IC), and it poses a challenge to radiologists [3-6]. RS has been found to be associated with both benign proliferative lesions and atypical/malignant proliferative lesions [7-12]. The management of patients with RS detected on image-guided core needle biopsies (CNBs) is still a matter of debate because the data from previous studies are conflicting in regard to whether these lesions are independent risk factors for malignancy [7-30]. However, many previous studies did not take into account patient's prior history of breast cancer or atypical proliferative lesions (APLs), which are associated with an increased risk for future breast carcinoma development [31,32]. Therefore, the increased rates of upgrade to malignancy on surgical excision after RS on CNBs found in some studies might be related to coexisting APLs or breast cancers. The aim of our study was to evaluate the surgical excision outcome of a consecutive series of RS patients without any history of a prior or concurrent breast cancer or APLs over a period of 12 years at a single institution.

2. Methods and materials

2.1. Patient selection and data collection

After institutional review board approval at The Ohio State University, a pathology archive database search was performed for a period of 12 years (January 2003 to December 2014). Although majority of the biopsies were performed using 14-gauge needles with 3 to 5 passes, some of the biopsies were done with 8-gauge mammotome needles. Biopsy specimens were received in 10% formalin and embedded in paraffin. Four levels of sections for each tissue block were obtained and stained with standard hematoxylin and eosin. Surgical excision specimens were also fixed in 10% formalin and embedded in paraffin. Most excisional specimens were submitted entirely for histologic examination.

Radial scar was diagnosed based on the following criteria: a stellate lesion with central fibroelastotic zone of basophilic elastic material and radiating fibrous bands and dilated or compressed tubular structures with 2 cell layers (Fig. 1A). Cases were considered to be upgraded if follow-up excision (FUE) showed flat epithelial atypia (FEA) (Fig. 1B), atypical ductal hyperplasia (ADH) (Fig. 1C), and lobular neoplasia (LN) (atypical lobular hyperplasia [ALH] and lobular carcinoma in situ [LCIS]) (Fig. 1D).

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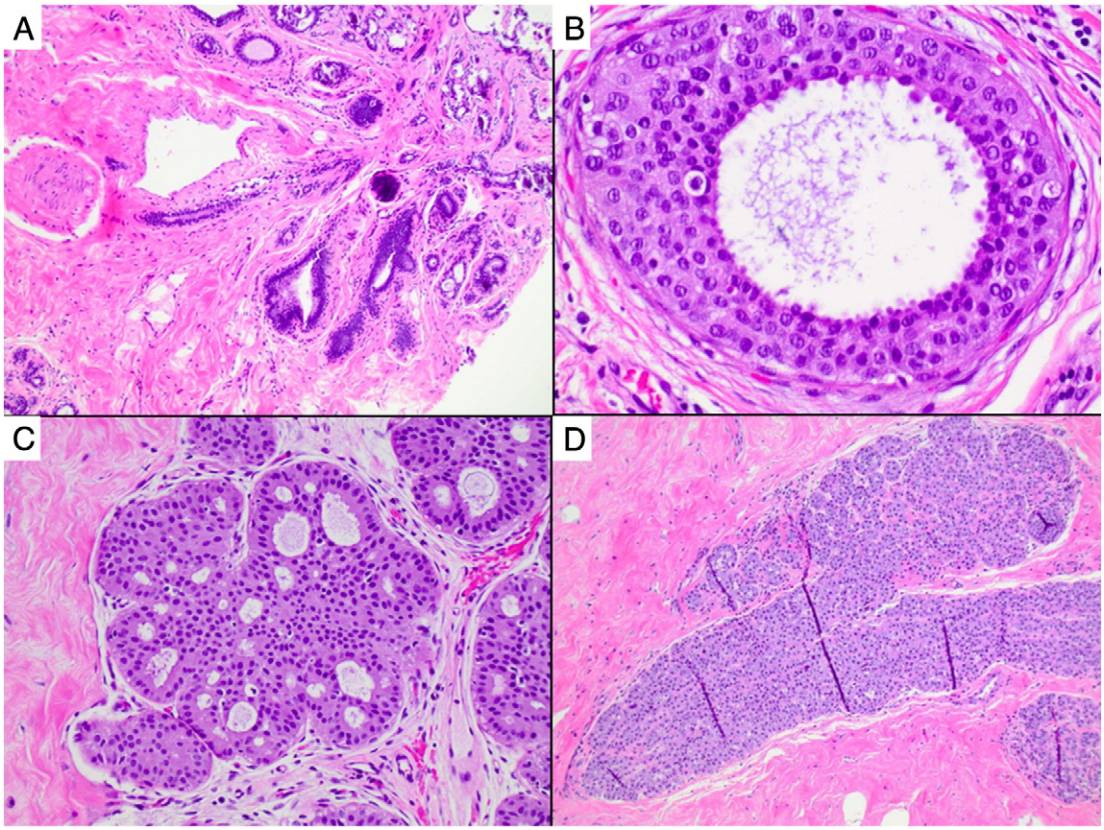

Fig. 1. Representative images of RS, ADH, LCIS, and IC. Radial scar (A); FEA (B); ADH (C); LCIS (D).

A total of 113 cases were interpreted as RS with or without other benign or malignant lesions. Thirty-two cases with a diagnosis of RS were excluded from this study due to concurrent or prior diagnosis of FEA, ADH, LN, ductal carcinoma in situ (DCIS), or IC. The details are summarized in Table 1.

The remaining 81 cases of radial scar without any other concurrent or prior APLs were included in this study. Medical records were reviewed for patient age, symptoms, and radiologic results (microcalcification, distortion, mass, etc). The American College of Radiology Breast Imaging, Reporting and Data System (BI-RADS) score was also recorded.

2.2. Statistical analysis

Data were entered using Microsoft Excel spreadsheet software (Microsoft, Redmond, WA). Mean, median, and SD were calculated. Fisher exact test was used to compare the difference. All the analyses were done using the SAS 9.3 system (SAS Institute, Cary, NC), and $P < .05$ was considered statistically significant.

3. Results

The mean age of all patients (81 cases) in this study was 52.6 years (range, 24-75 years). All patients were rendered a BI-RADS score of 4 (suspicious abnormality: a biopsy should be considered) on mammography before CNBs. Biopsy methods included ultrasound guided (47 cases) and stereotactic guided (34 cases). Microcalcification was detected in 42 patients including 26 (65%) in cases with FUE and 16 (39%) in cases without FUE. Forty-nine cases with distortion or mass on radiologic imaging were deemed as targeted lesions, including 18 (45%) in cases with FUE and 31 (76%) in cases without FUE. Eight-gauge mammotome core biopsy was performed in 18 cases, including 8 in cases with FUE and 10 in cases without FUE (Table 2).

Follow-up excision was performed in 40 cases (49%), and the other 41 cases did not have any FUE. Significantly more cases with microcalcification and fewer cases with distortion/mass were found in the group with FUE than in the group without FUE, indicating that surgical excision was less likely performed for targeted lesions (distortion/mass lesions) (Table 2).

Significant lesions on FUE were divided into 5 categories: IC, DCIS, ADH (with/without LN), LN alone, and FEA. Of the 40 cases with RS on

Table 1
Excluded cases: 32 due to concurrent or prior history of atypical proliferative lesions or carcinomas.

	Concurrent	Prior
FEA	4	0
ADH	5	0
LN (ALH and LCIS)	6	0
DCIS	7	2
IDC	7	1
Total	29	3

Abbreviation: IDC, invasive ductal carcinoma.

Table 2
Age and radiological findings of cases with/without FUE.

	Cases with FUE ex: n = 40	Cases without FUE ex: n = 41	Total, n = 81	*P*
Average age	53.2 (39-70)	52.0 (24-75)	52.6 (24-75)	NS
BI-RADS ≥4	40 (100%)	41 (100%)	81 (100%)	NS
Microcalcification	26 (65%)	16 (39%)	42 (52%)	.02
Distortion/mass	18 (45%)	31 (76%)	49 (60%)	.005
Mammotome Bx	8 (20%)	10 (24%)	18 (22%)	NS

Note: Some cases have overlapping radiologic findings.
Abbreviations: NS, not statistically significant; Bx, biopsy.