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Cellular fibroepithelial lesions of the breast: A long term follow up study

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ABSTRACT

Some fibroepithelial lesions (FEL) of the breast are difficult to classify as cellular fibroadenoma (CFA) or benign phyllodes tumor (BPT) due to overlapping histologic features. This indeterminate group is histologically characterized by prominent stromal cellularity, mild atypia, and mitotic activity. The local recurrence potential of cellular FEL (CFEL) has been insufficiently studied. The objective of this study was to evaluate the histologic features, characterize the long-term follow-up and recurrence rate of CFEL, and compare this data with the recurrence rate of definitive BPT. Ninety CFEL that were < 4 cm were recovered from the benign breast disease cohort. The control group comprised of 10 randomly selected patients with BPT. Cases were classified based on a combination of mitotic activity, intracanalicular growth, stromal atypia, stromal prominence, and fat infiltration. None of the CFEL was widely excised. Of the 90 CFEL cases, there were 22 BPT-like, 35 CFA, and 33 indeterminate. The mean age of the patients was 40.1 years. The mean tumor size was 2.4 cm. All patients had at least two years of follow-up (median 27). None of the patients with BPT-like CFEL showed ipsilateral recurrence. Five of the 35 patients with CFA had recurrent ipsilateral CFA. This occurred within 1 to 11 years after the initial diagnosis. One of 33 patients with indeterminate type had a recurrent ipsilateral lesion five years after the initial diagnosis with histologic features of CFA. None of the patients in control group had any recurrence. In conclusion, as a group, CFEL have a low proclivity for recurrence, even when enucleated with close or positive margins. The presence of histologic features of BPT did not correlate with an increased potential for recurrence.

1. Introduction

Fibroepithelial lesions of the breast are neoplasms that are characterized by biphasic architecture with epithelial and stromal constituents. Histologically, they are classified as either fibroadenomas or phyllodes tumors, but this depends on the appearance and proliferative activity of the stromal component. However, the histopathologic distinction between fibroadenomas and phyllodes tumors is not always straightforward. Fibroadenomas have a balanced contribution of benign epithelium and bland collagenous stromal elements, which results in an architecturally-uniform microscopic appearance with low overall cellularity. However, phyllodes tumors are defined by the presence of autonomous fibroblastic and myofibroblastic proliferation, which is at least focally crowded with nuclei and tends to overgrow the epithelial compartment of the tumor. This results in a heterogeneous cellular picture with characteristically prominent intracanalicular architecture. Approximately 80% of phyllodes tumors are benign or low- grade malignant [1]; these tumors show a combination of increased cellularity with mild to moderate atypia, focal mitotic activity and a tendency to display prominent stromal compartment.

Fibroadenoma, particularly in young patients, may be characterized by moderately cellular stroma with focal intracanalicular growth and occasional mitotic activity. These “cellular” variants of fibroadenoma overlap microscopically with benign variants of the phyllodes tumor in which only some but not all diagnostic microscopic features are evident. The histologic characterization of these indeterminate “cellular fibroepithelial lesions” (CFEL) is poorly defined. Furthermore, there is no study in the recent literature that reports the long-term clinical behavior of this indeterminate group of CFEL. This prompted us to examine the long-term follow-up and recurrence rate in a series of patients with indeterminate CFEL and compare them with the recurrence potential of patients with definitive benign phyllodes tumor (BPT).

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2. Materials and methods

2.1. Study population and follow up

Ninety cases of CFEL were derived from the Mayo Benign Breast Disease (BBD) Cohort [2], which is an IRB approved study of 13,652 women between the ages of 18–85 years who had a benign breast disease, were diagnosed via surgical excision or needle core from 1967 to 2001. Cellular fibroepithelial lesions within the BBD cohort represent a subset of fibroadenomas with either stromal prominence or increased stromal cellularity or both; these 90 patients form the basis of this study. Original slides of all these cases were reviewed in a blinded manner by a single pathologist (DV) and were classified based on the revised, updated WHO diagnostic criteria [3], which includes stromal mitotic activity, stromal overgrowth, stromal atypia, intracanalicular growth, and invasion of the surrounding adipose tissue.

To rule out the possibility of undersampled phyllodes tumor, we further limited our study to CFELs that measured less than or equal to 4.0 cm in diameter. The age of the patient at the time of diagnosis and the tumor size was obtained by reviewing patient records. Of the 90 patients, 28 (31%) were between the ages of 18 to 30 years. Follow-up information, including duration of follow up and recurrence, was obtained through comprehensive (inpatient and outpatient) Mayo Clinic medical records. A questionnaire system was designed for the BBD cohort to keep track of all recurrent events and update information regarding additional surgeries performed elsewhere after the index procedure at Mayo Clinic. Therefore, up-to-date follow-up information regarding current breast status, interval breast surgery, and recurrent disease have been recorded in these 90 patients with CFEL. Follow-up duration for the entire study population ranged from 2.8 to 45 years with a median of 27 years. Information regarding recurrence was obtained by additional breast procedures after the initial (index) biopsy and from the diagnosis of the second procedure. Any subsequent ipsilateral biopsy or excision performed at Mayo Clinic or elsewhere having a diagnosis of fibroadenoma or phyllodes tumor was considered as "recurrence."

2.2. Histology

After selection for this study, original slides from each case were reviewed, and the following microscopic parameters were recorded:

1) Mitotic activity, which was further classified as absent (0) or rare (+) which was defined as less than three within the entire lesion, and frequent (++), which was defined as at least three per 10 magnification fields examined.
2) Stromal overgrowth, which was defined as at least two areas in which epithelium was absent within a 10× microscopic field.
3) Stromal cell atypia, further classified as absent, mild (pleomorphism without hyperchromasia or > two-fold enlargement compared to normal fibroblasts), or moderate (pleomorphism with hyperchromasia and up to three-fold cell enlargement).
4) Intracanalicular growth, defined subjectively as the presence of at least focal polyp-like projections of stroma into epithelial lined cyst-like spaces or clefts (Fig. 2a)
5) Invasive growth, defined as least one focus in which there was percolation of tumor-associated collagen and or cells between fatty stroma at the periphery of the lesion, thereby creating an irregular tumor-host interface.

Owing to marked heterogeneity, with the partial presence of diagnostic criteria for phyllodes tumors, most of our tumors were difficult to classify uniquely as fibroadenoma or phyllodes tumor. We, therefore, developed an arbitrary algorithm for classification using those above revised, updated criteria. Patients whose sections showed more than three of the five features were arbitrarily classified as a CFEL, most likely BPT (i.e., mitoses could be rare or frequent and be considered "present"). Cases having less than three of the above histological features were classified as CFEL most likely cellular fibroadenoma (CFA). Patients having three of the aforementioned diagnostic criteria were classified a CFEL, indeterminate type. None of the cases was "widely excised" or re-excised following initial excision. All had margins that were either "close" (0.1 cm or less) or positive.

2.3. Control group

The control group was comprised of 10 randomly selected patients diagnosed with definitive BPT that also had adequate (at least two years) follow up. All patients underwent wide local excision at Mayo Clinic. Histologic sections were reviewed by a breast pathologist blinded to the initial interpretation. All cases were classified using the updated WHO diagnostic criteria [3] including, stromal mitotic activity, stromal overgrowth, stromal atypia, intracanalicular growth, and invasion of the surrounding adipose tissue. Age of the patient at the time of diagnosis and tumor size was obtained by reviewing patient records. Follow-up information, including duration of follow-up and recurrence, was obtained through the comprehensive Mayo Clinic medical records. Disease recurrence was defined as a fibroepithelial lesion diagnosed on any subsequent ipsilateral biopsy performed after initial (index) procedure.

2.4. Statistical analysis

Categorical data were summarized with frequencies and percentages, and continuous data were summarized with means (or medians) and ranges, as appropriate. The groups were compared with respect to age, tumor size, and total years of follow-up with Kruskal-Wallis tests. The categorical features (mitoses, overgrowth, atypia, ICGr, and invasion) were compared with Fisher's exact tests. Due to the low number of events, the difference in risk of recurrence or death could not be statistically tested between the groups. All analyses were performed with SAS version 9 (Cary, NC). P-values < .05 were considered statistically significant.

3. Results

Table 1 shows the demographic and clinical characteristics of the 90 test and ten control patients in our study. The age of the patients with BPT ranged from 18 to 80 years (mean: 42.3 years). The age of the patients with CFA and CFEL of indeterminate type ranged from 18 to 84 years (mean: 38 years) and 19 to 71 years (mean: 41 years), respectively. In the control group, the age of the patients ranged from 25 to 61 years (mean: 49.1 years). The patients in the control group were slightly older than in test group overall (49.1 vs. 40.1, p-value .02). The tumor size distribution of the entire study and control population is shown in Fig. 1. The mean tumor size for patients with BPT was 2.3 cm (range: 0.9–4.0 cm). Patients with CFA and CFEL of indeterminate type had a mean tumor size of 2.3 cm (range: 0.9–3.5 cm) and 2.6 cm (range: 1.4–3.8 cm) respectively. The mean tumor size in the control group was 4.9 cm (range: 1.6–12 cm). The mean tumor size in control group was larger compared to the test group overall (4.9 vs. 2.4 cm, p-value .02).

Based on the diagnostic criteria mentioned above, 22 (24.4%) of the 90 CFEL cases were classified as BPT, 35 (38.9%) were classified as CFA, and the remaining 33 (36.7%) were called indeterminate CFEL.

Eighteen of 22 patients with BPT-like CFEL underwent excisional biopsy, and four patients had core biopsies. None of the four patients underwent a subsequent excision. Eighteen of 18 patients with excisional biopsy had positive or close surgical resection margins (< 1 mm). All 19 patients with CFA and all 28 patients with CEFL of indeterminate type had positive or close margins on excisional biopsy. All patients in control group had wide local excision with negative margins.

Table 1
Comparison between patient groups from the different histologic categories.

	BPT (N = 22)	CFA (N = 35)	Indeterminate (N = 33)	Control (N = 10)	p value
Age					.09[a]
Mean (SD)	42.3 (17.6)	38.0 (13.1)	41.0 (16.8)	49.1 (10.2)	
Range	(18.0–80.0)	(18.0–84.0)	(19.0–71.0)	(25.0–61.0)	
Tumor size (cm)					.02[a]
Mean (SD)	2.3 (0.8)	2.3 (0.7)	2.6 (0.7)	4.9 (3.6)	
Range	(0.9–4.0)	(0.9–3.5)	(1.4–3.8)	(1.6–12.0)	
Mitoses					< .0001[b]
(+) Rare	14 (63.6%)	6 (17.1%)	18 (54.5%)	1 (10.0%)	
(++) Frequent	7 (31.8%)	0 (0.0%)	6 (18.2%)	9 (90.0%)	
(0) None	1 (4.5%)	29 (82.9%)	9 (27.3%)	0 (0.0%)	
Overgrowth	20 (90.9%)	7 (20.0%)	25 (75.8%)	4 (40.0%)	< .0001[b]
Atypia					.002[b]
(0) None	0 (0.0%)	11 (31.4%)	4 (12.1%)	0 (0.0%)	
[1] Mild	15 (68.2%)	22 (62.9%)	25 (75.8%)	10 (100.0%)	
[2] Moderate	7 (31.8%)	2 (5.7%)	4 (12.1%)	0 (0.0%)	
ICGr	18 (81.8%)	25 (71.4%)	19 (57.6%)	10 (100.0%)	.04[b]
Invasion	10 (45.5%)	0 (0.0%)	2 (6.1%)	7 (70.0%)	< .0001[b]
Sum of 5 features					
1	0 (0.0%)	8 (22.9%)	0 (0.0%)	0 (0.0%)	< .0001[a]
2	0 (0.0%)	27 (77.1%)	0 (0.0%)	0 (0.0%)	
3	0 (0.0%)	0 (0.0%)	33 (100.0%)	0 (0.0%)	
4	19 (86.4%)	0 (0.0%)	0 (0.0%)	9 (90.0%)	
5	3 (13.6%)	0 (0.0%)	0 (0.0%)	1 (10.0%)	
Mean (SD)	4.1 (0.4)	1.8 (0.4)	3.0 (0.0)	4.1 (0.3)	
Range	(4.0–5.0)	(1.0–2.0)	(3.0–3.0)	(4.0–5.0)	
Recurrences	0	5	1	0	
Deaths	2	4	4	1	
Total years of follow-up					< .0001[a]
Median	27.5	24.5	32.0	4.0	
Range	(12.1–45.0)	(2.8–42.0)	(5.1–45.0)	(2.0–11.0)	

[a] Kruskal Wallis.
[b] Fisher exact.

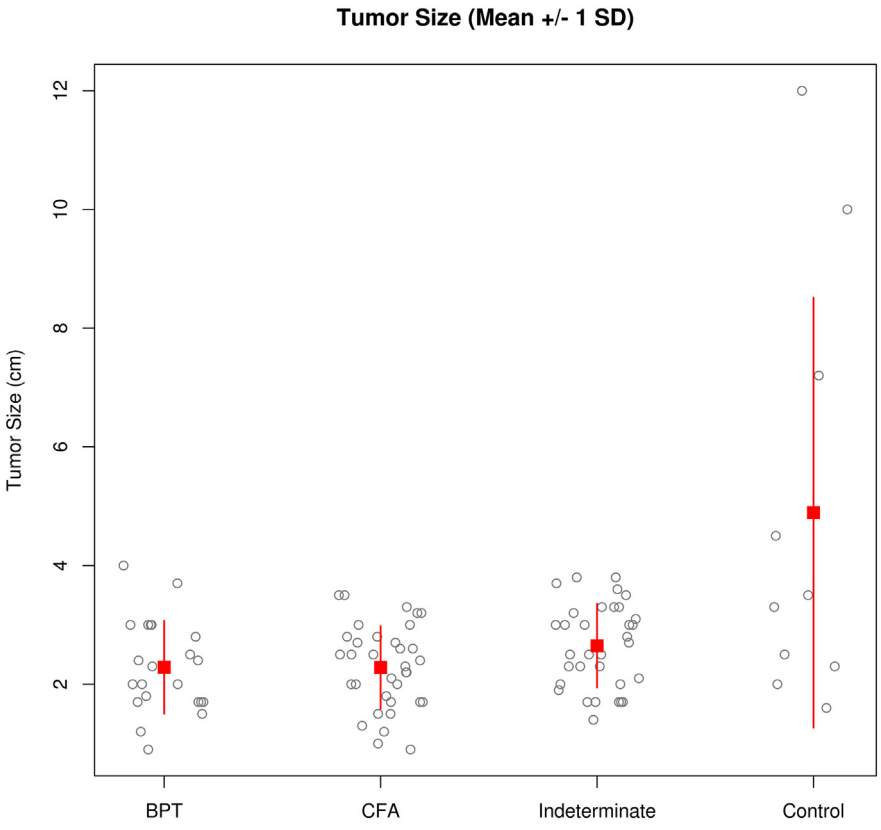

Fig. 1. Tumor size distribution in patients with cellular fibroepithelial tumor and definite benign phyllodes tumor (BPT). The red square indicates the mean, and the lines extend to 1 standard deviation above and below the mean. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

3.1. Histologic features

Table 1 shows various histologic features observed in each diagnostic category in the study group as well as the control group.

Twenty-one of 22 BPT (95.4%) had rare or frequent mitotic figures per 10 HPF. The majority of CFA, 29 of 35 (82.9%), had no mitotic activity, whereas only 6 cases (17.1%) showed rare mitoses per 10 HPF. Of 33 indeterminate CFET, 18 cases (54.5%) showed rare mitotic figures, and 6 (18.2%) cases showed frequent mitotic figures, respectively. Only nine of the 33 cases (27.3%) had no mitotic activity. All 10 of 10 cases in the control group are mitotically active (9 frequent; 1 rare). Stromal overgrowth was seen in 20 (90.9%) of the 22 BPT cases and 25 (75.8%) of 33 indeterminate CFET cases. In contrast, the vast majority of CFA (28 of 35, 80%) did not demonstrate stromal overgrowth. In the control group, four of 10 cases showed stromal overgrowth. All 23 (100%) BPT cases showed mild to moderate stromal atypia. Whereas, 22 (62.9%) of 35 CFA cases and 25 (75.8%) of 33 indeterminate CFET cases demonstrated mild stromal atypism. Stromal atypia was seen in all cases in the control group. Prominent intracanalicular growth was present in 18 (81.8%) of 22 BPT cases, 25 (71.4%) of 35 CFA cases and 19 (57.6%) of 33 indeterminate CFET cases. All cases in the control group showed prominent intracanalicular growth. Adipose tissue infiltration was seen in 10 (45.5%) of 22 BPT cases and two (6.1%) of 33 indeterminate CFEL cases. None of the 35 CFA cases demonstrated adipose tissue invasion. Seven (70%) of 10 patients in the control group showed infiltration into the surrounding adipose tissue (focal in a minority of cases).

Table 2 shows that each diagnostic category in our study group is characterized by marked histological diversity. In patients with BPT-like CFEL, ten different combinations of histological features were observed (considering rare and frequent mitoses separately, as well as mild and moderate atypia). All five histologic features were seen in only three (13.6%) of the 22 BPT cases, and the remaining 19 (86.4%) cases had four features. A case of CFEL with BPT-like features was shown in Fig. 2. In the patients with CFEL having fibroadenoma-like features, nine different histologic combinations were observed. Most (27, 77.1%) of these cases had just two features with the remaining eight (22.9%) having only one feature. One case of CFEL with CFA-like features was shown in Fig. 3. CFEL of “indeterminate” type (Fig. 4) was the most heterogeneous category, with 11 different histologic feature combinations (considering rare and frequent mitoses separately, as well as mild and moderate atypia).

3.2. Follow up and recurrence data

Follow-up duration for patients diagnosed with BPT ranged from 12 to 45 years (median: 27.5 years). None of the 22 patients with BPT had an ipsilateral recurrence of BPT. One of 22 patients developed fibroadenoma on the contralateral side three years after the initial diagnosis. Follow-up duration for patients with CFA ranged from 2.8 to 42 years (median: 24.5 years). Of 35 patients with CFA, five patients developed recurrent lesions on the ipsilateral side. The first patient had recurrent CFA at the age of 40 years, and this tumor was 1.2 cm in its greatest dimension five years after the initial diagnosis. The histologic features of recurrent CFA showed mild to moderate cellular stroma with mild cytologic atypia. No mitotic activity was seen. The second patient developed two recurrent CFA at the age of 43 years, which were 2 cm and 1.8 cm in greatest dimension, and this was 11 years after the initial diagnosis. The third patient developed a hyalinized fibroadenomatoid nodule at the age of 50 years, and this was three years after initial diagnosis. The fourth patient had a recurrent CFA at the age of 38 years, and this tumor was 0.9 cm in greatest dimension one year after the initial diagnosis. The fifth patient at the age of 39 years underwent bilateral risk reduction mastectomies 11 years after her initial diagnosis. She had proliferative fibrocystic changes and CFA (0.6 cm in greatest dimension). All five patients who recurred within the CFA group developed recurrent disease after the age of 35 years. Patients with CFEL of indeterminate type had a follow-up duration ranged from 5 to 45 years (median: 32 years). Only 1 of 33 patients had biopsy five years after the initial diagnosis. The recurrent lesion was classified as CFA based on the presence of rare mitotic activity (1/10hpf) and focal intracanalicular growth pattern. Stromal cell atypia, stromal overgrowth, and invasion were absent. In the control group, the follow-up duration ranged from two to 11 years (median: 4 years). There was no ipsilateral recurrent disease in this group.

Demographic information and histologic features in patients with recurrent CFEL. There were five patients with recurrence in CFA group, three showed a combination of ICG and mild stromal atypia, one showed ICG and stromal overgrowth, and one had stromal overgrowth and mild stromal atypia. One patient with indeterminate CFEL showed a combination of prominent intracanalicular growth, mild stromal atypia, and rare mitotic figures. There was no particular combination of histologic features that would predict recurrence within this group.

In summary, there was no recurrent PT in any of the test patients and control group. There were six ipsilateral recurrent CFA noted, five in CFA group and one in indeterminate CFEL. The recurrent events were too few to evaluate any statistically significant difference among the

Table 2
Pathologic criteria among the three histologic categories.

Group	Rare/frequent mitoses	Mild/moderate atypia	Overgrowth	ICGr	Invasion	Total features	Number of cases
BPT	−	+	+	+	+	4	**1**
	+	+	−	+	+	4	**2**
	+	+	+	−	+	4	**4**
	+	+	+	+	−	4	**12**
	+	+	+	+	+	5	**3**
CFA	−	−	−	+	−	1	**3**
	−	−	+	−	−	1	**3**
	−	−	+	+	−	2	**3**
	−	+	−	−	−	1	**2**
	−	+	−	+	−	2	**17**
	−	+	+	−	−	2	**1**
	+	−	−	+	−	2	**2**
	+	+	−	−	−	2	**4**
Indeterminate	−	+	−	+	+	3	**1**
	−	+	+	+	−	3	**8**
	+	−	+	−	+	3	**1**
	+	−	+	+	−	3	**3**
	+	+	−	+	−	3	**7**
	+	+	+	−	−	3	**13**

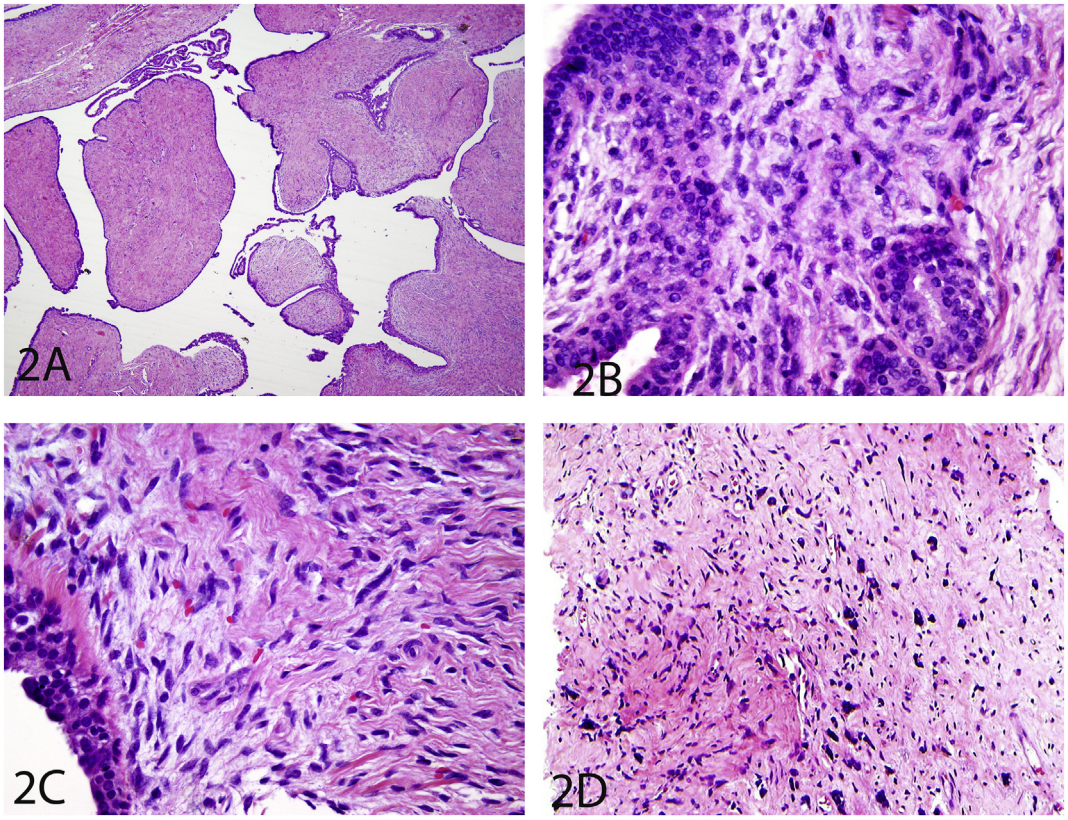

Fig. 2. Cellular fibroepithelial Lesion with BPT-like features. A combination of prominent intracanalicular growth (2A), stromal mitosis (2B), moderate stromal cytologic atypia (2C), and stromal overgrowth (2D) was observed on H&E staining. Based on the presence of 4 of 5 histologic features, this lesion was classified as BPT-like CFET. H&E indicates Hematoxylin and eosin.

groups. In addition, there was no statistically significant difference between CFA, BPT, and indeterminate group in terms of patient's age, tumor size, and type of surgery.

4. Discussion

Our study carries a significant importance as being the first study reporting the histopathologic features and long-term outcome of patients with CFEL. Our data reveal a high level of morphologic diversity within the category of CFEL. Only 3/90 cases had all five histological features, which included mitoses, stromal overgrowth, stromal cell atypism, intracanalicular growth, and invasion, which are cited by standard references as diagnostic criteria for phyllodes tumors [1, 3]. At the other end of the spectrum, only 8/90 cases had less than two of the five criteria (e.g., in addition to hypercellularity, which was a criterion for case selection). Moreover, there was no apparent combination of features that would consistently allow for the separation of these lesions into a limited number of microscopically-defined subsets. Among our 90 cases, there were 30 unique combinations (19 combinations if combining rare/frequent mitoses as well as mild/moderate atypia) of the assessed histological features, with no combination having > 17 associated cases. Further, there were 12 different combinations of histological features, which had only one case each (4 combinations if combining the categories noted above). Therefore, it would be nearly impossible, to derive a limited set of microscopic criteria that would consistently classify these lesions in a dichotomous manner. Based on the results of this study, we endorse the view that this size limited-CFEL represents a distinct clinicopathologic subset having uncertain

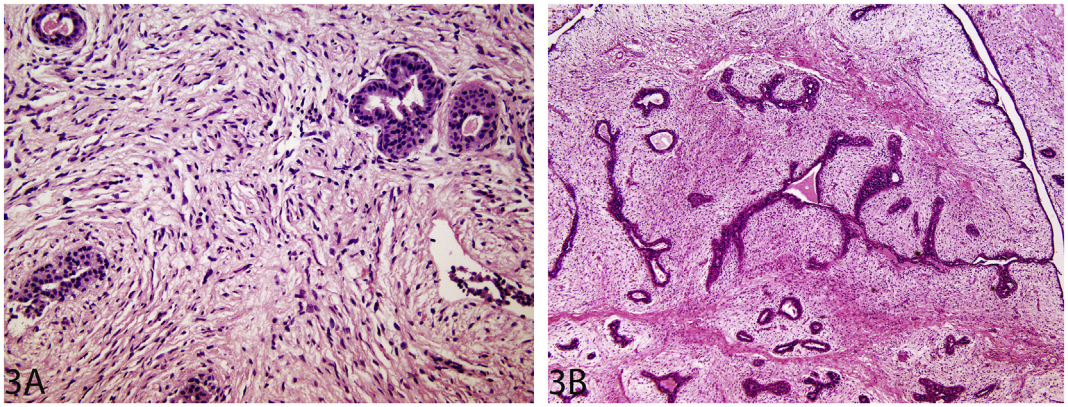

Fig. 3. Cellular fibroepithelial Lesion with CFA like features (H&E).This particular case showed mild stromal atypia (3A) and lack of stromal overgrowth (3B), mitosis, intracanalicular growth. Due to the presence of < 3 of 5 features, this lesion was classified as CFA-like CFEL. H&E indicates Hematoxylin and eosin.

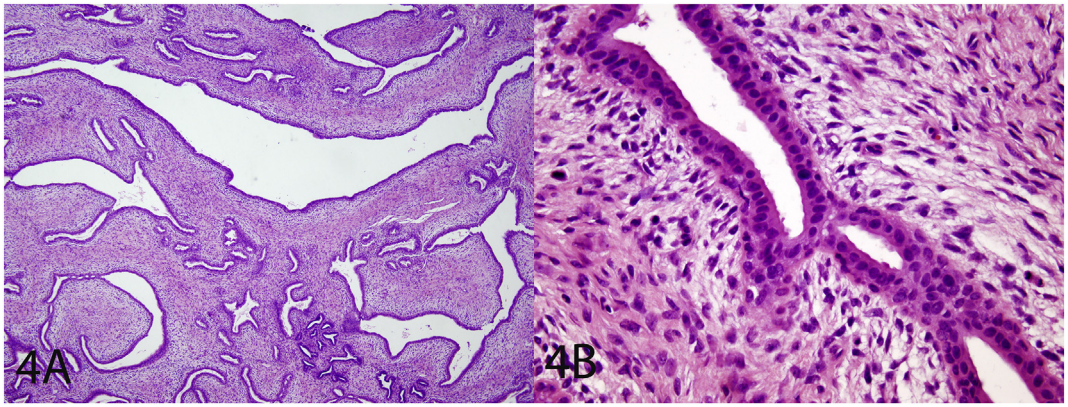

Fig. 4. Cellular fibroepithelial Lesion with indeterminate type (H&E): A combination of 3 of 5 histologic features including intracanalicular growth (4A), mild stromal atypia, and stromal mitosis (4B). Due to the absence of adipose tissue infiltration and stromal overgrowth, this lesion was classified as indeterminate. H&E indicates Hematoxylin and eosin.

histogenesis but a similar outcome.

Based on the presence of mitotic activity and stromal prominence with the addition of at least mild atypia, invasion, or intracanalicular growth at least 19 of our CFEL cases, and maybe as many as 22, likely represent examples of small BPT. The literature suggests that BPTs have a significant risk of local recurrence. In several series, the recurrence rate of BPTs after local excision has been reported in the range of 0 to 66% [4, 5, 6, 7, 8, 9, 10, 11, 12]. However, in one large literature review a cumulative risk of local recurrence rate for BPT was 21% after local excision [13]. This risk was considerably lower (8%) among patients treated with wide excision [13]. Several other studies had reported the strong association of local recurrence with positive surgical resection margins [9, 11, 14, 15, 16]. Therefore, excision with wide margins has been considered to be the best treatment option for these patients [13]. All 22 patients in our study cohort underwent enucleation/marginal excision with close (< 1 mm)/positive margins or core biopsy without subsequent excision. In contrast to these findings reported earlier, none of the 22 patients with BPT- like CFEL recurred despite close or positive margins. For comparison, we included ten patients with BPT who underwent wide excision with negative margins. None of these patients showed any recurrent events during a median follow-up of four years. Our data suggest that there may not be a need for routine "wide excision" of BPT-like CFEL, assuming they are small (< 4 cm) and fully characterized histologically.

The series that report high recurrence rates for BPT are likely derived from referred cases and may be biased by an admixture of aggressive cases. It should also be noted that the diameter of recurrent BPT is not reported in most series and may well contain larger examples. Although we do not view our recurrence data as sufficient for making definitive treatment recommendations, we do not think it would be unreasonable to consider careful clinical follow-up (without wide excision) for a woman with small and BPT-like CFEL that has been "marginally excised."

Similarly, our data do not suggest that CFEL without convincing diagnostic features of phyllodes tumor behaves in a locally recurrent manner. Therefore, we do not infer that they represent "minimal" examples of phyllodes tumors and would not diagnose them as such. Again, this recommendation does not apply to larger tumors. However, reporting of those CFEL without diagnostic features of PT is a problem because standard references do not provide details on how to classify CFEL having some but not all features of PT. Use of the term "CFEL," implies uncertainty, and may result in unnecessary re-excision for some patients having close or positive margins. Owing to the histological overlap among CFELs, we interpret our data to imply that the diagnosis of phyllodes tumor should be made using relatively strict criteria. For lesions that do not meet strict criteria for BPT, but instead are CFEL with some features of BPT, these lesions have a very low recurrence rate and do not require wide excision. In our opinion, these criteria should include the presence of mitotic activity with significantly expanded stromal compartment, intracanalicular growth, and at least mild cytological atypia. Clinical factors and imaging features may be useful in problematic cases.

At the other end of the spectrum, cases with fibroadenoma-like features may be considered as the "control group" for our study. There is a marked morphologic diversity in this subgroup, as shown by 11 different histologic combinations. However, the majority of the cases showed a combination of mild stromal atypia and intracanalicular growth pattern. A minority of the cases displayed mitotic activity or stromal overgrowth; however, an interpretation of "cellular fibroadenoma" was relatively straight forward for most cases in this category. Regarding the recurrence potential for CFA, there are only few case series in the literature, and these have a limited number of patients. Fekete et al. had reported a series of 21 patients, 13 of which had solitary lesions without additional lesions detected on follow-up. Eight of 21 patients had multiple and successive lesions, which were considered to be synchronous or metachronous multicentric lesions rather than a local recurrence [17]. Remadi et al. had also reported a small case series of seven patients with CFA, two of which developed recurrence due to incomplete surgical resection [18]. Similarly, another study reported no recurrence in all 19 patients with solitary lesion regardless of tumor size, microscopic pattern, or manner of excision. However, all six patients they studied with multiple and bilateral CFA developed additional benign masses requiring re-excision [19]. Our data suggest a modest rate (14%, 5 of 35 patients) of local recurrence in patients with CFA-like CFEL, regardless of tumor size. These recurrences all occurred in patients older than 30 years (range: 32–47 years).

Our study does not specifically address the problem of CFEL in needle core breast biopsies, where the literature documents a significant rate of underdiagnosis of phyllodes tumor due to sampling artifact. Therefore in the setting of core needle biopsy diagnosis, complete excision should be performed when there is significant mitotic activity, particularly if there is stromal cell atypism, a tumor size larger than 3 cm, or if the patient is over age 35 years.

In conclusion, our data show that, despite heterogeneous microscopic features that overlap with BPT, local recurrence is unlikely in marginally excised/enucleated size defined CFEL.

In summary, CFELs of the breast display a marked morphologic diversity, and a precise classification into either CFA or BPT is not always possible. Regardless of the histologic classification of CFA-like or BPT-like CFEL, size limited CFEL as a group carries a low recurrence potential. Therefore, patients with BPT-like CFEL may not require

routine excision with wide surgical margins.

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