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Ninety-four cases of encapsulated follicular variant of papillary thyroid carcinoma: A name change to Noninvasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features would help prevent overtreatment

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Encapsulated follicular variant of papillary thyroid carcinoma is a common thyroid gland cancer, with a highly indolent behavior. Recently, reclassification as a non-malignant neoplasm has been proposed. There is no comprehensive, community hospital based longitudinal evaluation of encapsulated follicular variant of papillary thyroid carcinoma. Ninety-four cases of encapsulated follicular variant of papillary thyroid carcinoma were identified in a review of all thyroid gland surgeries performed in 2002 within the Southern California Permanente Medical Group. All histology slides were reviewed and follow-up obtained. Seventy-five women and nineteen men, aged 20–80 years (mean 45.6 years), had a single ($n=61$), multiple (same lobe; $n=20$), or bilateral ($n=13$) tumor(s), ranging in size from 0.7 to 9.5 cm in diameter (mean 3.3 cm). Histologically, all cases demonstrated a well-formed tumor capsule, with capsular and/or lymphovascular invasion in 17 and no invasion in 77 cases. Lymph node metastases were not identified. The tumors had a follicular architecture, without necrosis or >3 mitoses/10 high-power fields (HPFs). Classical papillary thyroid carcinoma nuclear features were seen in at least three HPFs per 3 mm of tumor diameter, including enlarged, elongated, crowded, and overlapping nuclei, irregular nuclear contours, nuclear grooves, and nuclear chromatin clearing. Lobectomy alone ($n=41$), thyroidectomy alone ($n=34$), or completion thyroidectomy ($n=19$) was the initial treatment combined with post-op radioablative iodine in 25 patients. All patients were without evidence of disease after a median follow-up of 11.8 years. Encapsulated follicular variant of papillary thyroid carcinoma showed benign behavior, supporting conservative surgery alone and reclassification of these tumors to *Noninvasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features* (NIFTP).
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Papillary thyroid carcinoma is the most common malignant neoplasm of the thyroid gland worldwide, with excellent survival. Specific variants of papillary carcinoma are well recognized: well differentiated (classical, encapsulated, follicular, cystic, and microscopic), intermediate differentiated (tall cell, columnar cell, diffuse sclerosing, oncocytic, and insular), and poorly differentiated (presence of tumor necrosis and increased mitoses[1,2]), which correlate with 'biologically indolent' and 'biologically aggressive' types.[3] There are two forms of follicular variant: the *encapsulated/well circumscribed* and the *infiltrative* form. The encapsulated follicular variant of papillary thyroid carcinoma, characterized by an encapsulated (sometimes partial) noninvasive tumor with a nearly exclusive follicular pattern, focal to diffuse distribution of characteristic nuclear features of papillary carcinoma, a low risk of lymph node metastases, very low recurrence risk, and a strong association with *RAS* mutations,[1,4–7] has an excellent prognosis.[1,7–20] Recently, reclassification of this tumor as a non-malignant neoplasm has been proposed by an international group of thyroid gland specialists, using the term *Noninvasive Follicular*

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Thyroid Neoplasm With Papillary-Like Nuclear Features (NIFTP).[21] To date, there has not been a large, multi-institutional community practice evaluation of conservative management (surgery only *without* radioablative iodine or suppression therapy). This study will present clinical data, histologic findings, and patient management consequences in a retrospective review of 94 cases of encapsulated follicular variant of papillary thyroid carcinoma.

Materials and methods

All 721 patient records with thyroid surgical cases performed during 2002 at the 11 Southern California Permanente Medical Group hospitals were analyzed. Review was performed of 9999 slides including 2022 intraoperative and immunohistochemical slides, and all original and deeper sections. The 721 patients ranged in age from 0.9 to 86 years (mean 49.5 years), included 566 females and 155 males (F:M = 3.7:1), and included 505 whites, 102 blacks, and 97 Asians (where race was reported). Overall, 282 (39%) patients had non-neoplastic diseases and 439 (61%) had neoplasms. Papillary thyroid carcinoma accounted for 74% of all neoplasms and 45% of the thyroid gland surgeries. Histologic types of papillary thyroid carcinoma were as follows: classical ($n = 106$; 33% of papillary thyroid carcinoma), microscopic/microcarcinoma ($n = 98$; 30%), and follicular variant (encapsulated: $n = 81$; invasive: $n = 13$; 30%), among others.

This report focuses on encapsulated follicular variant of papillary thyroid carcinoma; however, Table 1 provides general data of the whole papillary thyroid carcinoma group for comparison. Encapsulated follicular variant of papillary thyroid carcinoma represented 13% of all thyroid diagnoses; 21% of all thyroid gland neoplasms; and 30% of all papillary thyroid carcinoma in this cohort. A single glass slide from 45 cases in this cohort was submitted for inclusion in the 268 cases evaluated by the consensus group for the re-examination of the encapsulated follicular variant of papillary thyroid cancer.[21]

Electronic medical records were reviewed with additional information obtained as needed. Tumor recurrence was defined as any increase in serum thyroglobulin level (biochemical recurrence) or any evidence of metastatic lesion confirmed by a pathology examination (structural recurrence). This clinical investigation was conducted in accordance with all the guidelines of an Internal Review Board authorization (#5968).

A range of 5–37 slides (often with multiple sections per slide) were examined per case, with a mean of 11.9 blocks submitted per case. The mean tumor size of 3.3 cm yielded an average of 3.6 blocks/cm of tumor, interpreted to be satisfactory for evaluation of the tumor periphery. *Data recorded*: tumor focality (unifocal, multifocal [same lobe], and bilateral); tumor encapsulation (presence or absence; Figure 1); extrathyroidal extension (defined as tumor microscopically present within perithyroidal adipose tissue, skeletal muscle, perithyroidal nerves, adjacent to medium perithyroidal vessels); capsular invasion (tumor penetration through the capsule by >50% of the capsule thickness); vascular invasion (tumor plugging a vascular channel within or immediately beyond the tumor capsule; tumor attached to the vessel wall; associated thrombus); lymphatic invasion; intratumoral fibrosis; architectural pattern of growth (papillary, follicular (Figures 1 and 2), solid, cystic, trabecular, and insular); irregularly shaped/twisted/elongated follicles; presence of papillae, % of tumor volume with papillae; psammoma bodies; tumor necrosis; increased mitotic rate (>3/10 high-power fields [HPFs]); presence of lymph nodes (perithyroidal and cervical) and presence of metastatic disease. Nuclear features of papillary thyroid

Table 1 Papillary carcinoma clinical and macroscopic features

	Encapsulated follicular variant n = *94 (29%)*	*All papillary carcinomas* n = *324 (100%)*
Gender		
Females ($P < 0.0001$)	75	250
Males	19	71
Age at presentation (years)		
All (mean)	45.6	48.4
All (range)	20–80	13–86
<45 years at presentation	46	128
≥45 years at presentation	50	195
Location (dominant mass)		
Right lobe	43	119
Left lobe	37	106
Isthmus	0	4
Bilateral	14	95
Size (in cm)		
Range	0.7–9.5[a]	0.1–11.6
Mean ($P = 0.01$)	3.3	2.3
Number of blocks submitted		
Range	5–37	1–87
Average	11.9	12.8
Number of tumors		
Single	58	159
Multifocal (in one lobe)	22	69
Bilateral	14	96
If multiple, average number	3	3.5
MACIS		
Average (range)	5.0 (3.31–8.15)	5.24 (3.13–11.42)
<6 (Number/%)	81 (86%)	243 (75%)
6.0–6.99 (Number/%)	8 (9%)	39 (12%)
7.0–7.99 (Number/%)	4 (4%)	27 (8%)
8 or higher (Number/%)	1 (1%)	15 (5%)

Abbreviations: MACIS score: metastases, age, completeness of excision, invasiveness, and size.
[a]The tumor removed was the reason for the surgery, and thus assigned a specific type even though <1.0 cm.

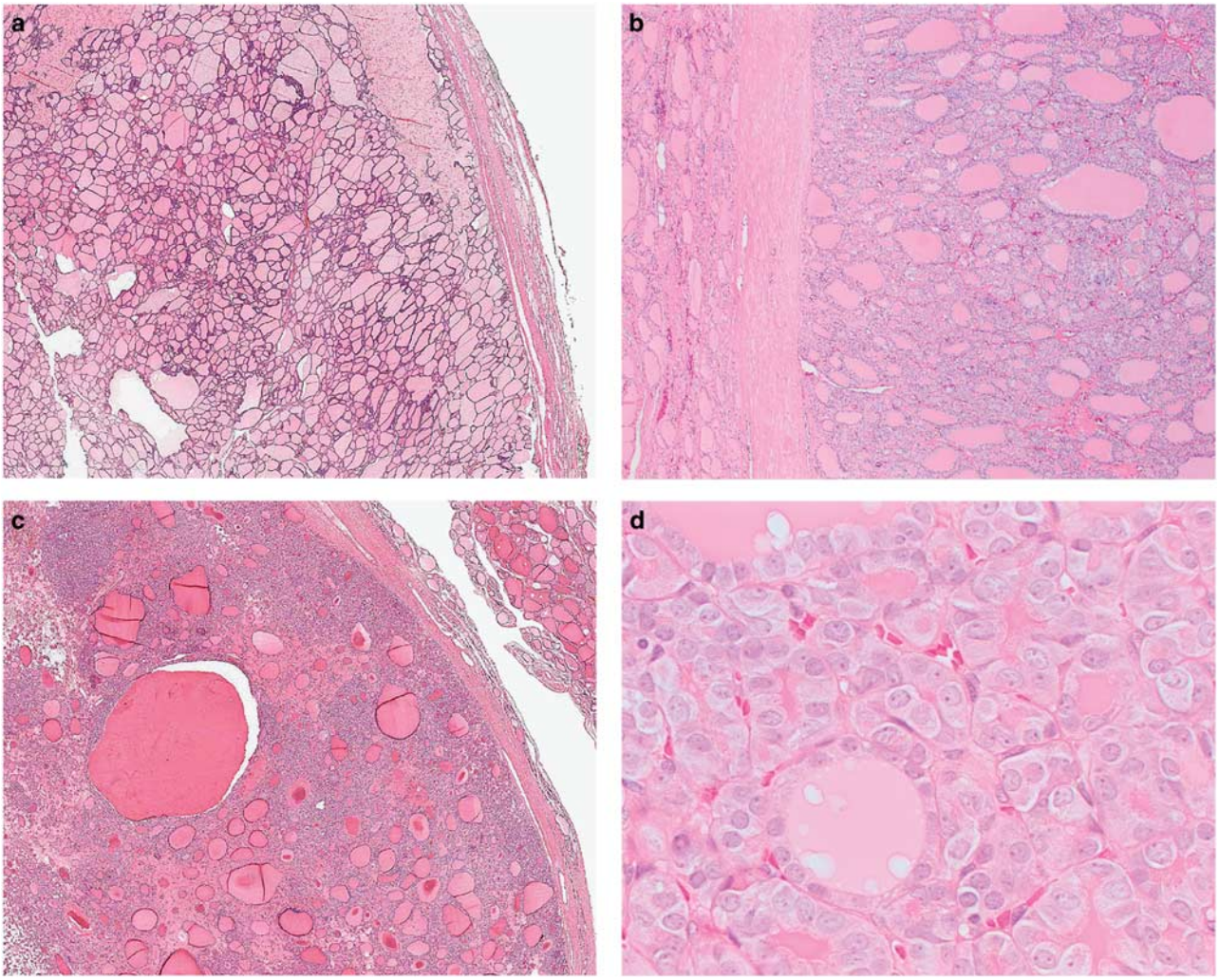

Figure 1 Variably thick capsules (**a–c**) around tumors with a follicular pattern and hypereosinophilic colloid. (**d**) Nuclear enlargement with delicate chromatin.

carcinoma included nuclear enlargement, crowding, overlapping, loss of polarity, elongation, or ovoid shape (Figure 2); irregular contours, grooves or folds; pseudoinclusions, nuclear chromatin clearing, nuclear margination, nucleoli on nuclear membranes, and even, fine, delicate nuclear chromatin (Figures 1 and 2). Nuclear features of papillary thyroid carcinoma were required in at least three foci at ×40 objective magnification per 3 mm of linear tumor diameter, and less than 1% of tumor architecture could show papillary structures to be included in the encapsulated follicular variant of papillary thyroid carcinoma. These criteria were almost identical to the consensus group study.[21] All cases were classified by the American Joint Committee on Cancer (AJCC) staging (2010)[22] criteria, although original classification was based on earlier AJCC iterations. The cases were classified by metastasis, age, completeness of resection, invasion, and size (MACIS) scoring method, using the following definitions: MACIS 3.1 (if aged $\leqslant 39$ years) or 0.08 × age (if aged $>$ or $= 40$ years), + 0.3 × tumor size (in centimeters), + 1 (if incompletely resected), + 1 (if locally invasive), + 3 (if distant metastases present); < 6 is considered excellent and 8+ is considered poor (< 6, 6–6.99, 7–7.99, and 8+ were 99%, 89%, 56%, and 24% disease-specific survival, respectively).[23]

χ^2-tests and Fisher's Exact tests were performed to compare observed and expected frequency distributions. Unpaired *t*-tests or one-way analysis of variance were used to compare the means between groups. Confidence intervals of 95% were generated for all positive findings. The alpha level was set at $P < 0.05$.

Results

Clinical Findings

There were 75 females and 19 males (Table 1), ranging from 20 to 80 years (median 46 years). Four

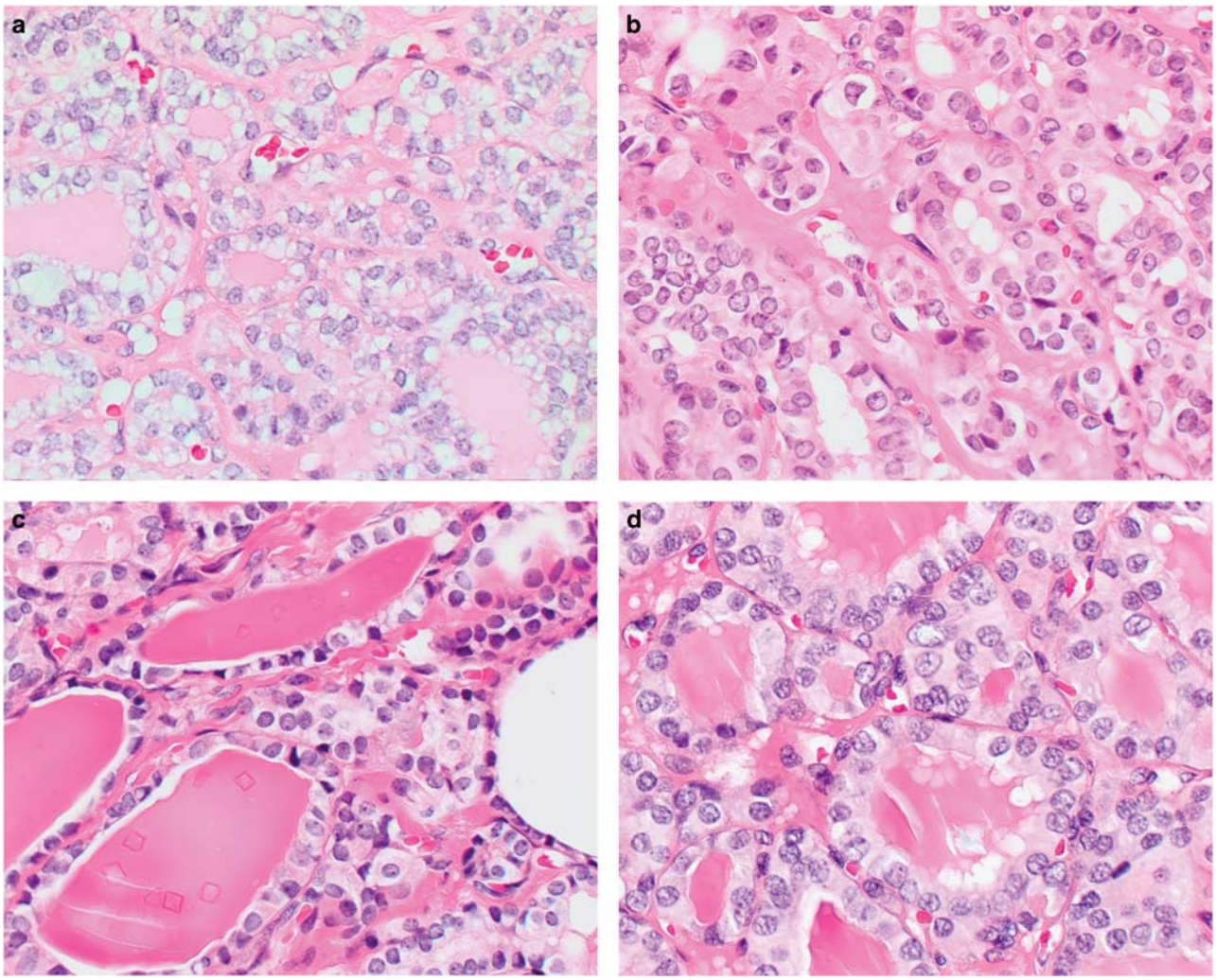

Figure 2 Histologic features of encapsulated follicular variant of papillary thyroid carcinoma including (**a**, **b**) cellular enlargement, nuclear enlargement and elongation, nuclear overlapping and crowding, optical clearing, nuclear grooves, contour irregularities, and delicate chromatin; (**c**, **d**) hypereosinophilic scalloped colloid and crystalloids.

tumors were found incidentally during evaluation for hyperparathyroidism.

Pathologic Features

Macroscopic. The encapsulated follicular variants of papillary thyroid carcinomas were bilateral (15%), multicentric (one lobe, 23%), or unicentric (62%). In 28 of 36 patients with multifocal tumors, the additional tumor was microscopic (<1 cm by definition), with a range of one to eight additional tumors, whereas eight patients had a second tumor of >1 cm. Compared with all papillary thyroid carcinomas ($n=324$), 96 tumors were bilateral (30%), 69 were multiple (21%), and 159 were unifocal (single, 49%). Therefore, 51% of all papillary thyroid carcinomas were multifocal.

The tumors varied from 0.7 to 9.5 cm in greatest diameter (mean 3.3 cm; median 3.0 cm). Five microcarcinomas in this group were the reason for the surgery (ie, not incidental), with the patients evaluated for a single mass. The encapsulated follicular variant of the papillary thyroid carcinoma group had statistically significantly larger tumors ($P=0.01$) than classical papillary carcinoma (mean 2.7 cm).

Microscopic. The tumors were all encapsulated (Table 2) and were divided into 24 'invasive' and 77 'noninvasive' tumors, without any MACIS scoring differences between the groups. All of the cases in this cohort showed a well-developed fibrous connective tissue capsule (no cases showed only partial encapsulation or only well-circumscribed tumors). Capsular invasion was identified in 11 tumors (2–14 foci of invasion, mean 6.6 per case). Fourteen tumors showed lymphovascular invasion (two to seven foci of invasion, mean 3.6 per case). Extrathyroidal extension was identified in only one

case, but in a second, topographically distinct, microscopic classical tumor. The margins were positive in 5% of cases. No metastatic disease was identified in patients with either central compartment or lateral neck lymph node dissections. The majority of patients ($n=52$, 55%) did not have any lymph node samplings. All patients were stratified into MACIS score groups (Table 1), with 86% in the <6 group and only one patient in the 8 or higher group.

The architecture was follicular by definition, with only rare or isolated papillae noted. No cases demonstrated histologic features of other known papillary thyroid carcinoma variants (eg, tall cell, columnar, oncocytic, insular or cribriform variants), nor were any tumors poorly differentiated (solid pattern; tumor necrosis present; increased mitoses of $>3/10$ HPFs). The cells ranged from slightly flattened to cuboidal to columnar cells, showing an increased nuclear to cytoplasmic ratio and enlargement when compared to the uninvolved adjacent thyroid parenchyma. The nuclear features of papillary thyroid carcinoma were present (see Materials and Methods; identical to consensus criteria[21]), although the features were *not* uniformly present. Although preferentially identified at the tumor to capsule junction, they were frequently a focal finding. However, if at least three HPFs within a 3-mm linear area of tumor (diameter measure) showed these features, then the entire encapsulated nodule was diagnosed as an encapsulated follicular variant of papillary thyroid carcinoma, a convention used by others.[24,25]

Other thyroid gland diseases were noted: adenomatoid nodules (78%) and chronic lymphocytic thyroiditis (42%). Parathyroid gland tissue was detected in 25%, confirming inadvertent removal is common.

Table 2 Microscopic features of encapsulated follicular variant of papillary thyroid carcinoma and tumor staging

Feature	*Number*
Capsular invasion present	11
Lymphovascular invasion present	14
Extracapsular extension present	1
Margin status positive	5
Lymph node status (sampled and negative)	42
Tumor T stage	
pT1	29
pT1a	5
pT1b	24
pT2	38
pT3	27
Tumor N stage	
pNx	52
pN0	42
Overall AJCC group	
I	61
II	19
III	14

Abbreviation: AJCC, American Joint Committee on Cancer.

Clinical Treatment and Patient Outcome

See Table 3 for management protocols. Most patients were managed by surgery only ($n=69$), with the remainder managed by surgery and by ^{131}I radiotherapy ($n=25$). Of those with surgery only, the median survival was 11.8 years without any events. Surgical procedures included lobectomy only ($n=42$), thyroidectomy only ($n=21$), thyroidectomy with lymph node dissection ($n=1$), or a completion thyroidectomy after the original diagnosis *without* ^{131}I radiotherapy ($n=5$). There was no lymph node metastases in 42 patients with lymph node sampling. Those managed by follow-up radioactive iodine ablation ($n=25$) treatment had a mean dose of 139 mCi (range 28.9–200 μCi ^{131}I). Despite various management protocols, outcomes were identical.

Extrathyroidal extension was noted in one patient (by definition, pT3). There were no stage IV tumors (Table 2).

There was 100% patient follow-up with no evidence of recurrence based on biochemical or structural disease at the last follow-up: median 11.8 years (mean 11.2; range 1.2–12.5 years): alive ($n=92$) or dead ($n=2$). Outcomes were identical regardless of parameter: gender, age, tumor size, multifocality, presence of capsular or lymphovascular invasion, lymph node status, and stage or treatment.

Table 3 Patient management and outcome

Treatment	*Number of patients*	*Mean years of follow-up*
Lobectomy alone	42	11.3
Invasive type: LVI and/or capsular invasion	4	11.5
Thyroidectomy alone	21	11.6
Invasive type: LVI and/or capsular invasion	7	11.4
Thyroidectomy and lymph node dissection only	1	11.7
Completion thyroidectomy only	5	11.1
Surgery and radioablative iodine	25	10.6
Surgery alone	69	11.6
Median follow-up, 11.8 years; median age, 46; F:M, 55:14; median tumor size, 3.0; Stage I/II/III/IV: 44/14/11/0; **no** lymph node metastases, **no** recurrence and **no** distant metastases		

Discussion

Papillary thyroid carcinoma has several well-recognized histologic variants, with follicular variant a common type as defined by the World Health Organization.[3] There are two main types: *encapsulated* and *infiltrative* (macrofollicular and diffuse follicular variants are rare types not considered here). The term 'encapsulated papillary carcinoma' is applied to *classical* papillary carcinoma with a well-formed capsule,[26,27] showing a dominant *papillary rather than follicular* architecture. The follicular variant comprises ~22–34% of all papillary carcinomas (including this clinical series).[13,28,29] The biologic behavior of encapsulated and non-encapsulated or partially encapsulated but well-circumscribed tumors are equivalent.[13,18] Thus, the two types of follicular variant tumors (encapsulated and infiltrative) are biologically and histologically distinctive. The *encapsulated/well-circumscribed* form may occasionally display invasion (as in this series), showing a genotype that resembles follicular adenoma and/or follicular carcinoma (*RAS* mutations); while the *infiltrative* form lacks circumscription, shows a total or partial lack of a capsule, characterized by neoplastic follicles infiltrating between non-neoplastic ones, more frequently showing *BRAF* mutations, and showing a greater metastatic potential and higher risk of recurrence, similar to classical papillary thyroid carcinoma.[2,13–15]

Encapsulated follicular variant of papillary thyroid carcinoma affects a similar age group as classical papillary carcinoma, with a 45.6 year mean in this cohort *versus* a 44.0 year mean in compiled literature (Table 4). Patients <45 years have a more favorable prognosis. For encapsulated follicular variant of papillary thyroid carcinoma, no patients in this series had disease at the last follow-up. Compiled literature of reported follicular variant papillary thyroid carcinoma cases (invasive or noninvasive) showed that 3.0% had disease at last follow-up, but approached zero for the noninvasive category (Table 4).

This study correlated with the MACIS score categorization (Table 2), averaging a score of 5.0 for the encapsulated follicular variant of papillary thyroid carcinoma category, matching the predicted outcome of a 99% cause specific 21-year survival rate.

No encapsulated follicular variant of papillary thyroid carcinoma case in this series had an adverse outcome. However, when combined with cases reported in the literature, completely encapsulated or partially encapsulated tumors showed a much better outcome than invasive tumors. For follicular variant papillary thyroid carcinoma, the outcome was better than for classical papillary thyroid carcinoma. This clinical study showed no lymph node metastases. The literature reported 12% lymph node metastasis (Table 4), much lower than rates for classical papillary thyroid carcinoma or other variant types but metastases were only identified in tumors with invasion.

Encapsulated follicular variant of papillary thyroid carcinoma is diagnosed based on hematoxylin and eosin stained slides. This tumor tends to genotypically cluster with other follicular patterned tumors rather than classical papillary thyroid carcinoma.[1,5,7,13,30–32] The Cancer Genome Atlas for papillary thyroid carcinoma identified most classical papillary thyroid carcinoma clustered with *BRAF* V600E-type tumors, without overlapping with the *RAS* or *PAX8/PPARγ* cluster of tumors.[6] Both *RAS* (*H*, *N*, or *KRAS*) or *PAX8/PPARγ* is seen in thyroid follicular-patterned tumors: follicular adenoma, follicular carcinoma, and follicular variant of papillary thyroid carcinoma. Therefore, follicular-patterned tumors can have similar molecular findings, even though nuclear features may be different. Histopathologic, clinical, and molecular data suggest that the follicular variant of papillary thyroid carcinoma is actually two lesions: (1) the *noninvasive,* partially or completely encapsulated follicular variant papillary thyroid carcinoma (genotypic and behavioral profile similar to follicular adenoma/carcinoma) and (2) *invasive* (including infiltrative type) follicular variant papillary thyroid carcinoma (genotypic and behavior profile similar to classical papillary thyroid carcinoma, including *the BRAF* mutation status).[5,7,13,31] Well-circumscribed tumors, whether encapsulated or not, '*noninvasive*' follicular variant papillary thyroid carcinoma-type tumors have an exceedingly indolent clinical behavior.

Total thyroidectomy with neck exploration and follow-up radioactive iodine therapy is advocated for biologically aggressive types of thyroid carcinoma, including aggressive variants of papillary carcinoma.[33] In this series, two patients (2%) developed permanent hypocalcemia, whereas none had permanent nerve damage. In this cohort and in identical noninvasive tumors reported in the literature, there was no evidence of metastatic disease (structural or biochemical).[12] Follow-up (mean 11.2 years) showed a complete lack of latent or unrecognized disease and no need for prophylactic central lymph node dissection for this tumor type.

The level of serum Tg is related proportionately to the amount of neoplastic thyroid tissue.[34] Therefore, in patients managed by surgery only (without radioactive iodine), neck ultrasonography is highly sensitive, while using 'stable' Tg levels as a guide. Only an increase in serum Tg should prompt further investigation.[35]

Previous studies have concluded that adequate therapy for encapsulated follicular variant of papillary thyroid carcinoma should be a lobectomy[35–37] without radioactive iodine.[1,12,14,15,29] Radioactive iodine should be employed only when a clinical benefit can be reasonably expected which cannot be shown for this tumor type, and thus should be avoided.

Before this series, case numbers have been small, shown referral bias, had short follow-up periods, and/or patients lost to follow-up. On the basis of this clinical study, together with a compilation of

Table 4 Literature summary of encapsulated follicular variant of papillary thyroid carcinoma

Author	*FV*	*Male*	*Female*	*Age*	*Size*	*Single*	*Multifocal*	*Encap*	*Capsular invasion*	*Vascular invasion*	*ETE*	*Central LN metastases*	*Follow-up number*	*Recurrence*	*Metastases*	*Follow-up in years (mean)*
Hawk[46]	15	4	11	40	n/r	n/r	n/r	15	15	n/r	n/r	3	15	0	1	7.3
Schroder[47]	6	1	5	44	2.5	6	n/r	6	6	4	n/r	3	6	0	0	5.3
Carcangiu[29]	25	7	18	41	n/r	n/r	n/r	16	n/r	n/r	0	8	21	2	0	n/r
Tielens[45]	37	10	27	44	1.2	11	26	11	28	3	6	8	37	0	1	2.8
Moreno[48]	25	4	21	36	n/r	20	5	25	n/r	0	n/r	3	25	0	0	9
Jain[49]	71	n/r	n/r	41	2.8	53	18	20	n/r	5	9	4	n/r	n/r	n/r	n/r
Zhu[31]	30	9	21	42	3.4	n/r	n/r	15	n/r	6	4	4	n/r	0	1	n/r
Passler[50]	37	6	31	49	1.7	25	12	n/r	n/r	n/r	5	12	37	0	0	10.7
Zidan[43]	100	26	74	44	3.5	67	33	n/r	38	n/r	n/r	22	100	n/r	8	11.5 (d)
Burningham[44]	46	7	39	46	1.5	26	18	46	0	6	0	4	45	0	0	3.2
Lang[51]	67	10	57	39	2.5	47	20	n/r	25	9	18	18	67	6	3	11.3
Chang[52]	85	17	68	43	2.7	n/r	n/r	n/r	n/r	n/r	10	10	85	12	10	4.5
Hagag[38]	92	13	79	46	n/r	50	42	n/r	n/r	11	35	29	26	14	15	9.5
di Cristofaro[53]	24	8	16	39	2.2	n/r	n/r	21	n/r	12	n/r	7	n/r	n/r	0	n/r
Liu[14]	78	12	49	43	2.5	n/r	n/r	61	14	10	3	3	42	0	0	11.1 (d)
Yuksel[54]	41	11	30	n/r	1.7	37	4	n/r	n/r	n/r	n/r	0	n/r	0	0	n/r
Widder[20]	82	31	154	44	3.1	n/r	n/r	n/r	n/r	n/r	n/r	n/r	79	0	0	9.3
Rivera[15]	63	23	40	43	3.1	n/r	n/r	63	24	16	0	2	63	0	4	8.9 (d)
Gupta[55]	41	6	16	47	1.7	n/r	n/r	22	n/r	1	0	0	n/r	n/r	n/r	n/r
Baloch[8]	56	13	43	46	n/r	30	26	56	10	2	4	4	34	2	1	9 (d)
Boler[9]	15	n/r	n/r	n/r	n/r	n/r	n/r	15	1	1	n/r	1	n/r	n/r	n/r	n/r
Vivero[18]	77	11	66	50	2.4	69	8	62	8	5	1	0	66	1	0	8.3; 9.3 (d)
Howitt[13]	28	5	23	49	2.4	11	17	28	0	0	0	0	28	0	0	5.3; 6.1 (d)
Rosario[17]	57	10	47	45	2.9	54	3	57	0	0	0	0	57	0	0	6 (d)
Finnerty[11]	119	31	61	48	1.6	90	29	92	n/r	6	0	19	119	0	0	2.2 (d)
Walts[19]	48	11	37	51	1.2	19	29	22	n/r	n/r	20	10	45	4	1	2.7 (d)
Ganly[12]	83	15	42	48	3.0	n/r	n/r	57	0	0	0	0	83	0	0	9.5 (d)
Totals	1448	301	1075	44	2.5	615	290	710				174		27	45	

Abbreviations: (d), Median; Encap, partially or completely encapsulated; ETE, extrathyroidal extension; FV, follicular variant; FU, number of patients with follow-up; LN, lymph node; n/r, not reported.

the literature (Table 4), there is strong evidence that *no additional intervention* is required. Noninvasive, partially to completely encapsulated follicular variant papillary carcinomas as a group have exceedingly indolent behavior and do not require completion thyroidectomy or radioactive iodine therapy. Cases of biologically aggressive encapsulated follicular variant of papillary thyroid carcinoma[38–40] have been reported, but these included tumors with extrathyroidal extension or invasion, and lacked information about encapsulation or multifocality, features which each predict more biologically aggressive behavior independent of histologic variant. On the basis of the American Thyroid Association 'Risk Continuum' or 'Risk Stratification', the tumor would fit in at the lowest point on the continuum, matching the recommendations of initial surgery alone.[41] '*The Endocrine Pathology Society Conference for Re-examination of the Encapsulated Follicular Variant of Papillary Thyroid Cancer*' was convened 20–21 March 2015 in Boston, MA, USA, and based on extensive evaluation of cases, outcome data, and the development of a set of inclusion and exclusion criteria, issued a new name: *Noninvasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features (NIFTP)*.

Conclusion

Adopting a new term for noninvasive encapsulated follicular variant of papillary thyroid carcinoma, a tumor with an indolent outcome in the vast majority of cases, might avoid overtreatment and not unduly burden patients with a cancer diagnosis and potential lifelong follow-up. Rapid adoption of the proposed new term, *Noninvasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features (NIFTP)*, will enhance appropriate risk stratification and management of these patients rather than the current 'one size fits all' approach. Whereas there is a small potential for distant metastases in *invasive* tumors,[8,15,39,42–45] the *noninvasive* follicular thyroid neoplasm with papillary-like nuclear features (formerly encapsulated follicular variant of papillary thyroid carcinoma without invasion) are exceedingly indolent tumors, best managed conservatively by lobectomy or thyroidectomy alone, without radioablative iodine or suppression therapy.

Disclosure/conflict of interest

The author declares no conflict of interest.

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