ISSN 2689-8268 | Volume 8

American Journal of Surgery and Clinical Case Reports

Case Report Open Access

Diagnosing And Treating Solitary Fibrous Tumors in Thyroid. Significance of The Diagnostic Test

Maria Teresa Soriano Palao[1,*], Miriam Abellán Lucas[1], JuanJose Ruiz Manzanera[1,2], Alvaro Cerezuela Fernandez de Palencia[1], Beatriz Febrero Sanchez[1,2] and Jose Manuel Rodríguez Gonzalez[1,2]

[1]Virgen de la Arrixaca Hospital in Murcia

[2]University of Murcia

[*]**Corresponding author:**

Maria Teresa Soriano Palao,
Virgen de la Arrixaca Hospital in Murcia

Received: 02 Jan 2025
Accepted: 28 Jan 2025
Published: 03 Feb 2025
J Short Name: AJSCCR

Citation:

Maria Teresa Soriano Palao. Diagnosing And Treating Solitary Fibrous Tumors in Thyroid. Significance of The Diagnostic Test. Ame J Surg Clin Case Rep. 2025; 8(4): 1-6

Keywords:

Solitary Fibrous Tumors; Thyroid; Biopsy; Core Needle

1. Abstract

Solitary fibrous tumor (SFT) are a type of mesenchymal fibroblastic neoplasms that rarely metastasize. Thyroid localization is exceptional, with only 51 cases described worldwide to date. The diagnosis of these tumors can be suspected by imaging tests. In less than half of the cases described in the literature, a preoperative diagnostic biopsy has been performed, most of which have been fine needle aspiration. Fine needle aspiration, usually guided by ultrasound, is the gold standard for the diagnosis of thyroid nodules. Nevertheless, a core needle biopsy is more likely to give us the amount of material and information about the capsule to perform inmunochemistry techniques that leads into a proper diagnosis.

1.2. Significance Statement

Solitary fibrous tumors are extremely uncommon, and it is remarkable that they occur in the thyroid tissue. Selecting the appropriate preoperative test is crucial for accurate diagnosis and management. The accurate diagnosis can be made sooner and with fewer diagnostic procedures if a core needle biopsy is done as soon as we suspect this entity. We can use a less aggressive treatment plan when more dangerous diseases like medullary thyroid carcinoma are ruled out.

1.3. Introduction

Solitary fibrous tumor (SFT) are a type of mesenchymal fibroblastic neoplasms that rarely metastasize. For many years they have been known as hemangiopericytomas [1,2]. Although they have classically been related to the thoracic cavity, more than 50% of tumors are extrathoracic.

Thyroid localization is exceptional, with only 51 cases described worldwide to date (Table 1).

Table 1: summary of clinicopathological characteristics of the reported cases of thyroid SFT.

	Year	Ref.	Age	Sex	Size (cm) and Location	Mitosis (10Hpf)	Necros	STAT 6	CD34	Risk*4	Treatment	Follow-up (months)
1	1993	Taccagni G. [3]	44	F	6 R	Escasa	NA	NA	NA	NA	RHT	NED (60)
2	1993	Taccagni G.	61	M	6 L	s	NA	NA	NA	NA	ST	NED (48)
3	1993	Taccagni G.	32	F	3.5 R	Escasa	NA	NA	NA	NA	RHT	NED (60)
4	1994	Cameselle-Tejeiro [4]	43	F	4 L	0	No	NA		Low	ST	NED (160)
5	1997	Kie JH. [5]	48	F	8 R	0	No	NA	Yes	Low	RHT	NA
6	1999	Brunemann RB. [6]	28	F	2.5	4	NA	NA	NA	NA	NA	NA
7	2001	Rodríguez I. [7]	43	F	3.5 L	2	No	NA	Yes	Low	NA	NA
8	2001	Rodríguez	52	M	2.5 L	0	No	NA	Yes	Low	NA	NA

9	2001	I. Rodríguez	44	M	2 L	1	No	NA	Yes	Low	NA	NA
10	2001	I. Rodríguez	64	F	4 R	2	No	NA	Yes	Low	NA	NED (60)
11	2001	I. Rodríguez	53	M	6 L	1	No	NA	Yes	Low	NA	NED (60)
12	2001	I. Rodríguez	47	F	4.5 R	0	No	NA	Yes	Low	NA	NED (48)
13	2001	I. Rodríguez	64	F	3 L	0	No	NA	Yes	Low	NA	NA
14	2001	Deshmukh NS. [8]	56	M	8 R	0	No	NA	Yes	Low	RHT	NED (12)
15	2003	Bohórquez CL. [9]	68	M	ion	0	No	NA	Yes	Low	LHT	NA
16	2003	Parwani [10]	61	M	5 L	0	No	NA	Yes	Low	ST	NA
17	2003	Cameselle [11]	36	M	6 L	0	No	NA	Yes	Low	TT	NED (25)
18	2004	Babouk [12]	45	M	5 L	0	No	NA	Yes	Low	LHT	NA
19	2006	Tanahashi [13]	64	M	5 R	0	No	NA	NA	Low	ST	NED (57)
20	2006	Tanahashi	41	M	3 R	0	No	NA	Yes	Low	RHT	NED (45)
21	2006	Papi [14]	70	F	1,5 R	0	No	NA	Yes	Low	TT	NED (6)
22	2007	Papi [15]	45	M	5 L	0	No	NA	Yes	Low	TT	NED (6)
23	2008	Santeusiano [16]	61	M	3,5 R	0	No	NA	Yes	Low	ST	NED (60)
24	2008	Santeusiano	42	F	4,7 R	0	No	NA	Yes	Low	RHT	NED (84)
25	2009	Farrag [17]	51	M	7 L	ND	NA	NA	Yes	NA	LHT	NA
26	2010	Ning [18]	76	F	4 R	Altas	Yes	NA	Yes	Intermediate	RHT	R/M
27	2010	Larsen [19]	58	M	8 IT	Escasa	No	NA	Yes	Low	HT	NA
28	2010	Cox [20]	69	F	2.2	s	NA	NA	Yes	NA	NA	NA
29	2011	Song [21]	37	M	4 I	<1	No	NA	Yes	Low	ST	NED (12)
30	2011	Verdi [22]	47	F	5.2 I	ND	No	NA	Yes	NA	LHT	NED (9)
31	2011	Verdi	59	M	7 D	0	No	NA	Yes	Low	RHT	NED(31)
32	2013	Lin [23]	88	F	9 IT	<1	Yes	NA	Yes	Low	ST	NED (36)
33	2013	Oya Topaloglu [24]	68	M	8.5 I	NA	NA	NA	Yes	NA	Tumorectomy	NED (9)
34	2013	Mizuuchi [25]	78	M	3D	0	No	NA	Yes	Low	ST	NED (12)
35	2013	Alves Filho [26]	60	F	13.8D	6	No	NA	No	Intermediate	ST	NA
36	2013	Vaziri M. [27]	74	M	12 IT	Sparse	No	NA	Yes	Low	TT	NED (24)
37	2014	Boonlorm [28]	61	F	10.5 L	0	No	NA	NA	Low	ST	NED (19)
38	2019	Ghasemi-rad [29]	41	F	11 L	4	No	Yes	Yes	Intermediate	TT	NED (10)
39	2019	Thompson [30]	44	F	7 NA	NA	NA	Yes	NA	NA	HT	NED (41)
40	2019	Thompson	45	F	8.2	NA	NA	Yes	NA	NA	HT	NED (28)
41	2019	Thompson	52	M	NA	NA	NA	Yes	NA	NA	HT	NED (5)
42	2019	Suh [31]	59	M	5.5 L	0	No	Yes	Yes	Intermediate	HT	NED(17)
43	2021	Mohamed [32]	45	F	5 L	0	No	Yes	Yes	Low	LHT	NED (60)
44	2021	Negura [33]	34	F	5.1 L	0	No	NA	Yes	Low	TT	NED (NA)
45	2022	Zhang [34]	65	F	1 NA	Sparse	No	No	Yes	Low	NA	NA
46	2022	Zhang	72	M	4.3	Sparse	No	Yes	No	Low	NA	NSY (1)
47	2022	Zhang	80	M	NA	Sparse	No	Yes	Yes	Low	NA	NA
48	2023	Jin Zhang [35]	68	M	6.2 L	No	No	Yes	Yes	Low	ST	NED (18)
49	2023	Santoro [36]	66	M	6 L	6	No	Yes	Yes	Intermediate	TT	R / M(17)
50	2023	Santoro	45	F	4.5 L	<1	No	Yes	Yes	Low	TT +LL6D	NED (12)
51	2023	Santoro	61	F	2.8 L	2-Jan	No	Yes	Yes	Low	TT	NED (10)
52	2023	Present	51	M	6 R	0	No	Yes	Yes	Low	RHT	NED (6)

F: Female; M: Male; R: Right Lobe; L: Left Lobe; IT: Intrathoracic; NA: Non Available; NED: No Evidence of Disease; R/M: Recurrence or Metastasis; HT: Hemithyroidectomy; RHT: Right Hemithyroidectomy; LHT: Left Hemithyroidectomy; ST: Subtotal Thyroidectomy; TT: Total Thyroidectomy; NSY: No Surgery Yet; LL6D: Left Level 6 Dissection

*Risk according to Demicco [2].

2. Clinical Case

We present the case of a 51-year-old male, with a history of papillary thyroid cancer in his mother, hypertension and OSAHS. He had a cholecystectomy for symptomatic cholelithiasis and 2 obesity surgeries.The patient presents to his primary care physician with a rapidly expanding cervical tumor that has been developing for 3 months. He has trouble swallowing but else remains same. Following a cervical ultrasound reported that the right thyroid lobe was found to have increased at the expense of a large nodule, predominantly cystic-liquid, with a solid isoechoic periphery. The nodule measures approximately 4 x 5.2 x 5.5 cm in diameter, with poor peripheral Doppler flow, without microcalcifications; TIRADS 2[38]. A core needle biopsy (CNB) was performed in light of the ultrasonography and clinical findings. The outcome showed mesenchymal proliferation without atypia, characterized by cells with wavy nuclei and inapparent cytoplasms. They are arranged in a spindle-shaped and whorled pattern with predominantly collagenous stroma, in sclerotic areas. The capillaries are elongated, thin-walled, focally "deer antler." No mitosis or necrosis is observed. At one end of the cylinders, thyroid follicles surrounded by proliferation are identified. The immunohistochemistry revealed positive results for CD34 and STAT6. A multidisciplinary committee discussed the case. The decision was made to perform a right hemithyroidectomy, which went off without any issues. The conclusive pathological exam describes a lesion measuring approximately 6 x 5.2 x 4.5 cm. fleshy in appearance and pearly-white in color with areas of pseudomyxoid appearance. The mass is well-defined although it shows irregular borders. Microscopy describes a well-circumscribed, non-encapsulated mesenchymal neoplasm consisting of spindle cells with soft nuclei, without atypia or mitosis. The neoplasm is trapping thyroid follicles at its Edge. There are alternating hypercellular and hypocellular zones and a hemangiopericitic arrangement/branched vessels in "deer antler." No necrosis is identified. The definitive immunohistochemical study also revealed positive for STAT6 and CD34. It was negative for CKAE1/AE3, Desmin, Actin, S-100, TTF-1, CD31 and spindle cells.A 12-month imaging test follow-up has been carried out thus far with no evidence of recurrence.

3. Discussion

First identified in pleura in 1931, SFT has been referred to by a number of names over the years, including submesiothelial fibroma, pleural fibroma, benign mesothelioma, and solitary fibrous mesothelioma [37].SFTs are more common in the fifth to seventh decades of life, although they can occur at any age. There are no recognized risk factors for this kind of tumor, and the prevalence is comparable in both sexes.It is estimated that the head and neck, including the meninges, are the site of origin for 20% of SFTs [39]. The first evidence of this type of thyroid tumors occurred in 1993, with the publication of Taccagni G [3]. The most common clinical presentation is compressive symptoms due to rapid growth. Paraneoplastic syndrome is exceptional. The diagnosis of these tumors can be suspected by imaging tests. Radiological findings on CT and MRI are similar to those of other soft tissue tumors. However, histological confirmation is needed in all cases.Preoperative diagnostic biopsies have been done in less than half of the instances reported in the literature (n=24), with the majority of these being FNAC as opposed to CNB or trucut (22 vs. 3, since both biopsies were done in 1 case). Only four of these—three FNAB and one CNB produced a conclusive diagnosis before surgery [17,36 and present] (Table 2). Table 2 Goes Here. Of the cases, twelve had spindle cells. Thyroid tissue does not often include spindle cells. They may have arisen initially or as a result of malignant tumors spreading to other areas. When we find these cells in thyroid FNAs, the differential diagnosis varies from absolutely benign lesions like Riedel's thyroiditis, benign nerve system tumors, and post-puncture sclerotic nodules to malignant lesions like medullary thyroid carcinoma, sarcomas, or anaplastic malignancy. For this reason, improving the diagnosis of the many illnesses requires the highest level of accuracy [42].The gold standard for diagnosing thyroid nodules is fine needle aspiration, which is typically guided by ultrasound [43,44]. The most accepted indications for CNB are when FNAs yield non- diagnostic results or atypia outcomes that are unclearly significant.Although it is possible to perform immunohistochemical techniques with material collected with FNAB, a CNB is more likely to give us the amount of material with sufficient cellularity and information about the capsule that bring us closer to the definitive diagnosis [45] . Likewise, a few recent publications have documented the use of CNB as the initial histological test to be conducted [46,47]. It can be used in the first instance if we suspect malignancy due to its clinical characteristics, such as large size, compressive symptoms or rapid growth. Many studies thatsupport its safety and lack of problems in skilled hands and high-volume centers are currently available in the literature. [48-50]

Although CNB is diagnostic, full resection is required for a complete histopathological evaluation[51].The tumors may present hemorrhage, necrosis or calcifications, especially in the large ones with high cellularity. Anaplasia or dedifferentiation occurs in less than 1% of SFTs [52] and present poor prognosis, associated with higher recurrence rates.The expression of CD34, Bcl2, CD99, vimentin, and the lack of actin, desmin, s100 protein, as well as epithelial markers such epithelial membrane antigen (AME), are all included in the conventional immunohistochemistry of SFTs. But these markers are not unique to TFS, nor are they always present in them.The expression of STAT6, or signal transducer and activator of transcription 6, has been found to be a highly specific (>85%) and sensitive (98%) diagnostic marker [53,54] . As of right now, there are no molecular indicators to identify if a tumor is benign or malignant, or how aggressive it is.Most SFTs have an indolent behavior [55], although, tumor size of more than 10 cm, a

high mitotic rate and the presence of tumor necrosis are risk factors for recurrence and metastasis [39,56,57] . The most used model when predicting the risk of these tumors is the Demicco Model [2]. This is based on a point classification that includes the number of mitoses per field, the patient's age, tumor size and the presence of necrosis.The management of these tumors follows principles of en bloc surgery for other mesenchymal neoplasms and, in fact, is the main basis for the treatment of localized disease [58].A follow-up strategy for these patients is not supported by research or clinical recommendations. The National Comprehensive Cancer Network (NCCN) [59] has post-treatment surveillance guidelines for soft tissue sarcomas, where we can classify these neoplasms. Based on stratified risk, the following follow-up could be carried out:

-Low risk: three years of six-monthly tumor site imaging tests. Afterwards, yearly imaging tests for a follow-up of five years.

-Intermediate-high risk: imaging test every 3-4 months during the first 2 years. Afterwards, every six months for a total of five years of follow-up. After that, a local recurrence is rare.

Table 2: Anatomopathologic characteristics of the preoperative biopsy.

Ref.	Preoperative diagnostic test	Preoperative diagnosis	Spindle cells	Suspect of malignancy	STAT6 in preoperative biopsy	CD34 in preoperative biopsy	Other markers in preoperative biopsy
Rodríguez I. [7]	FNAB	No	Yes	NA	NA	NA	NA
Deshmukh NS. [8]	CNB (trucut)	No	Yes	No	NA	NA	NA
Parwani [10]	FNAB	No	Yes	MTC vs benign tumor	NA	NA	NA
Babouk [12]	2 FNAB	No	Yes	NA	NA	NA	NA
Tanahashi [13]	FNAB	No	Yes	No	NA	NA	NA
Tanahashi	FNAB	No	No	B1*	NA	NA	NA
Papi [14]	FNAB	No	No	B1*	NA	NA	NA
Santeusiano	FNAB	No	No	B1*	NA	NA	NA
Farrag [17]	FNAB	Yes	Yes	No	NA	Yes	Negative to AE1/AE3, TTF-1, tiroglobulin, calcitonin, cromogranin, S- 100, smooth muscle actin and CD68
Ning [18]	FNAB	No	Yes	NA	NA	NA	NA
Verdi [22]	2 FNAB	No	No	B1*	NA	NA	NA
Verdi	FNAB	No	No	Colloid stroma vs sclerotic tissue. B1*	NA	NA	NA
Oya Topaloglu [24]	FNAB	No	NA	MTC	NA	NA	NA
Alves Filho [26]	FNAB	No	NA	B2*	NA	NA	NA
Ghasemi- rad [29]	FNAB and	No	No	B1*	NA	NA	NA
Thompson [30]	FNAB	No	Yes	NA	NA	NA	NA
Thompson	FNAB	No	No	B1*	NA	NA	NA
Suh [31]	FNAB	No	No	B2*	NA	NA	NA
Mohamed [32]	2 FNAB	No	No	B2*	NA	NA	NA
Negura [33]	FNAB	No	No	B2*	NA	NA	NA
Santoro [36]	FNAB	Yes	Yes	TIR4**	No	Yes	No
Santoro	FNAB	Yes	Yes	TIR4**	Yes	Yes	No
Santoro	FNAB	No	Yes	TIR3b**	No	No	No
Present	CNB	Yes	Yes	No	Yes	Yes	No

NA: Non Available; FNAB: Fine Needle Aspiration Biopsy: CNB: Core Needle Biopsy; MTC: Medular Thyroid Cancer; STAT6: Signal Transducer and Activator of Transcription 6

*According to Bethesda System [40]

**According to cytology category (Italian SIAPEC-IAP 2014) [41]

4. Conclusions

Thyroid-related SFTs are incredibly rare. Preoperative biopsy is crucial for determining the course of treatment and potential outcome. While FNA can provide definitive results, if the tumor's clinical and radiological features indicate this pathology, it is preferable to undergo CNB or FNA + CNB to finish the preoperative study. Imaging test follow-up appears to be adequate for recurrence control, despite the lack of long-term outcomes.

References

1. Tavora F, Calabrese F, Demicco EG. Solitary fibrous tumour of the thorax. In: Thoracic Tumors, 5th ed, WHO Classification of Tumours Editorial Board (Ed), IARC Press. 2021.
2. Demicco EG, Fritchie KJ, Han A. Solitary Fibrous Tumour. In: Soft Tissue and Bone Tumours, 5th ed, WHO Classification of Tumours Editorial Board (Ed), IARC Press. 2020; 104.
3. Taccagni G, Sambade C, Nesland J. Solitary fibrous tumour of the thyroid: clinicopathological, immunohistochemical and ultrastructural study of three cases. Virchows Arch A Pathol Anat Histopathol. 1993; 422: 491-497
4. Cameselle-Teijeiro J, Varela-Duran J, Fonseca E. Solitary fibrous tumor of the thyroid. Am J Clin Pathol. 1994; 101: 535-538
5. Kie JH, Kim JY, Park YN. Solitary fibrous tumour of the thyroid. Histopathology. 1997; 30: 365-368
6. Brunnemann RB, Ro JY, Ordonez NG, et al. Extrapleural solitary fibrous tumor: a clinicopathologic study of 24 cases. Mod Pathol. 1999; 12: 1034-1042
7. Rodriguez I, Ayala E, Caballero C, et al. Solitary fibrous tumor of the thyroid gland: report of seven cases. Am J Surg Pathol. 2001; 25: 1424-1428
8. Deshmukh NS, Mangham DC, Warfield AT, Watkinson JC. Solitary fibrous tumour of the thyroid gland. J Laryngol Otol. 2001; 115: 940-942
9. Bohórquez CL, González-Cámpora R, Loscertales MC. Solitary fibrous tumor of the thyroid with capsular invasion. Pathol Res Pract. 2003; 199: 687-690
10. Parwani AV, Galindo R, Steinberg DM. Solitary fibrous tumor of the thyroid: cytopathologic findings and differential diagnosis. Diagn Cytopathol. 2003; 28: 213-216
11. Cameselle-Teijeiro J, Manuel Lopes J, Villanueva JP. Lipomatous haemangiopericytoma (adipocytic variant of solitary fibrous tumour) of the thyroid. Histopathology. 2003;43(4):406-8.
12. Babouk NL. Solitary fibrous tumor of the thyroid gland. Saudi Med J. 2004; 25: 805-807
13. Tanahashi J, Kashima K, Daa T, K. Solitary fibrous tumor of the thyroid gland: report of two cases and review of the literature. Pathol Int. 2006; 56: 471-477
14. Papi G, Corrado S, Ruggiero C, Livolsi VA. Solitary fibrous tumor of the thyroid gland associated with papillary thyroid carcinoma. Thyroid. 2006; 16: 319-320
15. Papi G, Corrado S, Uberti ED, Roti E. Solitary fibrous tumor of the thyroid gland. Thyroid. 2007; 17: 119- 126
16. Santeusanio G, Schiaroli S, Ortenzi A. Solitary fibrous tumour of thyroid: report of two cases with immunohistochemical features and literature review. Head Neck Pathol. 2008; 2: 231-235
17. Farrag TY, Micchelli S, Tufano RP. Solitary fibrous tumor of the thyroid gland. Laryngoscope. 2009; 119: 2306-2308
18. Ning S, Song X, Xiang L. Malignant solitary fibrous tumor of the thyroid gland: report of a case and review of the literature. Diagn Cytopathol. 2011; 39: 694-699
19. Larsen SR, Godballe C, Krogdahl A. Solitary fibrous tumor arising in an intrathoracic goiter. Thyroid. 2010; 20: 435-437
20. Cox DP, Daniels T, Jordan RC. Solitary fibrous tumor of the head and neck. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010; 110: 79-84
21. Song Z, Yu C, Song X. Primary solitary fibrous tumor of the thyroid - report of a case and review of the literature. J Cancer. 2011; 2: 206-209
22. Verdi D, Pennelli G, Pelizzo MR, Toniato A. Solitary fibrous tumor of the thyroid gland: a report of two cases with an analysis of their clinical and pathological features. Endocr Pathol. 2011; 22: 165-169
23. Lin MW, Wu CT, Lee YH, Chang YL. Intrathoracic thyroid solitary fibrous tumor presenting with respiratory failure. Ann Thorac Cardiovasc Surg. 2014; 20 Suppl: 427-429
24. Topaloglu O, Ucan B, Demirci T, et al. Solitary fibrous tumor of neck mimicking cold thyroid nodule in 99m tc thyroid scintigraphy. Case Rep Endocrinol. 2013;2013:805745.
25. Mizuuchi Y, Yamamoto H, Nakamura K\. Solitary fibrous tumor of the thyroid gland. Med Mol Morphol. 2014; 47: 117-122
26. Alves Filho W, Mahmoud RR, Ramos DM. Malignant solitary fibrous tumor of the thyroid: a case-report and review of the literature. Arq Bras Endocrinol Metabol. 2014; 58: 402- 406
27. Vaziri M, Molanaei S, Tamannaei Z Solitary fbrous tumor of the intrathoracic goiter. Med J Islam Repub Iran. 2014 28:51
28. Boonlorm N. Solitary Fibrous Tumor of Thyroid Gland: A Case Report. Bull Dep Med Serv. 2014; 39: 133-141
29. Ghasemi-Rad M, Wang KY, Jain S, Lincoln CM. Solitary fibrous tumor of thyroid: a case report with review of literature. Clin Imaging. 2019; 53: 105-107
30. Thompson LDR, Wei C, Rooper LM, Lau SK. Thyroid Gland Solitary Fibrous Tumor: Report of 3 Cases and a Comprehensive Review of the Literature. Head Neck Pathol. 2019; 13: 597-605
31. Suh YJ, Park JH, Jeon JH, Bilegsaikhan SE. Extrapleural solitary fbrous tumor of the thyroid gland: a case report and review of literature. World J Clin Cases. 2020 8(4):782–789.
32. Mohamed AHB, Qureshi F, Eldin RS. Solitary fbrous thyroid tumor: a case report. J Endocrine Soc. 2021; 5:1
33. Negură I, Ianole V, Dănilă R. Primary solitary fbrous tumor of the thyroid gland: a review starting from a case report. Arch Clin Cases 2021; 8(4):97-105.

34. Zhang L, Lubin D, Sinard JH. Primary mesenchymal tumors of the thyroid gland: a modern retrospective cohort including the frst case of TFE3-translocated malignant perivascular epithelioid cell tumor (PEComa). Head Neck Pathol. 2022; 16(3):716-727.
35. Zhang J, Han S, Zhao Y. A case report of solitary fibrous tumor of the thyroid gland and literature review. Medicine (Baltimore). 2023;102(34):e34710.
36. Santoro F, Linari A, Maletta F. Solitary fibrous tumor of the thyroid: report of three cases with a focus on cytological features and histological clues for malignancy. Virchows Arch. 2023;483(2):245-250.
37. Klemperer P, Rabin CB. Primary neoplasms of the pleura: a report of five cases. Arch Pathol. 1931; 11:385.
38. Russ G, Bonnema SJ, Erdogan MF, Durante C, Ngu R, Leenhardt L. European Thyroid Association Guidelines for Ultrasound Malignancy Risk Stratification of Thyroid Nodules in Adults: The EU-TI-RADS. Eur Thyroid J. 2017;6(5):225-237.
39. van Houdt WJ, Westerveld CM, Vrijenhoek JE. Prognosis of solitary fibrous tumors: a multicenter study. Ann Surg Oncol. 2013; 20:4090
40. Ali SZ. The Bethesda System for Reporting Thyroid Cytopathology. 3rd ed. Springer Cham. 2023:290.
41. Fadda G, Basolo F, Bondi A. Cytological classification of thyroid nodules. Proposal of the SIAPEC-IAP Italian Consensus Working Group. Pathological. 2010; 102:405-408
42. Giampaolo Papi, Stefania Corrado, and Virginia A. LiVolsi. Primary Spindle Cell Lesions of the Thyroid Gland. An Overview Am J Clin Pathol. 2005;124(Suppl 1):S95-S123.
43. Hegedus L. Clinical practice. The thyroid nodule. N Engl J Med. 2024; 351:1764-1771.
44. Baloch ZW, LiVolsi VA. Fine-needle aspiration of thyroid nodules: past, present, and future. Endocr Pract. 20024; 10:234-241.
45. Cao H, Kao RH, Hsieh MC. Comparison of core-needle biopsy and fine-needle aspiration in screening for thyroid malignancy: a systematic review and meta-analysis. Curr Med Res Opin. 2016; 32(7): 1291-1301
46. Suh CH, Baek JH, Choi YJ. Efficacy and safety of core-needle biopsy in initially detected thyroid nodules via propensity score analysis. Sci Rep. 2017; 7(1): 8242
47. Hong MJi, Na DG, Kim SJ. Role of core needle biopsy as a first-line diagnostic tool for thyroid nodules: a retrospective cohort study. Ultrasonography. 2018; 37(3): 244-253
48. Novoa E, Gürtler N, Arnoux A. Role of ultrasound-guided core-needle biopsy in the assessment of head and neck lesions: a meta- analysis and systematic review of the literature. Head Neck. 2012; 34(10): 1497-1503
49. Ha EJu, Baek JH, Lee JH. Complications following US-guided core-needle biopsy for thyroid lesions: a retrospective study of 6,169 consecutive patients with 6,687 thyroid nodules. Eur Radiol. 2017; 27(3): 1186-1194
50. Paja M, Del Cura JL, Zabala R. Core-needle biopsy in thyroid nodules: performance, accuracy, and complications. Eur Radiol. 2019; 29(9): 4889-4896
51. England DM, Hochholzer L, McCarthy MJ. Localized benign and malignant fibrous tumors of the pleura. A clinicopathologic review of 223 cases. Am J Surg Pathol. 1989; 13:640.
52. Mosquera JM, Fletcher CD. Expanding the spectrum of malignant progression in solitary fibrous tumors: a study of 8 cases with a discrete anaplastic component--is this dedifferentiated SFT? Am J Surg Pathol. 2009; 33:1314
53. Doyle LA, Vivero M, Fletcher CD. Nuclear expression of STAT6 distinguishes solitary fibrous tumor from histologic mimics. Mod Pathol. 2014; 27:390.
54. Koelsche C, Schweizer L, Renner M. Nuclear relocation of STAT6 reliably predicts NAB2-STAT6 fusion for the diagnosis of solitary fibrous tumour. Histopathology. 2014; 65:613
55. Cranshaw IM, Gikas PD, Fisher C. Clinical outcomes of extra-thoracic solitary fibrous tumours. Eur J Surg Oncol. 2009; 35:994
56. Tapias LF, Mercier O, Ghigna MR. Validation of a scoring system to predict recurrence of resected solitary fibrous tumors of the pleura. Chest. 2015; 147:216.
57. Haas RL, Walraven I, Lecointe-Artzner E. Extrameningeal solitary fibrous tumors- surgery alone or surgery plus perioperative radiotherapy: A retrospective study from the global solitary fibrous tumor initiative in collaboration with the Sarcoma Patients EuroNet. Cancer. 2020; 126:3002.
58. Cardillo G, Lococo F, Carleo F, Martelli M. Solitary fibrous tumors of the pleura. Curr Opin Pulm Med. 2012; 18:339.
59. National Comprehensive Cancer Network (NCCN). NCCN clinical practice guidelines in oncology. 2022.