

Incidentally detected papillary thyroid cancer with highly elevated calcitonin: a case report

Jaejin Yang¹, Goo Lyeon Kim¹, Jeongrye Kim², Myungchul Chang³, Wonae Lee⁴, Jeesuk Yu¹

¹ Department of Pediatrics, ²Department of Radiology, ³ Department of General Surgery, ⁴ Department of Pathology, Dankook university Hospital, Cheonan, Korea, Republic of



Introduction

Thyroid cancer in children are less common than adults but still close monitoring is essential. Appropriate evaluation is needed including thyroid function tests, thyroid ultrasonography, thyroid scan, history of presenting symptoms and family history of thyroid disease. The most common pediatric thyroid cancer is papillary type, while medullary thyroid cancer (MTC) is very rare. Serum calcitonin is the biomarker of MTC, therefore it is recommended to suspect MTC if calcitonin is elevated.

Case

A 15-year-old girl was admitted to the hospital for generalized tonic seizure with fever. Her height and weight were 156.6cm (25-50 percentile) and 43.2kg (5-10 percentile), and head circumference was 54.5cm. In her family, none had history of seizure. Her mother had thyroid nodule, proven papillary thyroid cancer and right lobectomy had been done. On physical examination, her mental status was alert (GCS E4M6V5) after seizure stopped, and Rt. CVA tenderness and neck stiffness were noticed. Initial brain MRI showed a small oval diffusion restriction lesion in the midline of splenium of corpus callosum (Fig. 1). EEG did not reveal specific abnormality. Urinary tract infection with acute pyelonephritis was proven with urine analysis and urine culture.

Initial lab data showed severe hypophosphatemia (0.9mg/dL). Tubular reabsorption of phosphorus was estimated to check urinary loss and proven 96%. We checked calcitonin, parathyroid hormone (PTH) and vitamin D and the levels were 9744pg/mL, 72.7pg/mL and 10.7ng/mL (30-100).

Thyroid ultrasonography was done for elevated calcitonin level. A lobulated taller-than-wide, 0.6*0.7*0.6cm sized nodule was found suggesting highly suspicious malignancy of thyroid gland (K-TIRADS category 5) (Fig. 2). RET gene mutation was checked but pathogenic variant was not detected. Twenty-four hours urine was collected to rule out adrenal mass such as pheochromocytoma. Urinary levels of VMA, catecholamine (Epi), catecholamine (NE), metanephrine, and normetanephrine were 2.4mg/day (0-8), 4.0ug/day (0.5-20), 11.4ug/day (15-80), 136.5ug/day (33-185), and 112.4ug/day (57-286), respectively.

Fine needle aspiration was done and showed atypia of undetermined significance. The patient was then consulted to general surgeon for thyroidectomy. The pathology results was proven papillary thyroid cancer of right lobe with lymph node invasions (8 of 22 lymph nodes) (Fig. 3). The TNM staging of cancer was T1N1M0. Post-operative level of parathyroid hormone was 5.6pg/mL, CEA level was 0.5ng/mL and calcitonin level was 6.9pg/mL. I-131 100mCi treatment was added to the patient.

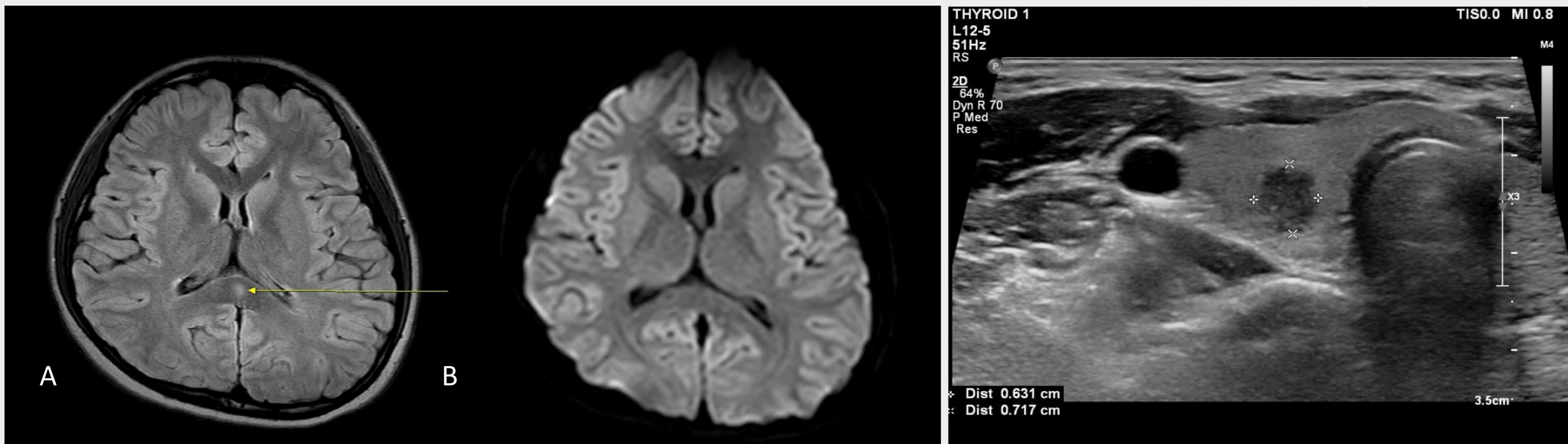


Fig. 1. Brain MR images, (A) 2020-11-18, A small oval diffusion restriction lesion in the midline of corpus callosum splenium, (B) 2021-09-01, Disappear previously noted lesion

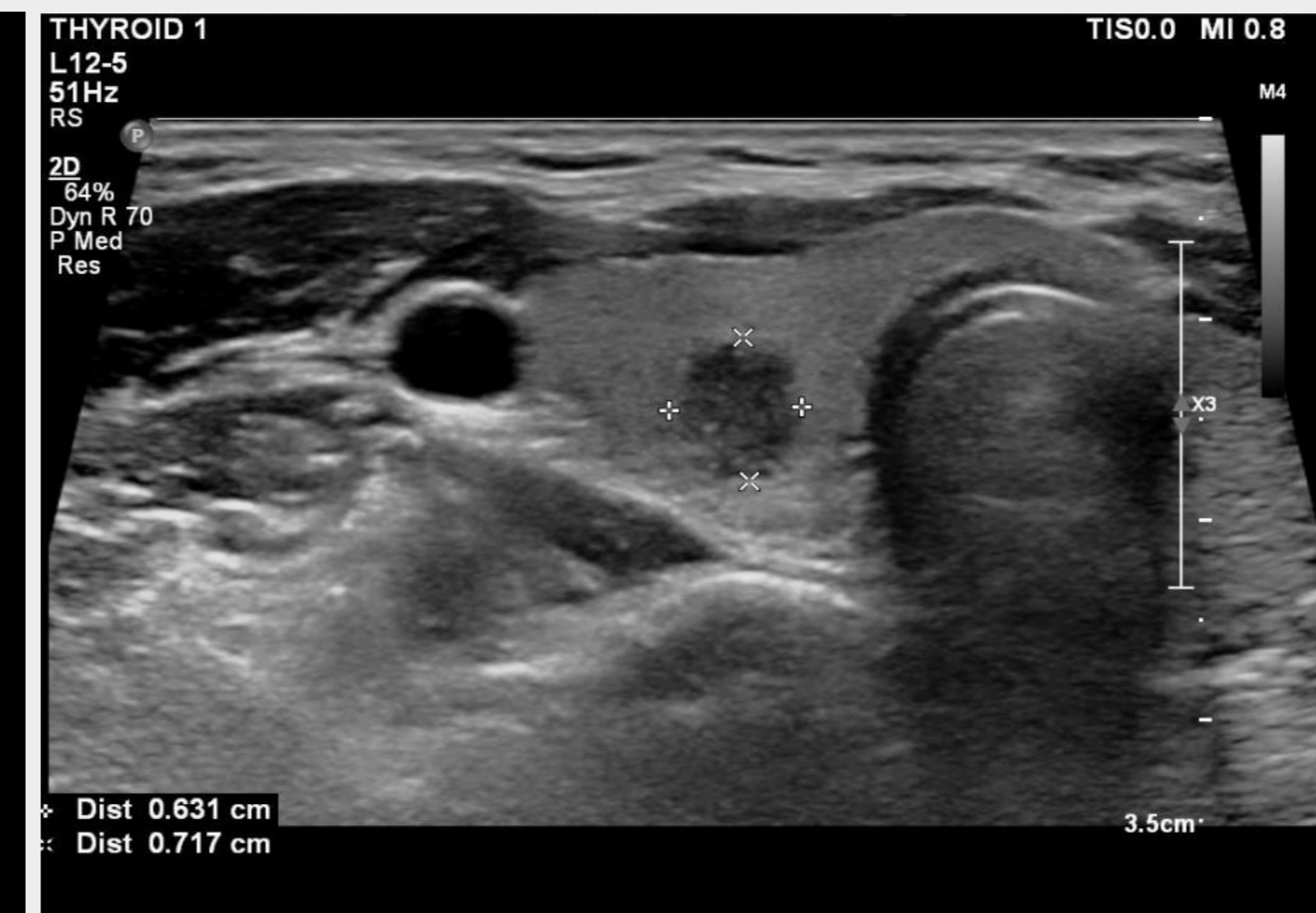


Fig. 2. Thyroid US, A lobulated taller-than-wide, 0.6*0.7*0.6cm sized nodule, (K-TIRADS category 5)

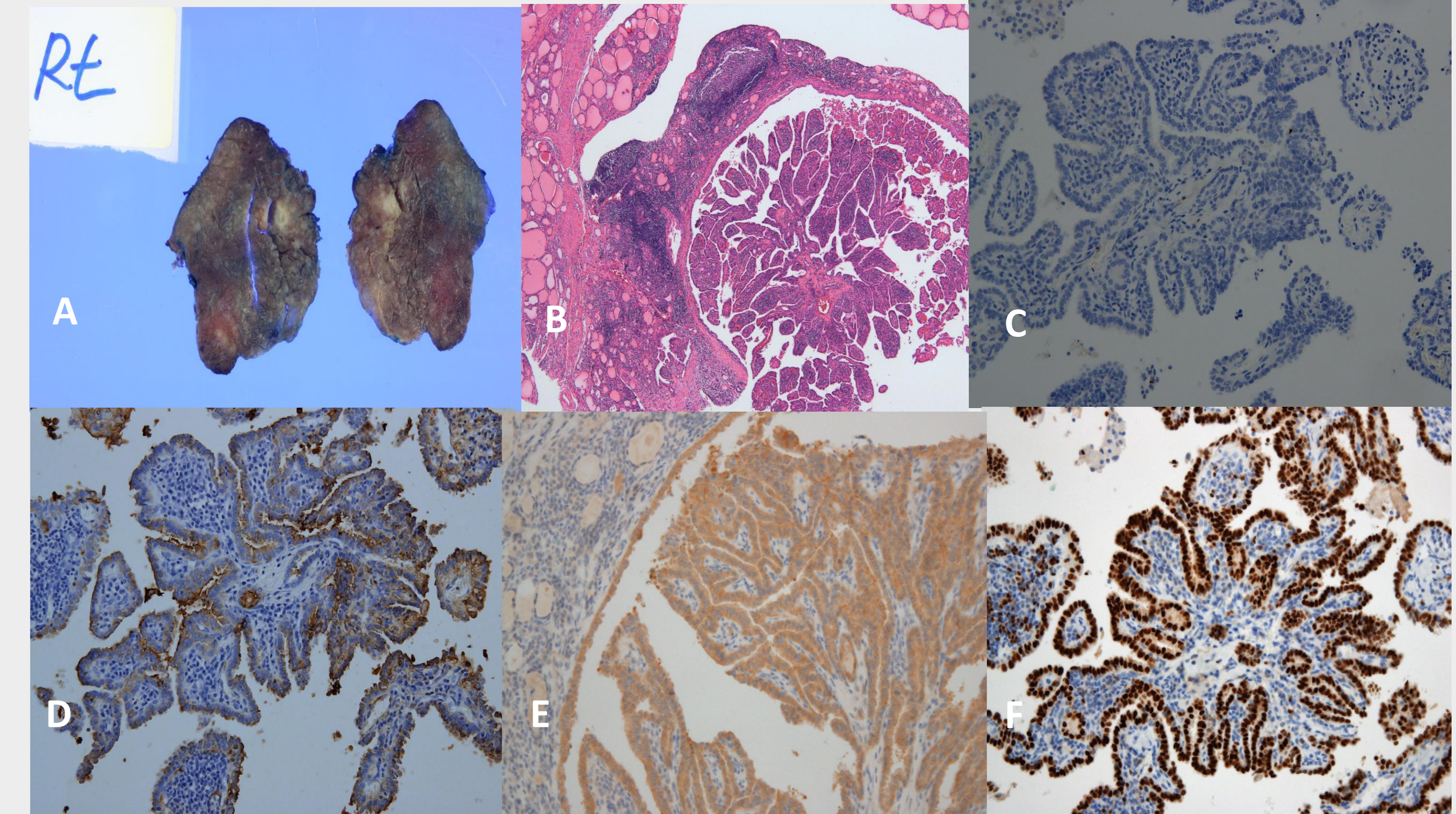


Fig. 3. Pathologic findings. (A) Gross image of right thyroid lobe, (B) H&E stain. Microscopic extrathyroidal extension was not identified, (C) Calcitonin, Chromogranin, Synaptophysin and CEA: Negative, (D) Thyroglobulin, Diffusely positive, (E) BRAF, Diffusely positive, (F) PAX8 and TTF-1, Diffusely positive

Conclusion

This case showed that papillary thyroid cancer can not be ruled out even though serum calcitonin was highly elevated in the evaluation of thyroid nodule. The cut-off value of calcitonin suggestive of MTC was usually reported as <100 pg/ML, this case showed that calcitonin can be elevated when PTC combined with C-cell hyperplasia.

References

- Haugen BR, Alexander EK, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer. *Thyroid* 2016;26(1):1-133.
- Essenmacher AC, Joyce PH Jr, et al. Sonographic Evaluation of Pediatric Thyroid Nodules. *Radiographics* 2017;37(6):1731-52.
- Rosai J. Immunohistochemical markers of thyroid tumors: significance and diagnostic applications. *Tumori* 2003;89(5):517-9.
- Costante G, Meringolo D, et al. Predictive value of serum calcitonin levels for preoperative diagnosis of medullary thyroid carcinoma in a cohort of 5817 consecutive patients with thyroid nodules. *J Clin Endocrinol Metab* 2007;92(2):450-5.

Table 1. Laboratory data during hospital course

	Reference range	U/L	Day 1	Day 3	Day 5	Day 7	Day 9	Day 24	POD #2	POD #27	POD #86	POD #107	POD #168	POD #197
AST/ALT	0-40/4-41	U/L	291/141	33/69	32/52	55/81	29/57	18/13	16/6	39/63	176/536	67/137	36/53	20/23
T-Ca/P	8.6-10.0/2.5-4.5	mg/dL	9.2/0.9	8.4/2.5	8.7/3.7	9.4/3.8	9.4/3.7		8.2/5.4		9.8/4.6	9.1/3.9		9.4/4.0
I-Ca	1.13-1.32	mmol/L	1.15	1.14					0.99					1.2
PTH	10-57	pg/mL	72.7		26.4				5.6		15.5			6
Calcitonin	0-10	pg/mL	9744		942				6.9		2.6			2.8
CEA	0-7	ng/mL				0.563			0.5					0.3
TSH	0.51-4.30	uIU/mL	1.33			2.29		1.12		2.74	0.04			0.02
ft4	0.98-1.63	ng/dL	1.8			1.33		1.1		2.03	1.74			1.62
Thyroglobulin	0-50	ng/mL				1.28				2.15	0.1			0.1
Tg Ab	0-70	IU/mL				125				68.1	41.6			16.4
Anti-TPO	0-26	IU/mL				<5.00								
TSI	0-1.5	IU/L			0.1									