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 156.6 cm (25-50 percentile) and 43.2 kg (5-10 percentile), and head circumference was 54.5 cm. 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 15/15/15). 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 (0.9 mg/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 9744 pg/mL, 72.7 pg/mL and 10.7 pg/mL (30-100).

Thyroid ultrasonography was done for elevated calcitonin level. A lobulated taller-than-wide, 0.6×0.7×0.6 cm 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 2.4 mg/day (0-8), 4.0 ug/day (0.5-20), 11.4 ug/day (15-80), 136.5 ug/day (33-185), and 112.4 ug/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 5.6 pg/mL, CEA level was 0.5 ng/mL and calcitonin level was 6.9 pg/mL. I-131 100 mCi 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, 0.6×0.7×0.6 cm 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**