Anaplastic Thyroid Carcinoma with Retained TTF-1 Expression

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Anaplastic thyroid carcinoma (ATC) is a rare, highly aggressive malignant neoplasm, accounting for only 2-3% of all thyroid gland tumors. We present a 78 year-old female with past medical history of papillary thyroid carcinoma, diagnosed in 2011. She received a total thyroidectomy and post-operative radioactive iodine with ablation of remnant right-sided thyroid tissue. In June 2023 she presented to the emergency department for right-sided neck pain and painful swallowing. She also reported an unintentional weight loss of 25 lbs. Upon physical examination, an immobile right sided neck mass was appreciated between the sternocleidomastoid and the head of the clavicle. Computerized tomography demonstrated a new 2.8 cm mass to the right thyroid bed; core needle biopsies were performed. Tissue examination showed evidence of anaplastic thyroid carcinoma. Immunohistochemical staining demonstrated TTF-1 positivity. The hallmark of ATC on histopathology is a highly infiltrative neoplasm, with invasion to vascular and adjacent tissues. Marked nuclear pleomorphism, increased mitotic rates, and extensive tumor necrosis are usually present. In approximately 75% of cases, PAX8 is positive and TTF-1 markers are usually negative. Thyroid transcription factor-1 or TTF-1 has a 38kDa homeodomain containing transcription factor with 371 amino acids. It is encoded by a gene located on chromosome 14q13 and is a member of the NKX2 gene family. TTF-1 is essential for thyroid morphogenesis and gene regulation and is believed to play a crucial role in oncogenic and inhibitory activities in cancer development. Pathological uses related to TTF-1 include serving as a tumor marker for primary and metastatic thyroid cancers. However, in ATC, TTF-1 expression is usually completely lost. TTF-1 stains are positive in papillary, follicular and medullary thyroid carcinomas, as well as follicular adenomas. Our objective is to clarify this distinctive presentation of a rare neoplasm, fostering enhanced management and advocacy for patients affected by this malignancy.



Kayla Martinez is a fourth year medical student at Ross University School of Medicine. She has completed her third year clerkships at Trinity Health Oakland Hospital in Pontiac, MI affiliated with Wayne State University School of Medicine. She is applying for general surgery residency for the 2024 application cycle. She has presented at the 2023 American College of Gastroenterology Annual Scientific Meeting and completed numerous research endeavors while pursuing her medical degree. She holds a strong interest in cancer histopathology and indicated surgical interventions.