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ABSTRACT

Mature thyroid tissue in the kidney is very rare and its interpretation requires a comprehensive imaging and histopathologic evaluation. Heterotopic thyroid tissue is thought to occur during embryogenesis from aberrant migration of the primordial thyroid. Most cases show locations in the neck and mediastinum, with few reports of subdiaphragmatic sites, including pancreas, duodenum, gallbladder, ovaries, and adrenal glands; only two cases have been reported in the kidney. Herein, we describe an exceedingly rare kidney mass in a 60-year-old female with a past medical history of hyperthyroidism and hysterectomy with bilateral oophorectomy 9 years ago, with a 10-cm dermoid cyst of the right ovary. She presented for evaluation of complicated urinary tract infection, and abdominal computed tomography incidentally identified a 32x31.3mm cystic lesion in the right kidney, concerning for malignancy. The partial right nephrectomy specimen contained a 3.2x2.5x2.0 cm multicystic lesion with a wall up to 0.75cm in thickness and smooth internal lining, filled with a thin gelatinous clear-yellow fluid. Microscopic examination showed a benign thyroid follicular architecture with cells that stained for CD117 and thyroglobulin, including thyroglobulin staining of the intrafollicular colloid; follicular cells also showed nuclear staining for thyroid transcription factor 1 and rare nuclear staining (~1%) for Mib-1. We discuss the differential diagnosis, including heterotopic thyroid, cystic mature teratoma, metastatic struma ovarii, and thyroid-like follicular carcinoma of the kidney. Post-operative evolution was unremarkable. The diagnosis and management of thyroid renal tissue remains puzzling and requires a multidisciplinary approach.

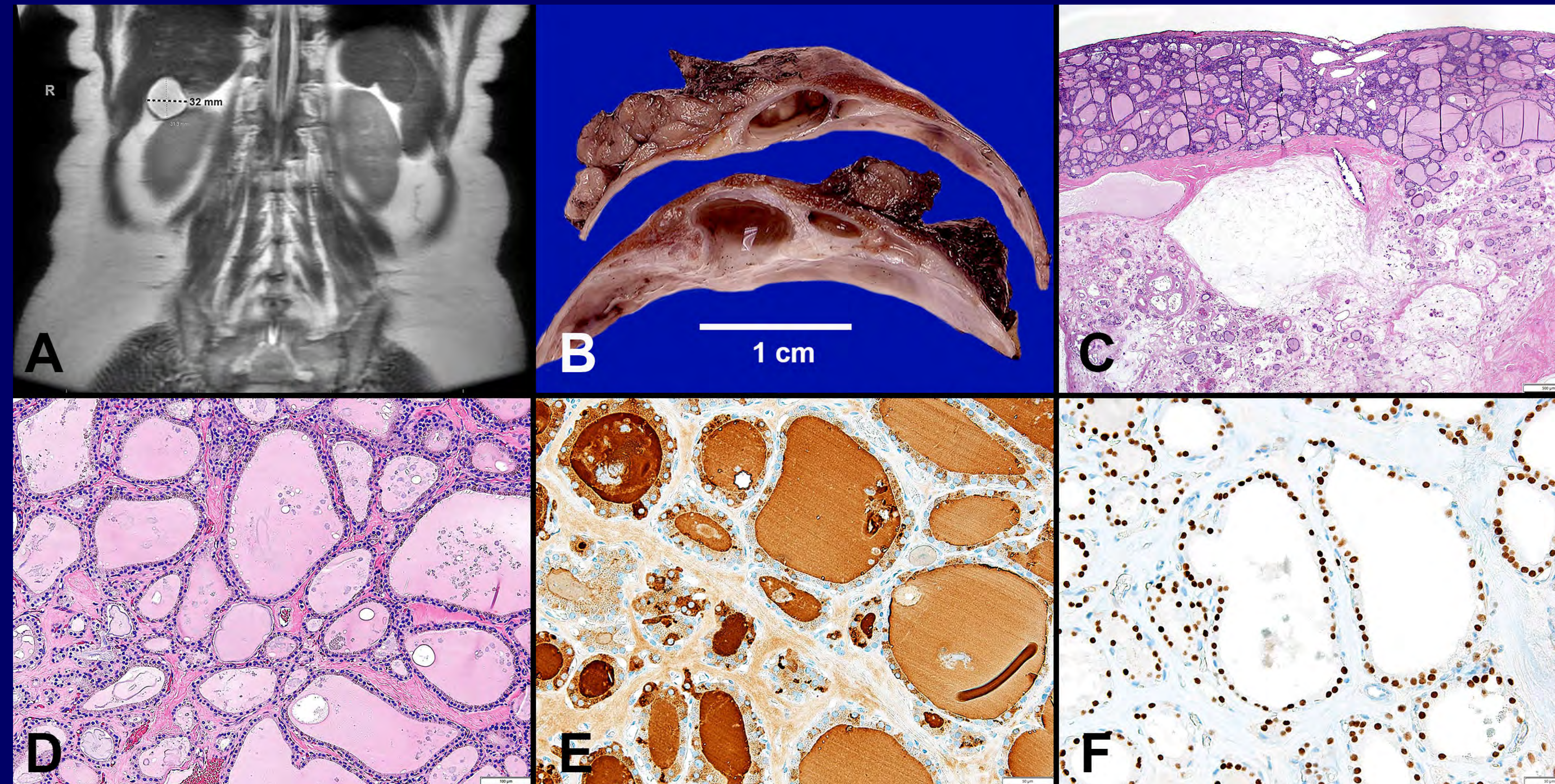


Figure 1. Computed tomography shows a 3.2 x 3.1 x 3.1 cm exophytic, cystic mass in the right kidney (A). Gross examination of the mass revealed a multicystic lesion with a smooth, glistening, grey-white lining containing thin clear-yellow fluid. Adjacent to this multicystic area, there was a rim of tan-brown tissue (B). Immunohistochemical studies for thyroglobulin (E), CD117, and thyroid transcription factor 1 (TTF-1) (F) showed strong positivity in the follicular cells. The intrafollicular colloid also stained strongly positive for thyroglobulin. Figure C (2x), Figures D-F (20x).

DISCUSSION

The histologic differential diagnosis for a kidney mass with follicular architecture includes metastatic thyroid carcinoma, thyroidization of renal tubules seen in end-stage renal disease, thyroid-like follicular carcinoma of the kidney (TLFC-K)⁽³⁾, and heterotopic thyroid tissue⁽²⁾. The diagnosis should incorporate clinical findings and the morphologic and immunohistochemical profile of the lesion.

Metastatic papillary thyroid carcinoma cells have classic cytologic features including nuclear enlargement, nuclear clearing, irregular nuclear membranes, nuclear pseudoinclusions, and nuclear grooves. Immunohistochemistry will show positivity for thyroglobulin and TTF-1.

Thyroidization of the renal tubules, seen in chronic pyelonephritis, is usually seen in conjunction with chronic tubulointerstitial inflammation, tubular atrophy, and interstitial fibrosis. The renal tubules take on a “thyroid follicle-like” appearance comprised of atrophic tubules containing hyaline casts. The renal tubules are positive for PAX8 and negative for TTF-1 and thyroglobulin.

Thyroid-like follicular carcinoma of the kidney is a primary renal cell carcinoma which can look morphologically like both heterotopic thyroid tissue and well-differentiated thyroid follicular carcinoma. However, the tumor cells are distinctly negative for TTF-1 and thyroglobulin and positive for PAX8, CK7, EMA, and vimentin.

In our case, the patient’s renal mass was composed of bland, uniform-appearing cells with an organized follicular architecture and eosinophilic colloid within the follicles. The follicular cells were strongly positive for thyroglobulin, CD117, and TTF-1 supporting thyroid origin. The intrafollicular colloid also stained positively for thyroglobulin⁽⁴⁾.

INTRODUCTION

Heterotopic thyroid tissue is a rare finding that occurs due to aberrant migration of the thyroid gland during embryogenesis. Most frequently, it is usually found around the course of the thyroglossal duct, within the neck, or in the mediastinum. Rarely, it has been described in the subdiaphragmatic organs including the pancreas, duodenum, gallbladder, ovaries, and adrenal glands⁽¹⁾. Histologically, heterotopic thyroid tissue within the kidney is an extremely rare finding which can pose a diagnostic challenge to the pathologist., and only one similar case has been reported in the literature⁽²⁾.

CLINICAL & IMAGING FINDINGS

A 60-year-old female with a past medical history of hyperthyroidism and a mature cystic teratoma (dermoid cyst) of the right ovary status post resection 9 years ago. She underwent computed tomography (CT) imaging for a complicated urinary tract infection and an incidental 3.2 x 3.1 x 3.1 cm exophytic, cystic right kidney mass was found (Figure 1A).

PATHOLOGY EXAMINATION

Gross examination of the mass revealed a multicystic lesion with a smooth, glistening, grey-white lining containing thin clear-yellow fluid. Adjacent to this multicystic area, there was a rim of tan-brown tissue.

Histopathologic examination of the renal mass showed bland, uniform appearing cells with a follicular architecture and intrafollicular eosinophilic colloid (Figures 1C and 1D). Immunohistochemical studies for thyroglobulin (Figure 1E), CD117, and thyroid transcription factor 1 (TTF-1) (Figure 1F) showed strong positivity in the follicular cells. The intrafollicular colloid also stained strongly positive for thyroglobulin. These microscopic and immunohistochemical findings were compatible with benign, heterotopic thyroid follicles in association with a sclerotic renal cyst.

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