Case Report

Renal Neuroendocrine Tumor: A Cat in the Box

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Abstract

Neuroendocrine tumors of the genitourinary tract are rare tumors. Considering the exhaustive list of the latest classification of renal neoplasms, renal neuroendocrine tumor is the last resort to the unanswered diagnosis in histopathology and always comes as a surprise after extensive work-up.

Keywords: Neuroendocrine tumors; genitourinary tract; renal; unanswered diagnosis.

Introduction

Neuroendocrine tumours (NETs) exhibit a wide range of neuroendocrine differentiation and biological behaviour. Primary NETs of the kidney, like carcinoid tumor, small cell carcinoma (SCC), and large cell neuroendocrine carcinoma (LCNEC), are exceedingly rare. [1]

Here, we discuss a case of neuroendocrine tumour of the kidney, which posed a diagnostic challenge, due to its rare occurrence and multiple differential diagnoses, considering multiple primary renal cell neoplasms in the current histological classification of renal tumours.

Case Report

A 54 years, male, presented with gradually increasing heaviness with dull, aching pain in the abdomen, of 1 month duration. On examination, the patient was found to have a left loin lump. Radiological studies were suggestive of a large left renal mass, suspected to be renal cell carcinoma. No lesions were present in any other organs on radiology.

Left nephrectomy was performed. We received a left nephrectomy specimen (Figure 1a and 1b) measuring 20 x 19 x 10 cm. The external surface of the specimen was smooth. The cut surface revealed a circumscribed, friable, solid, brownish, hemorrhagic tumor measuring 17 x 16 x 8 cm at the upper, middle, and lower pole of the kidney. The periphery of the tumor showed firm foci. Compressed, identifiable kidney (Figure 1b: arrow) at the periphery measured 8 x 6 x 4 cm. The tumor

was confined to the kidney; there was no involvement of the renal sinus and perinephric fat. The tumor was 0.1 cm, 0.2 cm, and 0.1 cm away from the renal capsule, Gerota's fascia, and renal sinus, respectively. The renal capsule was intact. Renal vein thrombosis was absent. The stump of the ureter, renal vein, and renal artery measured 9 cm, 1 cm, and 1 cm, respectively, and their cut margins were 9 cm, 1.3 cm, and 1.3 cm, respectively, away from the tumor. No hilar lymph nodes were dissected; fatty tissue was submitted.

Microscopy revealed an encapsulated tumor peripherally showing a thickened, fibrocollagenous, hyalinized (Figure 2a) to calcified capsule, comprising relatively monomorphic cells arranged in nests, sheets, trabeculae (Figure 2b), papillary, cords, and tubular patterns, showing eosinophilic to clear cytoplasm (Figure 2c and 2d) with bland nuclei, interspersed blood vessels, hemorrhage, and cystic change. Mitosis and necrosis were not seen. The tumor was confined to the kidney with no extension into the perinephric fat and renal sinus. Renal vein thrombosis was absent. Hilar fat did not reveal any lymph node and was free of tumor.

By immunohistochemistry, tumor cells were negative for CK7, S100p, AMACR, Dog1, HMB45, Melan A, CD117, SMA, CD56, inhibin, CD34, and CD10.

Pax8 was positive in occasional cells. Vimentin and CA IX (cytoplasmic; Figure 3a) were positive. As Pax8 was not significantly positive, it was not a clear-cut case of renal cell carcinoma, and hence, morphological assessment was relooked into. Suspicion of neuroendocrine tumor was raised. Further immunohistochemistry revealed positivity for CK, synaptophysin (Figure 3b). INSM1 (Figure 3c) was weakly positive in a few tumor cells. Chromogranin (Figure 3d) was positive in a few tumor cells. Ki-67 was 14-15% in high proliferation zones.

Hence, the final diagnosis offered was, well-differentiated neuroendocrine tumor of the kidney.

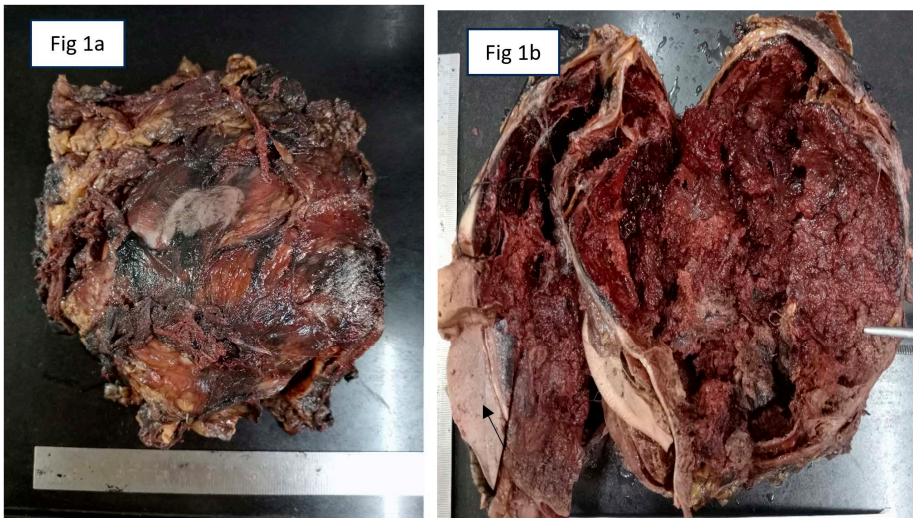

Figure 1: Gross: (a) External surface of left nephrectomy. (b) Cut surface: circumscribed, friable, solid, brownish, hemorrhagic tumor at the upper, middle, and lower pole of the kidney.

Discussion

Neuroendocrine tumor is of rare occurrence in the genitourinary tract but may occur in the kidney, bladder, testis, and urethra. It usually presents with abdominal and back pain and hematuria. The majority of tumors are incidentally detected. Carcinoid syndrome has also been reported. Neuroendocrine neoplasms of the genitourinary tract are classified into: i) Neuroendocrine tumors–well-differentiated neuroendocrine tumor, ii) Neuroendocrine carcinomas (small cell and large cell), iii) Mixed neuroendocrine neoplasms, and iv) Paragangliomas. Grossly, they are well-circumscribed, lobulated, yellow to tan. On microscopy, these tumors are composed of bland, monotonous cells with mild nuclear pleomorphism and speckled nuclei, which are arranged in acini, cords, nests, and trabeculae. Mitoses are scarce, and the Ki-67 is usually low. Immunohistochemically, the tumor cells are reactive for Chromogranin A, synaptophysin, and CD56. Reactivity for PSA and TTF1 have been reported to be negative. [2]

CA IX reactivity has been described in renal NET. [3]

Renal NETs may abut or involve the pelvicalyceal system, and some cases may have nodal metastasis. There is no established grading system for NET in the genitourinary tract. However, gastrointestinal and pancreatic NET grading systems are recommended for future use and multi-institutional collaborative studies. More recently, an attempt has been made to use the Ki-67 index as a prognosticator with 3% as a cut-off value for favorable versus unfavorable behavior. [2] Hence, our case fits into a well-differentiated neuroendocrine tumor, grade 2, and with an unfavorable prognosis, as per the proposed criteria.

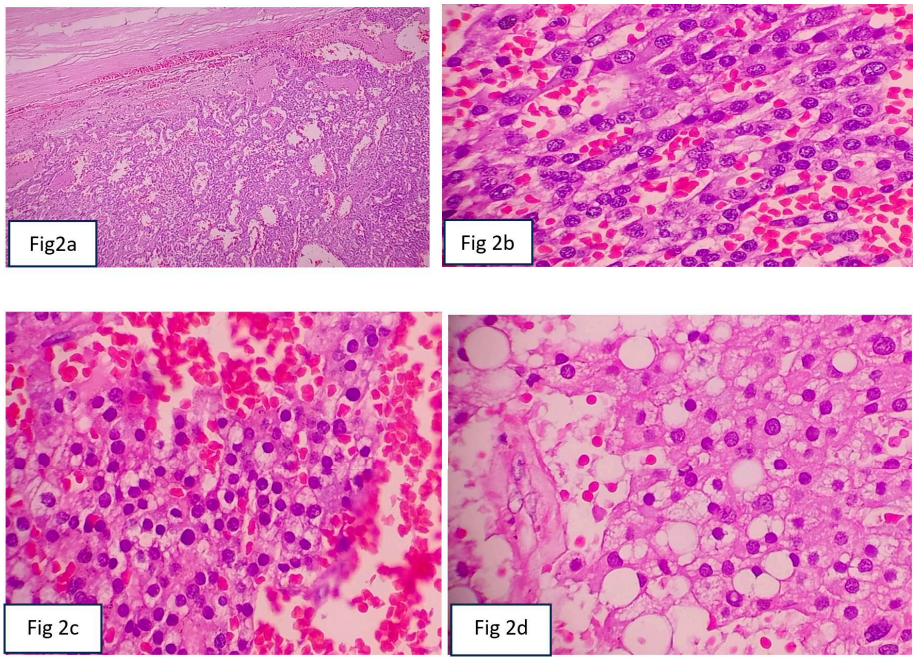

Figure 2: Microscopy: (a) Tumor with peripheral thickened fibrocollagenous capsule (H&E, ×40). (b) Tumor in trabecular pattern (H&E, ×100). (c) Relatively monomorphic tumor cells with clear to eosinophilic cytoplasm (H&E, ×400). (d) Tumor cells with clear to eosinophilic cytoplasm and bland nuclei (H&E, ×400).

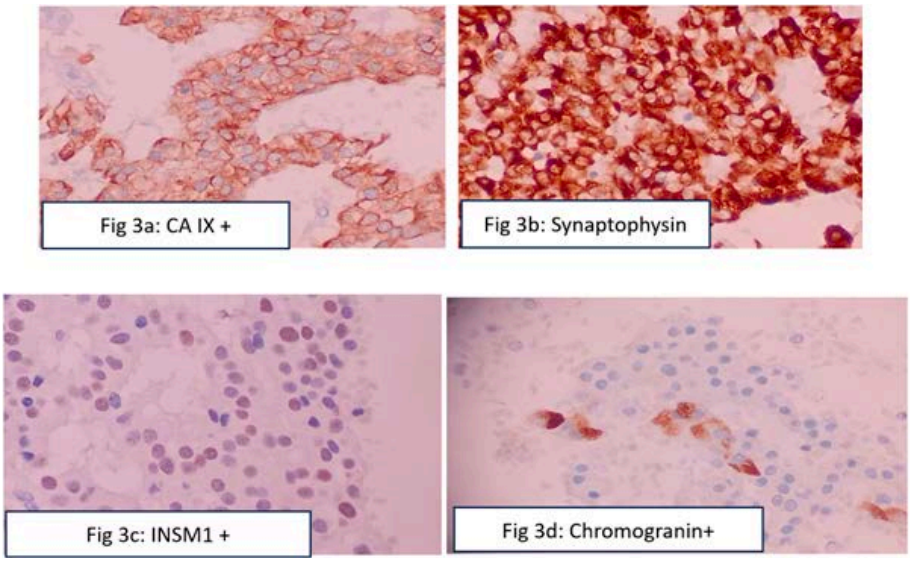

Figure 3: Immunohistochemistry: (a) CA IX positive. (b) Synaptophysin positive. (c) INSM1 positive. (d) Chromogranin positive.

Surgical excision with regional lymph node dissection has been proven to be curative for renal carcinoid tumors and low-stage renal NETs of other histology. Nephrectomy should be viewed as the primary mode of therapy for these patients, but many will require additional treatments for the best chance at a cure. In the reviewed literature, 47% of patients who underwent nephrectomy for renal carcinoids were disease-free after a mean follow-up of 43 months. [1]

Conclusion

A neuroendocrine tumor should always be kept in the differential diagnoses of unsolved renal neoplasia on histology.

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References

1. Lane BR, Jour G, Zhou M. Renal neuroendocrine tumors. Indian J Urol. 2009 Apr;25(2):155-60. doi: 10.4103/0970-1591.52905. PMID: 19672338; PMCID: PMC2710056.
2. De Krijger RR, Hansel DD, Perez-Montiel D et al. Well-differentiated neuroendocrine tumor. In: Amin Mahul B et al. WHO Classification of Tumors Editorial Board Urinary and Male Genital Tumours. 5th edition, Lyon (France): International Agency for Research on Cancer; 2022. p (387-388).
3. Monroe HL, Patadji Santiago S, Williams HJ, El Naili R. Renal Neuroendocrine Tumor: A Case Report with Evaluation of Grading Criteria and Relationship with Carbonic Anhydrase 9 Immunoreactivity. International Journal of Surgical Pathology. 2023;32(3):570-577. doi:10.1177/10668969231186931.