Case Report

Collecting Duct Carcinoma of the Kidney

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Abstract:

Collecting duct carcinoma (CDC) is a rare, highly aggressive malignant neoplasm that arises from the collecting duct epithelium of the kidney. It generally pursues a more aggressive course than conventional renal cell carcinoma. The average age is approximately 53 years. These are large tumors commonly located in medulla or central part of kidney with extension into perinephric fat and invasion into renal pelvis. Microscopically, they show combined tubulo-papillary, microcystic and solid growth pattern; cells are highly atypical with a basophilic or eosinophilic cytoplasm and polymorphic nuclei, often of the hobnail type. Stromal desmoplasia and dysplastic changes in the neighbouring medullary renal tubules are often associated. Their biologic behaviour is mostly aggressive with a high rate of local, lymphatic and haematogenous spread at the times of diagnosis and a poor long-term prognosis.

Key Words: Collecting duct; renal cell carcinoma.

Introduction:

Collecting duct carcinoma (CDC), also known as Bellini duct carcinoma, is a rare tumour and constitute less than 1% of renal epithelial tumors (Matz et al, 1997). Although earlier cases had been reported but it was not recognized as a separate clinicopathological entity until 1986, when Fleming & Lewi (1986) described the clinical and morphologic features of six cases. Collecting duct carcinoma may occur at any age, the mean age at presentation is 53 years with a range of 13 to 83 years. Hematuria is the most common symptom followed by pain, weight loss and the presence of a palpable mass.

Case Report:

A 75 years old male presented with bleeding per urethra since 15 days and dribbling of urine since 8 days. On examination, in right renal angle a tender, firm to hard mass was palpable which measured around 12x6x5cms.

Routine investigations: Blood: Hb - 8.1gm/dl, TLC: 12,800, neutrophils-92%, lymphocytes-8%, ESR-135mm/hr; Urine: Reddish in appearance and turbid; pus cells-18-20/hpf, RBCs-plenty/hpf; Blood urea-88.2mg/dl and Serum creatinine-2.7mg/dl.

Special investigations: X-ray (KUB region) revealed a radio-opaque density in right renal region. Intravenous pyelography showed renal mass with calculi in right lower calyx. Ultrasonography real time scanning showed enlarged right kidney with hydronephrosis and isoechoic mass in lower pole calyx with calculus. Computerized Tomography scan of abdomen: hyperechoic mass within collecting system in right kidney with calculus in lower pole calyx and hydroureter.

On Gross examination of right nephrectomy specimen, it was found to be of greyish white in colour with irregular surface and variable sized nodules. It measured 12x6x5cms with attached fibrofatty tissue. Renal pelvis was not identified externally & ureter was also not seen. Cut section showed a large irregular greyish white solid tumour one side of the kidney measuring 8x6cms; renal cortical thickness measured 1cm; tumor was completely replacing hilum of the kidney; renal vessels and ureter could not be identified. One dark brown renal stone was seen within pelvis measuring 1cm in diameter and was adherent to kidney. No lymph node was identified in perirenal fat (Fig. I). Histopathological Examination: It showed a poorly circumscribed mass composed of highly pleomorphic epithelial cells arranged in ducts, tubules and at places with papillary pattern (Fig. II A & B). These cells were round to oval with abundant eosinophillic cytoplasm, vesicular nuclei with irregular nuclear membrane and prominent 1-2 nucleoli (Fig. III). Occasional mitosis seen. At places hobnail pattern was seen. Adjacent renal parenchyma revealed features of chronic pyelonephritis. A diagnosis of Collecting duct carcinoma with chronic pyelonephritis, hydronephrosis & nephrolithiasis of right kidney was made.

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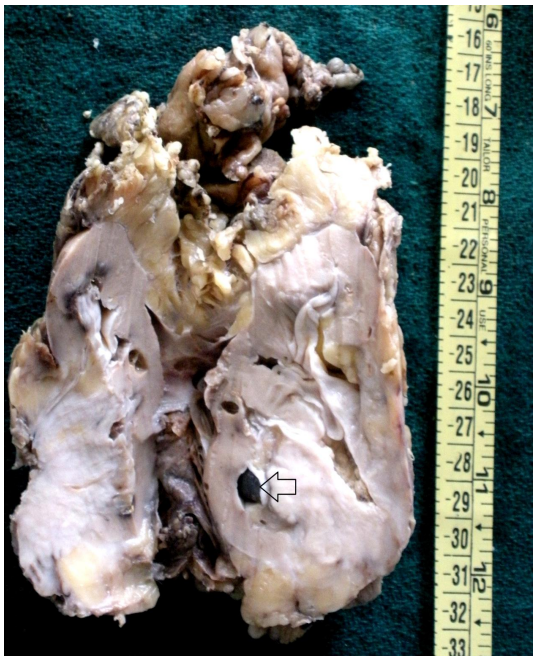

Fig. I: Cut section of mass shows large irregular grey white solid mass which is completely replacing the hilum.

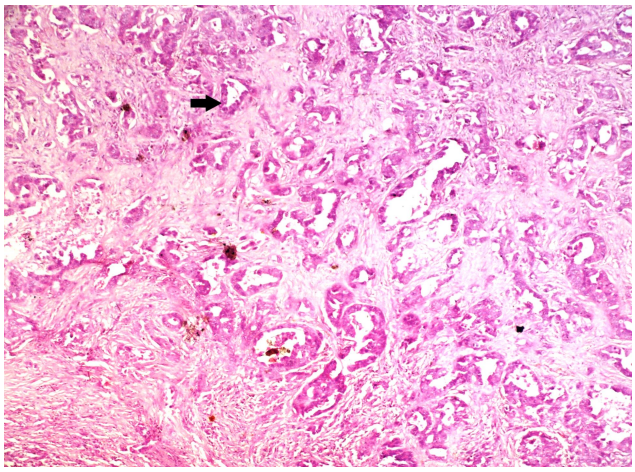

Fig. IIA: Section shows poorly circumscribed mass composed of pleomorphic cells arranged mainly in ducts and tubules (40x, H&E).

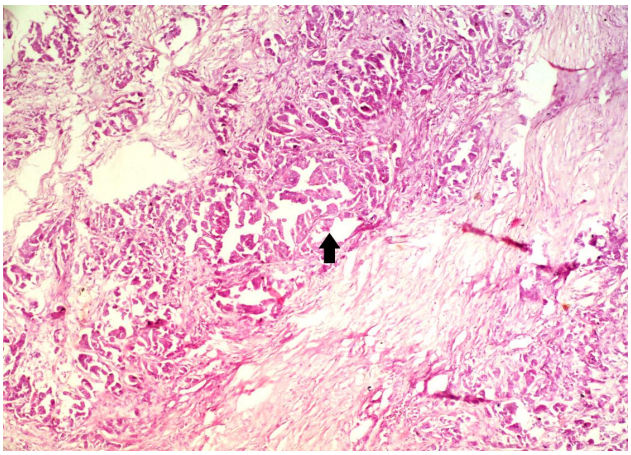

Fig. IIB: Section shows poorly circumscribed mass composed of pleomorphic cells at places in papillary pattern (40x, H&E).

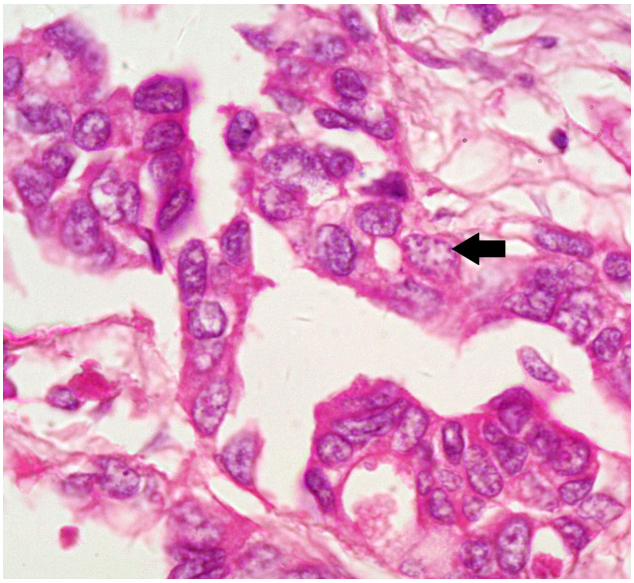

Fig. III: These cells are round to oval with abundant eosinophillic cytoplasm, vesicular nuclei with irregular nuclear membrane and prominent 1-2 nucleoli. (100x, H&E).

Discussion:

Collecting duct carcinoma (CDC) is a rare but distinct subtype of renal cell carcinoma; about 100 cases have been described in the literature so far (Srigely & Eble, 1998). Association with nephrolithiasis is extremely rare (Qureshi, 2007).

The first description of collecting duct carcinoma was given by Mancilla- Jimenez et al (1976) who reported a series of 34 papillary renal cell carcinomas (Kru lin et al, 2001). They observed atypical and hyperplastic changes in adjacent collecting tubules in three tumors, and hypothesized on their collecting duct origin. In 1979, Cromie et al (1979) described a renal tumor composed of papillary, transitional and tubular cell component, and suggested its origin for collecting duct. Many case reports appeared in the literature later.

Collecting duct carcinoma arises from the collecting duct epithelium of the kidney and shares a common embryonic origin with renal pelvis and minor and major calyces (mesonephros) rather than with proximal nephron (metanephros).

Grossly, the tumour may commence at the cortico-medullary junction but due to its aggressiveness, can spread to the entire kidney and beyond at diagnosis. Unlike conventional renal cell carcinoma, CDC is not usually circumscribed, and only small to punctuate hemorrhagic areas are present.

Histologically, it is characterized by tubulopapillary pattern of growth, marked desmoplasia, inflammatory infiltrate, high-grade cytological features

with hobnail nuclei. These tumors often have a mixed papillary and infiltrative tubular architecture. The infiltrative component is associated with marked stromal desmoplasia. Foci of dysplasia, or carcinoma in situ, can be found in the adjacent collecting ducts in some cases. The tumors are of high nuclear grade, corresponding to Fuhrman grade 3 or 4. Some cases have been described with a urothelial carcinoma component.

On immunohistochemical studies, tumor cell positivity with antibodies to Ulex European agglutinin 1 lectin strongly suggests the diagnosis of CDC. The tumor is also positive to peanut agglutinin (PNA), vimentin, lysozyme, distal tubular marker EMA, and high molecular weight cytokeratin, and negative for proximal tubular markers (Matei et al, 2005).

The main differential diagnosis of collecting duct carcinoma includes papillary renal cell carcinoma, adenocarcinoma or urothelial carcinoma with glandular differentiation and metastatic carcinoma (Qureshi, 2007).

The prognosis is poor, more than 50% of the reported patients died within two years of presentation (Kru lin et al, 2001). The collecting duct carcinoma is characterized by being an aggressive entity with an unfortunate outcome in most patients (Çalli et al, 2004).

Conclusion:

Identification of the Bellini's duct carcinoma has important diagnostic and prognostic ramifications. There are no specific radiological findings of this entity. The diagnostic process should involve meticulous attention to the architectural, histologic and immunohistochemical findings.

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