Renal Papillary Adenoma, an Incidental Finding in the Background of Chronic Calculous Pyelonephritis: A Case Report

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Abstract

An unencapsulated tumour mostly arising in the renal cortex and having papillary or tubular architecture with low WHO/ISUP grade and < / = 15 mm in diameter is termed as renal papillary adenoma. Papillary adenoma and papillary renal cell carcinoma have similar immunohistochemical and genetic profile but truly unencapsulated papillary adenomas with 15mm or less in size and low nuclear grade have no capacity to metastasize. These adenomas are found in patients with renal vascular disease, on long-term hemodialysis, acquired cystic disease or the patients undergoing transplantation for end-stage renal disease. Here we present a case of a 55years old gentleman who was provisionally diagnosed as recurrent left renal calculi with chronic pyelonephritis with left renocutaneous fistula and underwent simple left nephrectomy. He had a past history of left sided nephrolithotomy seven years back when about 41 renal stones of variable size were extracted. In the nephrectomy specimen along with dilated pelvicalyceal system, stones and fibrosis, a grey white area in the cortex of upper pole beneath the capsule were found. Histopathologically the case was diagnosed as chronic pyelonephritis with nephrolithiasis with papillary adenoma. Immunohistochemical analysis revealed usual nuclear reactivity of alpha-methylacyl-coenzyme A racemase (AMACR) and low ki-67 index in papillary adenoma. In this article, our diagnostic approach to this rare entity is discussed.

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Keywords: Renal papillary adenoma, papillary renal cell carcinoma, chronic pyelonephritis, nephrolithiasis, AMACR immunostain

Introduction

Renal adenomas are benign tumours of renal tubular epithelial origin. They are classified as papillary adenoma, oncocytoma and metanephric adenoma principally based on their histological pattern.[1-3] World Health Organization (WHO) defines renal papillary adenoma as a benign epithelial tumour with the pathological features such as unencapsulated with papillary or tubular architecture, low grade(WHO/International Society of Urological Pathology) and diameter of </=15 mm. There may be multiple adenomas, usually more than five, in one kidney known as renal adenomatosis.[4] Recent studies reported that papillary adenoma and papillary renal cell carcinoma shares similar immunohistochemical and genetic profile, that's why papillary adenoma is considered as a precursor lesion of papillary renal cell carcinoma (PRCC).[3,5,6] Here we report a case of renal papillary adenoma incidentally found in a patient with recurrent renal calculus with chronic pyelonephritis and renocutaneuos fistula.

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Case presentation

A 55-years-old gentleman presented with complaints of left flank pain and pus coming out through his previous left nephrolithotomy operation site for one and half months. He had fever, low urine output and mild weight loss. He was mild anaemic. His fever was subsided with antibiotic and antipyretic medication. Left costovertebral angle was tender on palpation. Others vital signs were normal. He had a significant past history. Left sided nephrolithotomy was done seven years ago and 41 renal stones of variable size were found. He was a smoker and used to smook 1 pack/day for almost 35 years. His family history was nothing contributory. He was provisionally diagnosed as recurrent left renal calculus with chronic pyelonephritis with left renocutaneous fistula. His haemoglobin level was 7.8 g/dl, white blood cell (WBC) count was 14.2×10^9/L. Urine analysis revealed pus cells 40-50 /HPF, epithelial cells 6-8/HPF, RBC was nil. Serum creatinine was 2.25 mg/dl. Serum electrolyte was normal. 4D ultrasound of KUB region revealed normal size, shape and position of both kidneys with well differentiated cortex and medulla. Two stones of 1.8 and1.0 cm were found in left kidney. A hypoechoic tract like lesion was also seen in left renal area connected with skin measuring 2.75 cm (sinus tract in left renal area) (Fig.1). Left kidney was removed by simple nephrectomy. During operation marked adhesion was found.

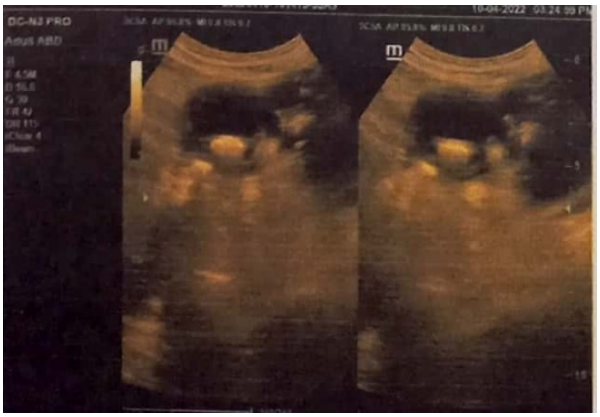
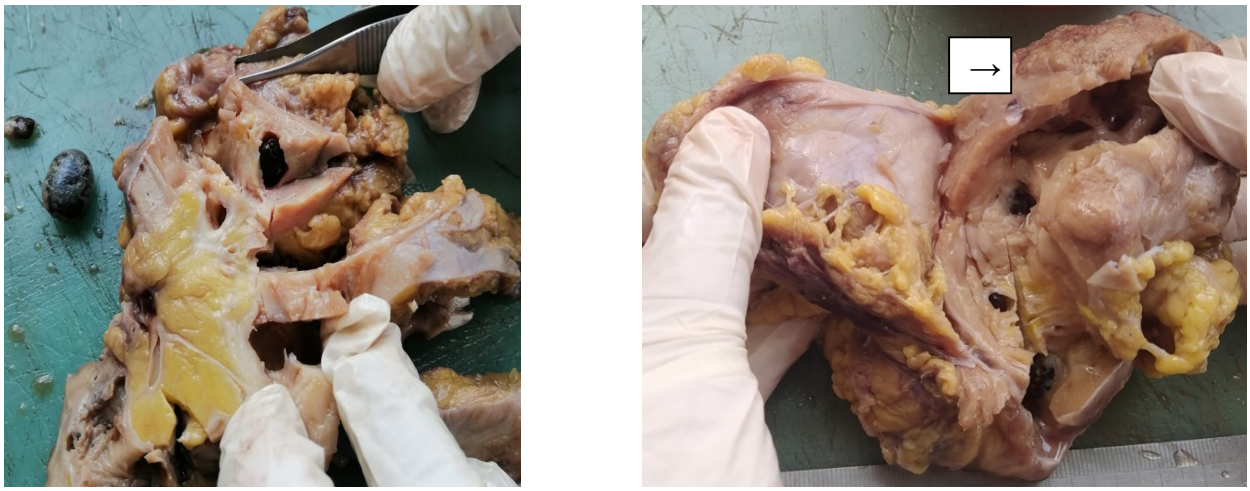


Figure 1. USG showing stones in left kidney with a hypoechoic tract like lesion.

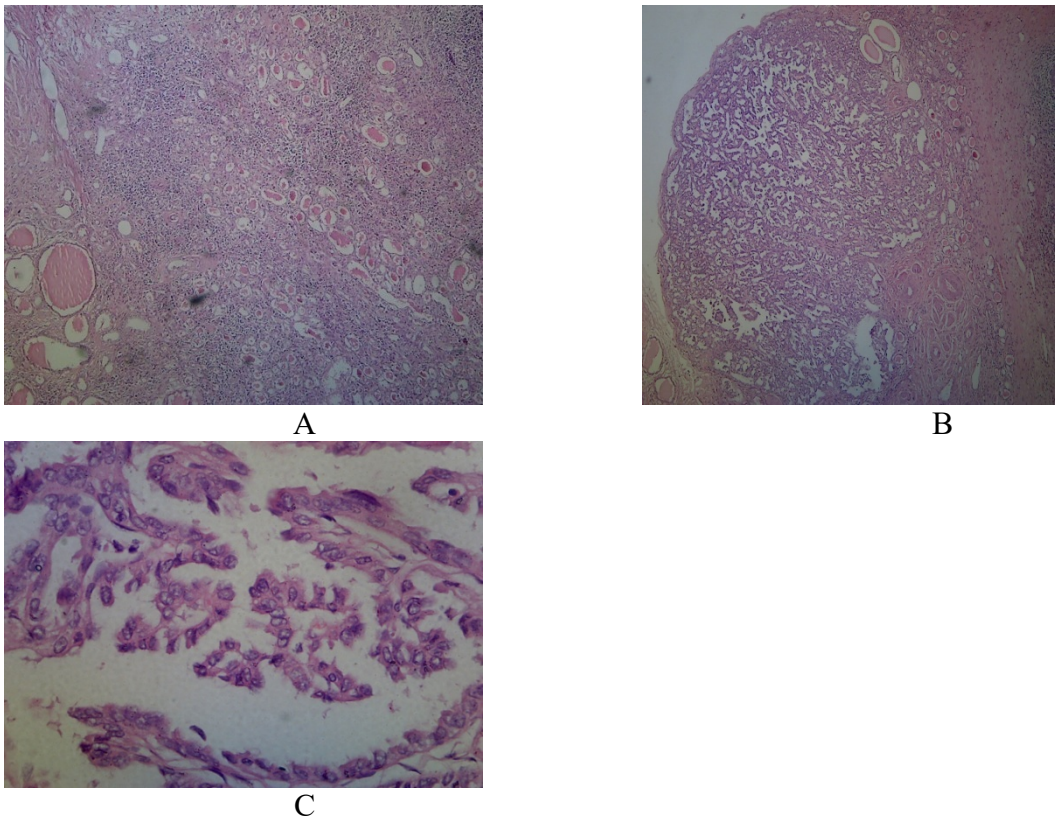
Resected left kidney measuring 10×6×3 cm with a 3.0 cm long ureter and attached perinephric fat was received in the department of Pathology, BSMMU for histopathological examination. Outer surface of kidney was focally bosselated at the upper pole. Cut surface showed multiple black, rounded, smooth stones, the largest one measuring 1.5 cm. The pelvicalyceal area was partly replaced by fat (Fig.2A). There was also an irregular, grey white area measuring 0.8 cm in the cortex of upper pole beneath the capsule (Fig.2B).



A B

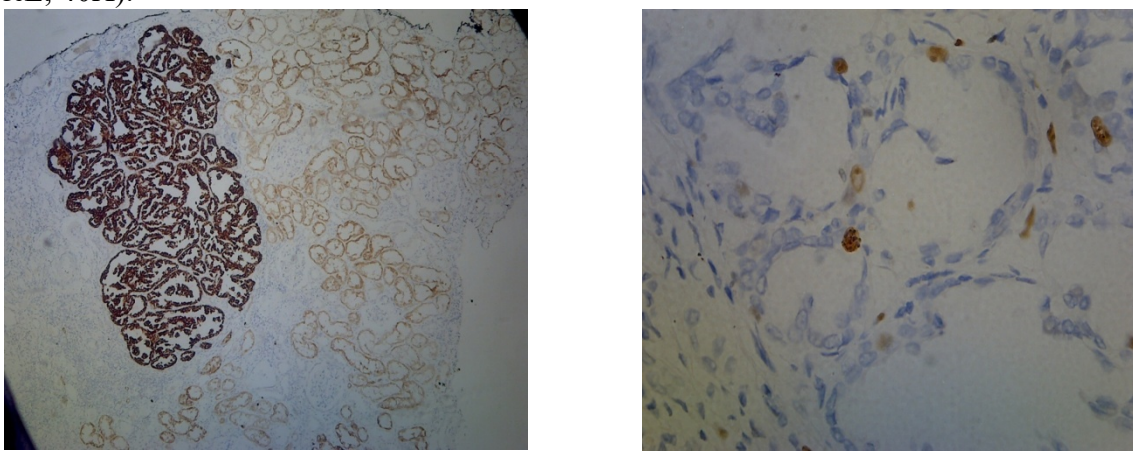
Figure 2. Gross picture showing A) multiple black, rounded, smooth stones and pelvicalyceal area partly replaced by fat, B) subcapsular grey white area (arrow).

Histopathological examination from kidney showed tubular atrophy with thyroidization of tubules, sclerosed glomeruli, moderate fibrosis, thick walled blood vessels and infiltration of chronic inflammatory cells (Fig.3A). Section made from grey white area showed a well circumscribed, unencapsulated tumour composed of densely packed thin papillae and tubules lined by cuboidal cells (Fig. 3B). These cells have low nuclear grade comprising of small round delicate nuclei with occasional nucleoli and eosinophilic cytoplasm. Few of these cells showed mild nuclear pleomorphism (Fig. 3C). Sections made from pelvis, ureter and renal vessels were unremarkable. No malignancy was seen. Immunohistochemistry for alpha-methylacyl-coenzyme A racemase (AMACR) and Ki67 were done for the papillary focus. AMACR was positive and Ki67 was low (Fig.4 A,B).The case was diagnosed as chronic pyelonephritis with nephrolithiasis and incidental papillary adenoma.



A B C

Figure 3. Photomicrograph showing (A) features of chronic pyelonephritis comprising of tubular atrophy with thyroidization, infiltration of chronic inflammatory cells and fibrosis (H &E, 10X), (B) unencapsulated tumour composed of densely packed thin papillae and tubules lined by cuboidal cells (H &E, 10X), (C). Few of the cells of papillary area showing mild nuclear pleomorphism (H &E, 40X).



A B

Figure 4. (A). Positive AMACR stain in papillary adenoma(AMACR immunostain, 10X), (B) Positive Ki67 in few cells of papillary adenoma (Ki67 immunostain, 40X)

Discussion

The definition, concept, distinctive size and diagnostic criterion of renal papillary adenoma have been changed frequently. Until 1985 a tumour measuring less than 3.0 cm in size was the diagnostic criterion of papillary adenoma. In 1986, Mainz classification system was defining papillary adenoma as tumour smaller than 1 cm in diameter. In 1998, the cutoff value was up to 5 mm.[7] Currently, according to WHO classification (2016) papillary adenoma is described as benign tumour </=15 mm in size. The decision to change the diagnostic size from 5 to 15 mm was based on the evidence that small renal masses of this size have lack of capacity to metastasize.[4]

Renal papillary adenoma is not uncommon. It is usually found incidentally during nephrectomy for other reason. They have been reported from nephrectomy specimen (7%) as well as autopsy renal specimen (10-40%). In a retrospective study, Wang et al.[3] re-evaluated 542 nephrectomy specimens, and discovered most common incidental tumour was papillary adenomas 38 (7%). Papillary adenoma was also found in kidney specimen with papillary renal cell carcinoma, hereditary RCC, renovascular disease, end stage renal disease (ESRD) and other renal cystic diseases.[8]

Papillary adenomas can arise multifocally in the renal parenchyma. In 1979 Syrjanen first described renal adenomatosis which is defined as presence of multiple renal adenomas.[9] Subcortical solitary renal adenoma is considered to be the most frequently encountered renal epithelial tumour. However its incidence varied in different series (0.26-22.4%).[3,5] Papillary adenoma defined as a tumour measuring </=15 mm.[4] In this case a subcapsular 0.8 cm grey white area was found in the cortex which was diagnosed as cortical papillary adenoma. The incidence of renal papillary adenoma increases with age (10% in 21-40-year-olds versus 40% in 70-90-year-olds).[4]

It has been observed that multiple papillary adenomas are related to long-term hemodialysis. Rarely, multiple papillary adenomas can arise without a history of hemodialysis and specific familial history. It can occur in a chronically damaged kidney as a result of obstruction, urolithiasis, and glomerulonephritis.[7] In this study case, the patient also developed renal papillary adenoma on the background of chronic pyelonephritis and recurrent multiple nephrolithiasis. His contralateral kidney was functionally normally and thus he didn't require dialysis. Etiology and pathogenesis of renal adenoma are unknown. End-stage renal disease and PRCC carries increased risk of development of renal adenoma, when compared with the normal population.[10] In a retrospective study, Tickoo et al found that papillary RCC and papillary renal adenoma were most frequent tumour associated with end stage renal disease .[11]

Histomorphologically renal papillary adenoma and type 1 papillary RCC (PRCC) are almost similar. Usually adenoma contains various amounts of tubules, and papillary structures. These structures are lined with cuboidal epithelium. They have oval nuclei with notched nuclear membrane. They don't contain nucleoli.[12] Psammoma bodies and presence of foamy histiocytes in the papillary cores are also seen in papillary adenoma.[13] It is very difficult to distinguish PRCC from renal adenoma because there are no reliable histological or immunohistochemical features that confidently distinguish PRCC from papillary adenoma. Hoever, tumour size is very important issue because it is the criterion for the distinction of papillary lesions.

Normal tubular epithelial cells' mitochondria contain the enzyme AMACR. Wang et al.[3] stated that strong AMACR positivity was observed both in papillary RCC, and

concomitant adenomas, while adenomas associated with acquired renal cystic disease (ARCC) were AMACR-negative . AMACR positivity might be representing an early sign of carcinomatous transformation. Tickoo et al. [11] also detected AMACR positivity in adenomas associated with carcinomas in the presence of end-stage renal damage. We found AMACR positivity in adenomatous foci but nuclear atypia and other associated findings consistent with carcinomatous transformation were lacking. Ki67 proliferation index was also very low. The current consensus believes that papillary adenoma and PRCC are on the spectrum of single disease. PRCC and adenoma has similar immunohistochemical expression of AMACR. Papillary adenoma and PRCC also share some similar cytogenetic changes. Both share trisomies of chromosome 7 and 17 and loss of chromosome Y.[13] For this reasons, it has been proposed that renal papillary adenomas are precursor lesions of papillary renal cell carcinoma.[3, 5, 10, 14] However, currently available genetic data fail to disclose the pathogenic mechanism of transformation from adenoma to carcinoma.

Papillary adenoma may also mimic with metastatic papillary carcinoma especially of thyroid from which it can be differentiated by characteristic nuclear features of papillary thyroid carcinoma. A rare reactive process, adenomatoid metaplasia of the epithelium of Bowman's capsule usually associated with liver malignancies, can also mimic with the changes seen in renal adenomatosis.[15]

There is no definite treatment for renal adenomatosis. The benefits of prophylactic surgery, such as bilateral nephrectomy, remain unclear.[1] With advances in imaging techniques more number of such small tumours may be identified preoperatively but treatment decisions can be difficult. Definitive classification of solid renal masses cannot be made by imaging alone. However, observation is generally recommended for solid renal masses <1cm, as these are likely to behave in a benign fashion.[8] Chou et al, 2022 reported a case of adenoma with slow progression over 10 years without evidence of metastasis.[16] Jones et al reported renal cortical adenoma incidentally found during living donor nephrectomy.[17] Currently it is also recommended that a donar kidney having papillary adenoma of < 5 mm is suitable for renal transplantation.[4]

We reported a rare case of papillary adenoma associated with recurrent pyelonephritis and nephrolithiasis. Even though etiology and pathogens are not known, recurrent pyelonephritis and nephrolithiasis could be etiological factors for renal papillary adenoma. Also one should be aware of getting renal papillary adenoma incidentally in nephrectomy specimens, not misdiagnose as metastatic papillary carcinoma.

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