Xanthogranulomatous pyelonephritis and renal tubulopapillary adenomas: A rare coexistence

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ABSTRACT
Xanthogranulomatous pyelonephritis is an uncommon inflammatory condition accounting for 1% of chronic pyelonephritis cases. Clinically and radiologically it mimics other renal space occupying lesions. Hence, correct preoperative diagnosis is not possible in all cases and nephrectomy is done in most patients. Renal tubulopapillary adenomas are benign epithelial lesions of kidney found to be associated with papillary renal cell carcinoma, acquired renal cystic disease, long term hemodialysis, arteriosclerotic renal vascular disease, etc. Here, we report two cases of Xanthogranulomatous pyelonephritis associated with the rare finding of renal tubulopapillary adenomas.

KEY WORDS: Xanthogranulomatous Pyelonephritis, renal cell carcinoma, renal tubulopapillary adenomas

INTRODUCTION
Xanthogranulomatous pyelonephritis is a rare chronic inflammatory disease of the kidney characterized by destruction and replacement of the renal parenchyma with granulomatous tissue containing lipid-filled macrophages. It is thought to be associated with long-term renal obstruction and infection mainly by organisms such as Proteus and Escherichia coli. A brief review of literature shows its rare coexistence with renal cell carcinoma (RCC), transitional cell carcinoma and even squamous cell carcinoma. Here, we present two cases of incidental microscopic renal tubulopapillary adenomas in nephrectomy specimens of xanthogranulomatous pyelonephritis.

CASE REPORTS
Case 1
A 42-year-old man presented with pain in the left flank and hematuria for 4 months. On physical examination, significant findings were pallor and a palpable swelling in the left flank. Laboratory investigations showed hemoglobin of 10.2 g/dl, total white blood cell count of 10,400/cu mm, neutrophil 78% and high erythrocyte sedimentation rate (ESR). Urine routine examination revealed pyuria and hematuria. Contrast enhanced computed tomography revealed a heterogeneous mass in the upper pole of the left kidney.

Based on clinical and imaging findings, left nephrectomy was performed. Nephrectomy specimen measured 20 cm × 9 cm × 5 cm. On cut section, the anatomy was grossly distorted. It showed hydrolephrotic changes, lipomatous infiltration and a firm, solid whitish area (measuring 4.5 cm × 3 cm × 2.5 cm) near the upper pole of the specimen [Figure 1a].

Microscopic examination showed a prominent diffuse inflammatory infiltrate of foamy histiocytes, some giant cells, lymphocytes, plasma cells, and a few neutrophils with areas of fibrosis. Tubules were atrophic, and most of the glomeruli were sclerosed. Numerous small papillary adenomas (1–3 mm in size), spherical in shape were present throughout the cortex. These tubulopapillary structures were lined by cells with scant cytoplasm, round to oval nuclei with occasional nuclear grooves and bland chromatin pattern. The diagnosis of xanthogranulomatous pyelonephritis with renal tubulopapillary adenomatosis was made [Figure 1b-d]. The patient is doing well on 3 years follow up.

Case 2
A 55-year-old man presented with complaints of abdominal pain and fever for 3 months. Significant hematological...
parameters were leukocytosis (14,600/mm³) and raised ESR value of 80 mm in the 1st hour. Urine analysis showed hematuria (red blood cells of 3+) and pyuria (pus cells 10–12/HPF). Physical examination revealed a mass in the left flank and ultrasound examination showed enlarged kidney with distortion of normal architecture.

Nephrectomy specimen measured 12 cm × 8 cm × 5 cm. On cut section, total area was solid whitish with the presence of necrotic foci. One pole showed a large cavity with the presence of brownish blackish material within it and measured 5 cm × 4 cm [Figure 2a]. Multiple sections on microscopic examination showed features of xanthogranulomatous pyelonephritis. In addition, there were similar tubulopapillary adenomas as in the previous case [Figure 2b-d]. The patient is doing well on 6 months follow-up.

DISCUSSION

Xanthogranulomatous pyelonephritis is a rare but severe form of renal parenchymal infection whereby the chronic granulomatous inflammatory process destroys and replaces the renal parenchyma by lipid-laden macrophages (xanthoma cells) and other inflammatory cells including leukocytes and plasma cells. The involvement is usually unilateral with middle aged women being commonly affected.[1] Depending on the extent of the disease process, it can be diffuse, segmental, or focal.

The pathogenesis is thought to be due to calculus or other causes of long standing obstruction and infection mainly by Gram-negative organisms (*Escherichia coli*, *Proteus mirabilis*, *Klebsiella*, *Enterococcus*, etc.).[2] In our cases, we found no evidence of obstruction with calculi and culture of urine showed no growth of organisms after 24 h of incubation.

Patients usually present with fever, abdominal pain, a palpable mass, weight loss, hematuria, etc. The clinical presentation together with equivocal laboratory and radiological findings poses a diagnostic dilemma for the surgeons and radiologists. It is often misinterpreted as a renal tumor.

Literature shows the rare simultaneous occurrence of xanthogranulomatous pyelonephritis with malignant conditions such as RCC, transitional cell carcinoma, and even keratinizing squamous cell carcinoma in the same kidney. The association with renal tubulopapillary adenomas is extremely rare and only one case of xanthogranulomatous pyelonephritis with renal tubulopapillary adenoma, and papillary cell carcinoma has been reported so far.[3]

Renal tubulopapillary adenomas are minute (0.5 cm or less in size) benign epithelial renal tumors having papillary, tubular or tubulopapillary architecture. By definition, the cells lack any resemblance to clear cell, chromophobe, or collecting duct RCC. These adenomas are frequently an incidental microscopic finding and have been reported in 10–40% of autopsy specimens and 7% of surgical nephrectomy specimens.[4] Other important renal adenomas include oncocytoma and metanephric adenoma.

While the frequency of association of renal papillary adenoma is largest with papillary RCC (47%), occurrence with other variants is also well documented (16% with clear cell RCC, 8% with chromophobe RCC, 2.5% with oncocytoma).[5] They are also known to occur with increased frequency in end-stage renal
disease especially acquired cystic disease. Occurrence in the setting of arteriosclerotic renal vascular disease, long-term hemodialysis and children with von Hippel–Lindau syndrome is also well known.\[6\]

Histopathological study, immunohistochemistry, and cytogenetics have shown common features between the tubulopapillary adenoma and papillary RCC. Overlapping morphological features between the two include papillary architecture with foamy histiocytes and psammoma bodies. Expression of alpha-methylacyl-coenzyme A racemase is seen in a similar fashion in both.\[4\] Trisomies of chromosome 7 and 17 and loss of chromosome Y is present in both.\[7\] Therefore, it is important to differentiate the two as one is a benign condition and the other is malignant. Furthermore, adenomas should not be overdiagnosed as carcinomas.

Our cases showed small sized, well-circumscribed tumors showing no significant nuclear atypia or mitoses, thus favoring the diagnosis of adenomas. Thorough sampling of the specimens was done to look for histological features suggestive of malignancy or aggressive behavior, but none were found.

**CONCLUSION**

Here, we report two cases of xanthogranulomatous pyelonephritis associated with the rare microscopic finding of renal tubulopapillary adenoma/adenomatosis. Such coexistence is very rare and has not been reported in literature.

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There are no conflicts of interest.

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