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CASE REPORT

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Transitional cell carcinoma arising in a pyelocaliceal cyst

An unusual cystic renal lesion with cytologic and imaging findings

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Abstract The differentiation between benign and malignant cystic lesions of the kidney is a diagnostic challenge. Medical imaging aids in this task, but many cystic renal lesions require further work-up, frequently by computed tomography-guided fine needle aspiration. We report on the pathological findings in a case of moderately differentiated papillary transitional carcinoma, which arose in a pre-existing pyelocaliceal cyst in a 53-year-old man. In the case of this lesion, the distinction between a benign and a malignant renal cyst is blurred. To our knowledge, this is the third such occurrence to be reported and the first to be diagnosed by fine needle aspiration biopsy.

Key words Kidney · Solitary cyst · Transitional cell carcinoma · Fine-needle aspiration biopsy

Introduction

Solitary renal cysts are a relatively common imaging finding. Although most solitary renal cysts are benign cortical cysts of little or no clinical significance, in some cases a cystic lesion is associated with a malignant neoplasm. To distinguish between benign and malignant renal cysts by noninvasive means remains a challenge [10, 14]. Large cysts or those with thickened and irregular walls, intracystic septa, increased density or contrast enhancement are designated as "complex" and require further evaluation, which is frequently performed by computed tomography (CT)-guided fine needle aspiration (FNA) biopsy [3]. This report describes a papillary transitional cell carcinoma (TCC) which arose in a pre-existing benign pyelocaliceal cyst.

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Clinical history

The patient was a 53-year-old man with a past medical history of coronary artery disease, congestive cardiomyopathy (thought to be related to excessive alcohol consumption) and arterial hypertension. During a work-up for his hypertension, an excretory urogram unexpectedly revealed a large mass in the middle region of the right kidney. Sonography and CT with and without contrast enhancement showed the mass to be a large (9.5 cm), complex cyst (on the basis of focal wall thickening; Fig. 1). Serial sonographic examinations during the next 24 months revealed additional cystic structures in the vicinity of the renal pelvis adjacent to the mass. A repeat CT examination showed that the mass had increased in size to 11 cm and that the medial cyst wall had become thicker (exceeding 4 mm) and enhanced with intravenous contrast. All of these changes elicited concern about the possibility of an underlying malignant neoplasm. A cystoscopic examination and periodic cytological examinations of voided urine were unremarkable.

Pathological findings

FNA biopsy

A CT-guided FNA biopsy of the cyst yielded 400 ml of serosanguineous fluid. Microscopic examination showed several fronds of moderately differentiated papillary TCC (Fig. 2). Following the procedure, the patient suffered a serious myocardial infarct that necessitated hospitalization for 2.5 months. When the patient recovered, a radical nephro-ureterectomy (including excision of a cuff of urinary bladder) was performed.

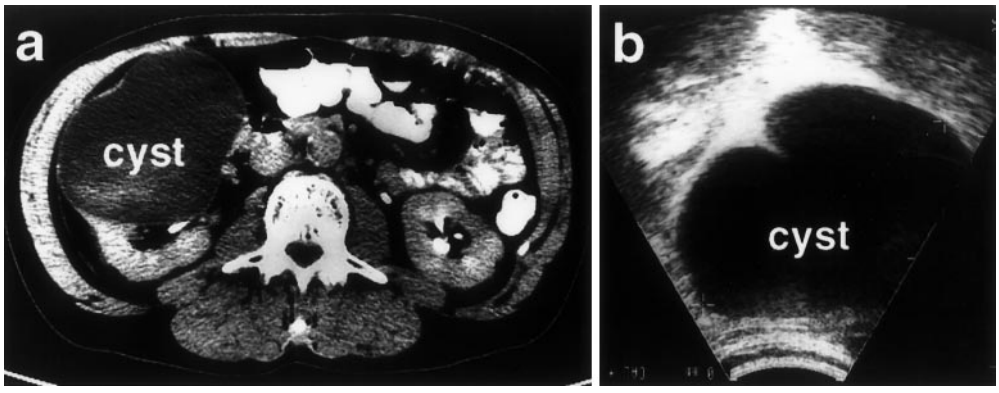


Fig. 1a, b Medical imaging of renal cyst: **a** computed tomographic image, **b** sonographic image

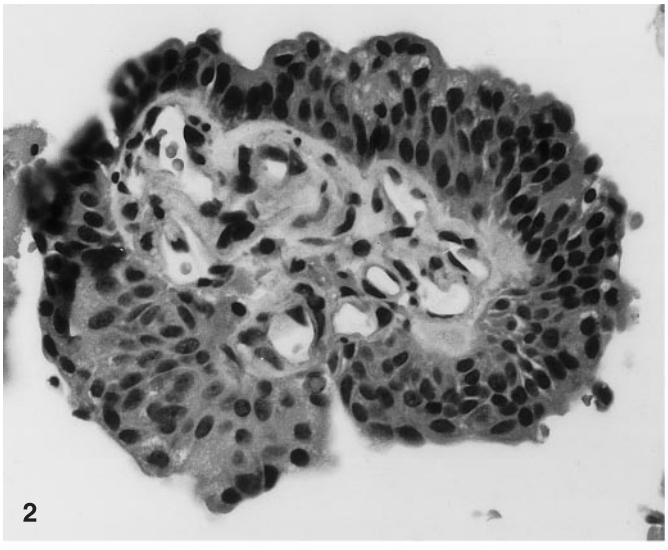


Fig. 2 Photomicrograph of a papillary frond of moderately differentiated papillary transitional carcinoma in a cell block made from the fine needle aspiration biopsy. Haematoxylin and eosin, ×210

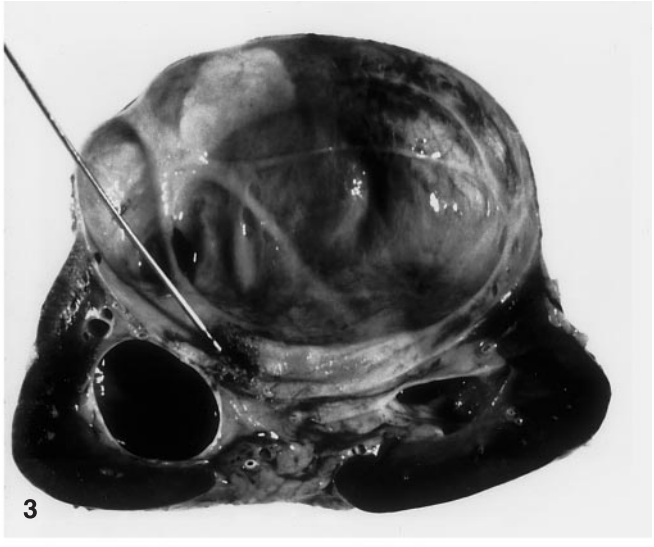
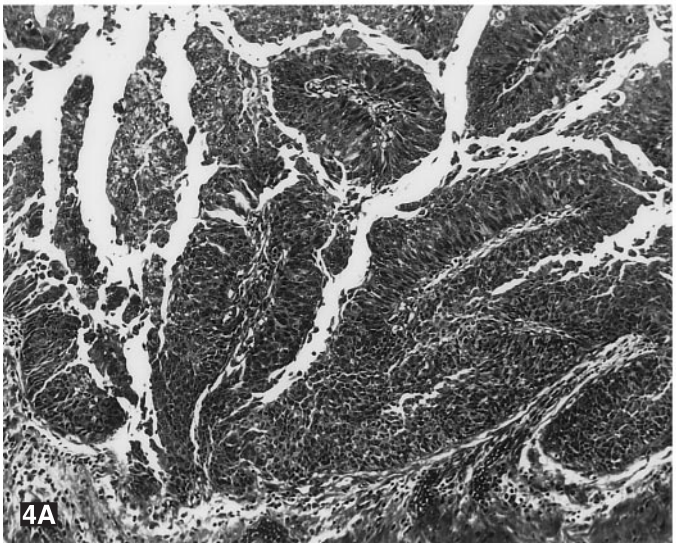


Fig. 3 Gross photograph of the bisected nephrectomy specimen showing the large cyst (9.5 cm). The probe tip indicates the area of papillary transitional cell carcinoma. ×0.6



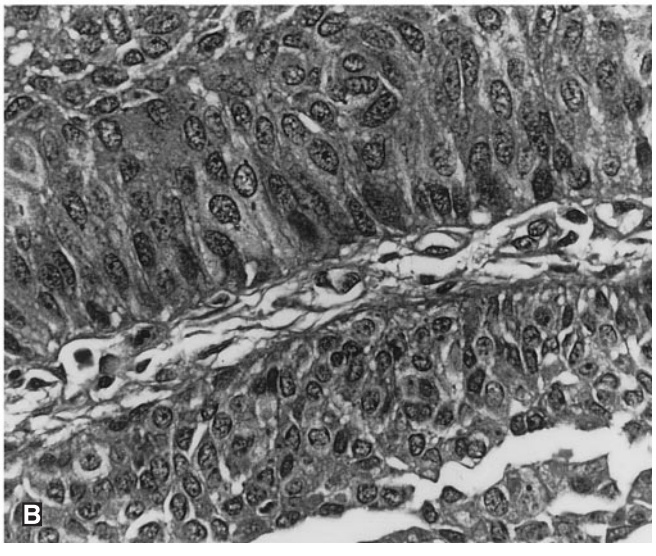


Fig. 4 Composite photomicrograph of the moderately differentiated superficial papillary transitional cell carcinoma that arose from the mucosa lining the cyst at **A** low and **B** high magnification. Haematoxylin and eosin, ×25, ×225

Nephrectomy findings

The kidney contained a 9.5 cm cyst in the middle region, which completely displaced the parenchyma of the superior and inferior pole (Fig. 3). The cyst was unilocular, encapsulated and tense, and it contained serosanguineous fluid and a blood clot (presumed to be secondary to the previous fine needle aspiration biopsy). The kidney weighed 240 g after evacuation of the cystic contents. The epithelium lining the cyst was remarkable for an area of moderately differentiated papillary TCC measuring 3×2.5 cm on the hilar aspect (grade 2/3 according to the World Health Organization histological grading system [11]) (Fig. 4). There was neither stromal invasion, nor tumour extension beyond the cyst. The remaining cyst lining appeared to be atrophic, being composed of only a single layer of benign cuboidal urothelium. The lateral wall of the cyst consisted of a thin rim of fibrous tissue. The renal parenchyma adjacent to the medial aspect of the cyst was fibrotic and chronically inflamed, and probably corresponds to the thickened and enhancing cyst wall noted by CT. The additional cystic structures in the vicinity of the renal hilum noted on sonography probably correspond to pelvicaliceal dilatation, which is presumed to have been secondary to compression by the cyst. Microscopic examination of renal pelvis, calices, and ureteral stump demonstrated multifocal atypical urothelial hyperplasia. Periodic urinary cytological examination subsequent to the nephrectomy has been unremarkable.

Discussion

We have described the pathological findings in a case of renal TCC arising within a pre-existing benign solitary cyst. The large size of the cyst, its atrophic epithelial lining and the lack of communication with the renal pelvis preclude a precise classification; it may represent a solitary renal cortical cyst with transitional cell metaplasia, a large pyelocaliceal cyst, or a pelvic diverticulum that lost its communication to the renal pelvis [8]. Because of its proximity to the renal pelvis and the presence of the TCC, we think that this cyst was most probably a large pyelocaliceal cyst. Renal TCC usually arises in the renal pelvis [17]. The occurrence of TCC in a benign renal cyst is rare. We are aware of only two other reported cases; one case arose in a 57-year-old man with a 10.5-cm pyelogenic cyst [2] and the other, in a 74-year-old man with an 8.5-cm bilobed caliceal cyst [9].

Small renal cortical cysts are present in the majority of adults. Radiographically detectable renal mass lesions (both cystic and solid) are identified in 20% of older adults examined by abdominal CT [13]. Most of these lesions represent solitary benign cortical cysts and are correctly evaluated by medical imaging. Occasionally, cystic renal lesions may require a biopsy for accurate assessment [3]. One commonly used biopsy technique is FNA performed under CT imaging guidance [15].

The association between renal neoplasm and renal cystic lesions remains controversial. In a comprehensive review of the literature with an individual series, Lang concluded that between 2.1% and 3.5% of kidneys with a cystic lesion also harbor a neoplasm, renal cell carcinoma being the most common [7]. The relationship between a renal cyst and a renal neoplasm appears to fall into one of five general categories: proximity without an etiological relationship (a coincidence) [7], cystic degeneration within a neoplasm [6, 10, 12, 14], cystic dilatation distal to a tumour secondary to tubular obstruction [1, 14], adult polycystic renal disease (that is to say a genetic cystic condition with possible predilection for renal cell carcinoma) [5], and tumours arising within a sporadic cyst (as in the case presented). Other examples of renal neoplasms that have arisen within or adjacent to benign renal cysts are “latent adenocarcinoma” [1], renal cell carcinoma [18], renal cell oncocytoma [16] and clear cell adenoma [4].

In conclusion, conventional wisdom and practice view cystic renal lesions as either benign or malignant. We have presented an unusual renal lesion consisting of a malignant neoplasm in a benign cyst, in which the distinction between a benign and a malignant renal cyst is blurred. To our knowledge, this is the third report of TCC arising in a benign renal cyst, and the only reported case diagnosed by FNA biopsy.

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