Renal Cysts: An Issue of Concern

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Abstract

Simple renal cysts are frequent benign conditions that rarely evolve to malignancy. Complications include rupture, hemorrhage, infection, and local compression effects. Benign cysts are most often asymptomatic and incidentally detected by imaging tests, which reveal that these changes can increase in size doubling their volume in a decade. The Bosniak classification is widely utilized as a useful guide for diagnosis and control, and the uncomplicated cysts usually do not need invasive procedures or interventions. An elderly female with asymptomatic simple cysts in the left kidney and antecedent of partial mastectomy and total thyroidectomy due to malignant tumors is here reported. The registered comparative abdominal images of a long-standing control are shown.

Keywords: *Bosniak, imaging study, renal cyst, renal malignancy.*

INTRODUCTION

Benign and malignant renal cysts are often incidentally found on abdominal imaging studies or autopsy, and may include simple, complex, and multifocal lesions; but if only based on images the findings may constitute a challenging diagnostic task [1-5]. Simple cysts are common after the age of 40 years and can double in size over a decade; and uncomplicated solitary cysts more often evolve asymptomatic and unsuspected [1, 2]. Ultrasound (US), computed tomography (CT), and magnetic resonance (MR) can contribute to Bosniak classification (described in 1984 and revised in 1997) a useful initial tool, followed by invasive procedures and histopathological studies if needed [1-4]. Diagnosis includes developmental changes, infections, and tumors (renal or implants) [1, 3, 6]. In a study by Lu *et al.* including 35 cases of renal metastasis found in patients with a mean age of 62.0 (45–83) years, and 65.7% males, 60% of the individuals had no symptoms [6]. The commoner primary sites of renal metastases are lungs (60%), followed by colon-rectum (8.6%), esophagus (5.7%), breast (5.7%), and ovary (5.7%); while the liver, endometrium, thyroid, parotids, and melanoma appears with the same frequency (2.9%). Most of the renal implants were incidentally diagnosed by images with no specificity [6].

Herein is reported an elderly female with the antecedent of well-controlled breast and thyroid cancers, besides renal cysts incidentally found in routine abdominal studies. The aim is to comment on the concerns about the concomitance of these three conditions, and the authors believe that case studies may contribute to better management of the cysts.

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CASE PRESENTATION

A 77-year-old woman, who had a right breast quadrantectomy in 2005 due to adenocarcinoma and thyroidectomy in 2008 because of papillary carcinoma, was diagnosed with simple renal cysts by a routine abdominal imaging study done in 2006. The patient had diagnoses of arterial hypertension and post-surgical hypothyroidism, well-controlled by the use of nebivolol (5 mg daily) and levothyroxine (75 mcg daily). The major diameters of two cortical cysts on the left kidney were 7.0 mm and 5.0 mm. As the longstanding postoperative follow-up included yearly abdominal imaging studies, the same radiology group performed the evaluations of these renal changes. The cysts evolved presenting a gradual increase in size: 7.6 mm and 7.0 mm in 2007; 10.0 mm and 9.0 mm in 2008; 11.0 mm and 9.0 mm in 2010; 11.0 mm and 9.0 mm in 2011; 13.0 mm and 9.0 mm in 2013; and 14.0 mm and 10.0 mm in 2014; while the 99mTC renal scintigraphy (2mCi-74MBq)

Table 1: Laboratory determinations of an old woman with renal cysts.

Parameters	2006	2014
Hemoglobin (11.2-14.4 g/dL)	12.9	13.2
Leukocytes (4-11 x 10 9/L)	8.48	7.46
Platelets (140-450 x 10 9/L)	275	243
Beta-2 microglobulin (< 2,7 mcg/mL)	1.9	2.3
Glucose (70-99 mg/dL)	98	90
Sodium (135-145 mEq/L)	138	135
Potassium (3.5-5.2 mEq/L)	4.4	5.0
Urea (10-50 mg/dL)	41	40
Creatinine (0.5-0.9 mg/dL)	0.8	0.9
Thyroglobulin (1.4-78.0 ng/mL)	< 0.2	< 0.1
Anti-thyroglobulin (≤ 115 IU/mL) Alpha-fetoprotein (< 5,5 IU/mL)	12.4 1.6	23.8 1.8
Carcinoembryonic antigen (< 5.0 ng/mL)	0.2	0.4
CA 15-3 (< 25.0 IU/mL)	10.0	15.6
CA 19-9 (< 39.0 IU/mL)	11.4	12.0
CA 72 4 (< 6.9 IU/mL)	0.7	0.9

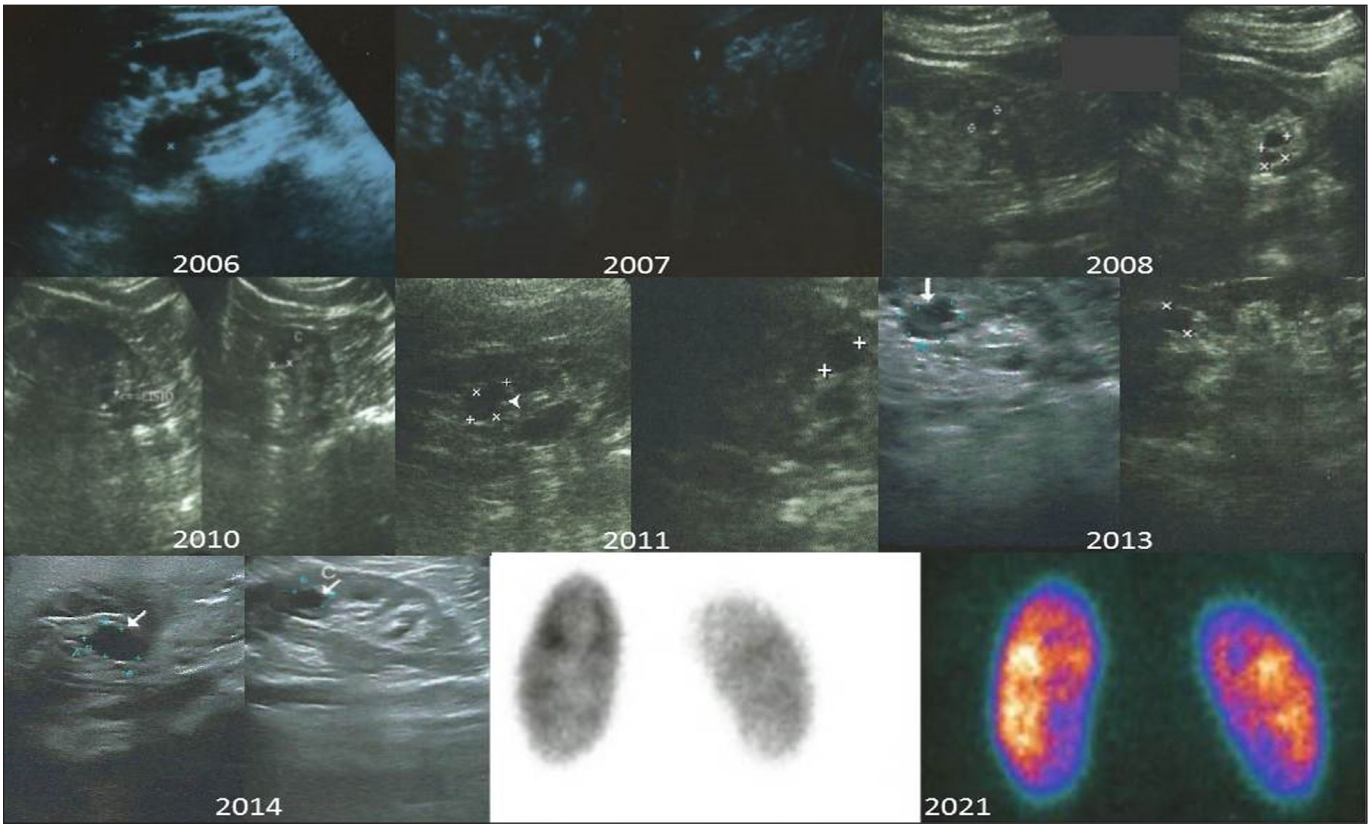

Fig. (1): Pannel with US images showing the progressive increase in the size of left renal simple cysts from 7.0 mm and 5.0 mm in 2006 to 14.0 mm and 10.0 mm in 2014; besides the more recent images of the 99mTC renal scintigraphy (2mCi-74MBq) study.

evaluation revealed normal topical kidneys with uniform radiopharmaceutical uptake and preserved cortical contours (**Fig. 1**). Besides, the routine laboratory blood determinations remained within normal ranges (**Table 1**) and the repeated urinalysis revealed unremarkable results from 2006 to 2014.

During all the follow-up period, the cystic lesions did not show any evidence of complications such as hemorrhage, infection or rupture, or some suggestive finding of malignant change like coarse calcifications, and irregularities or septa in their walls. Therefore, the watchful expectation was the first option for the management of renal cysts.

DISCUSSION

The initial evidence of renal cysts in this elderly patient was obtained by a US scan done in the postoperative follow-up of partial mastectomy due to breast cancer. Worthy of note, abdominal US and CT imaging were yearly performed as a routine since she underwent mastectomy and thyroidectomy for the treatment of carcinomas. Therefore, concomitant follow-up of renal cysts development was obtained for decades, allowing the longstanding comparative evaluations of cystic alterations in her kidneys.

Frequently the first resource for renal cyst detection is US evaluation, and the simple cysts have anechoic content, posterior enhancement, and well-defined borders [1-4]. Otherwise, the cyst is classified as complex, while the complicated ones show changes as rupture, hemorrhage, or infection, and cannot be accurately differentiated with base only on US images; in such cases, the findings of CT and MR can solve the doubts [1-5]. The prevalence, volume, and the number of focal renal cysts increase with ageing, and after the fourth decade of life they can be observed in up to 40% of the people; gene mutation, congenital dysplasia, infection, or toxin damage are predisposing factors [1-4]. According to the Bosniak classification, the categories of renal cystic lesions I (or simple cyst), II, and IIF are non-surgical; while III and IV (cystic tumors) are surgical; the enhanced modularity and increased attenuation (≥ 15-20 HU) indicate malignancy [1]. Simple cysts arise at the basement membrane of distal convoluted or collecting tubules [2], in their vast majority are benign, without calcification, septa, or enhancing nodularity [1, 2]. These cysts may increase in size over time and their treatment is usually not indicated; but the sizes do not indicate benignity or malignancy and the small may be malignant [1, 2]. They seldom increase enough to cause mass effect and block the normal flow of urine, requiring either cyst drainage and sclerotherapy or removal by laparoscopic surgery; while those patients with infected cysts should be managed with antibiotic therapy [2]. Category II cysts have a hair-line wall, thin septa, fine calcifications, hyperattenuation (> 20 HU), do not require treatment, and complicated smaller than 3 cm are also

included. Up to 95% of cysts category IIF (need follow-up) are benign, their wall, septa, and calcifications are conspicuous, and complicated cysts greater than 3 cm are included [1]. Almost 50% of category III cysts are malignant, with coarse calcifications, wall and septa are irregular with measurable enhancement; multilocular, hemorrhagic or infected cysts, multilocular nephroma, and cystic renal cell carcinoma (RCC) are included. Cyst surgical removal is recommended because of the increased risk of malignancy [1]. Category IV cysts are malignant, the majority are RCCs and metastases are very rare. Benign lesions (mixed epithelial and stromal tumor, and cystic angiomyolipoma) may be added into this category and the main data is the evidence of enhancing nodularity [1]. An additional concern is on renal cystic metastases, which should be differentiated from RCC based on images; metastases are often bilateral, multiple, and small-sized [1].

The differential diagnosis of renal cysts also includes acquired cystic renal disease, autosomal dominant polycystic kidney disease, infectious cysts, lithium-induced nephropathy, localized cystic renal disease, multifocal cysts, and abscess [1, 3]. Although representing a rare phenomenon, the progress from a simple renal cyst to RCC can occur, and the cyst-solid transition in the wall is shown by US or CT images; the multilocular cystic RCC consisting only of cysts also may cause misdiagnoses [4]. The long-standing imaging control of renal cysts may be useful to find malignant changes in the early stages, which improve the survival time and outcome of patients [4].

The findings of our present case study are in general agreement with the literature. Wentland *et al.* [6] evaluated by non-contrast CT the annual growth of 222 simple renal cysts in 182 patients with 58.4±6.0 years of age for a mean period of 7.5±2.8 years. The initial measurements of the axial long axis, surface area, and volume of the cysts were 2.5±1.7 cm, 2.5±4.5 cm2, and 17.6±52.5 ml, respectively; and the growth rate for these parameters was +6.5±7.3%/ year, +18±24%/ year, and +46±100%/ year. The majority of cysts (86%) increased in size and 174 in volume (6% or over) per year. Neither septations nor solid components were observed in the follow-up evaluations [6].

CONCLUSION

Renal cysts are frequently detected on abdominal imaging studies, being associated with benign or malignant conditions, which constitute diagnostic challenges. Worthy of note, the Bosniak classification method of renal cysts based imaging data, has been useful in daily practice to differentiate the nonsurgical from surgical lesions. However, additional histopathological evaluation is needed to better clear some cases, especially involving the lesions classified within categories III and IV of renal cysts.

AUTHORSHIP

Santos VM and Santos LAM made substantial contributions to 1) the conception and design of the study, acquisition of data, and analysis and interpretation of data; 2) drafting the article and revising it critically for important intellectual content, and 3) final approval of the version to be submitted.

CONSENT FOR PUBLICATION

The patient's informed consent was obtained before utilizing the data and renal imaging.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Declared none.

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