Incidental Findings of Simple Renal Cysts in Patients Seen with Symptoms of Bladder Outlet Obstruction and Review of Possible Risk Factors

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ABSTRACT

Objective: To review the incidental findings of simple renal cysts in patients seen with bladder outlet obstructive symptoms in University of Uyo Teaching Hospital and to assess the possible risk factors for simple renal cyst. Materials and Methods: A retrospective study of case notes of patients who presented in our facility with symptoms of bladder outlet obstruction from January 1st to March 31st 2013. Information used were extracted from 106 case notes between the ages of 50 to 86 years. Risk factors were obtained from the patient’s history, physical examination and laboratory investigations while characteristics of cyst were extracted from renal ultrasound scan reports. All patients were males and mostly diagnosed of cancer of the prostate, benign prostatic hyperplasia and urethral stricture. Results: Of the 106 patients whose clinical records were reviewed, 6 patients were excluded because their renal scan reports were inconclusive and lacked the necessary details needed for this study. 100 patients were actually studied. Comprising of 15, 28, 36, 21, respectively in the 6th, 7th, 8th and 9th decades. 64 patients (64%) were found to harbor renal cysts; comprising of 3 patients in the 6th decade, 17 patients in the 7th decade, 26 and 18 patients respectively in the 8th and 9th decades. Percentages age distribution were 20%, 60.7%, 72.2% and 85.8% respectively of 6th, 7th, 8th and 9th decades. This indicates that advancing age is a risk factor for renal cyst. Other risk factors were hypertension in 85 patients (85%), smoking in 16 patients (16), abnormal renal function e.g. raised serum creatinine and proteinuria were found in 86 patients (86%), no renal stone was encountered in the imaging study used. Number of cysts were solitary in 95% and 5% multiple. Site location were in the left kidney in 35.9%, right kidney in 86 patients (86%), no renal stone was encountered in the imaging study used. Number of cysts were solitary in 95% and 5% multiple. Site location were in the left kidney in 35.9%, right kidney in 64.1% and bilateral in 15.6%. Conclusion: Simple renal cyst is usually an incidental finding when renal scan is done to assess pathologies of the urinary tracts no attention. In this study, 64% of patients were seen to harbor renal cysts comprising 59% solitary and 5% multiple cysts. All the cysts did not need further evaluation other than renal scan and no treatment was offered to them.

Keywords: Simple renal cysts, Incidental findings, Bladder outlet obstruction, Risk factors, Renal scan

Introduction

Simple renal cysts are discrete lesions within the kidney that are typically cortical extending outside the parenchyma and distorting the renal contour. They may be unilateral or bilateral, solitary or multiple are usually filled with clear fluid and have no connection to the pyelocaliceal system.¹ Usually lined with a single layer of flattened epithelial cells. Its occurrence may increase with age: 20% with 40 years, 33% with 60 years of age.

The aetiology of simple renal cyst formation is not fully understood. They are almost always asymptomatic and usually found incidentally on imaging of the urinary tract for unrelated purposes. In rare cases, larger cysts (more than 10cm in diameter) may cause local symptoms such as palpable abdominal mass or pain. It may be infected or bleed and may cause urinary obstruction if located near the renal pelvis. Renal function is usually preserved. Hypertension may be noted if the cyst compresses a large vessel. Simple renal cyst can be differentiated from polycystic kidney disease by their fewer numbers, lack of extra-renal manifestation, normal sized kidney and function and lack of family history. Unlike acquired renal cystic diseases, simple renal cysts are generally associated with a normal serum creatinine level unless associated with urinary tract obstruction or other pathologies.

The primary concern is to differentiate simple renal cyst from malignant masses. If the appearance is typical of a simple cyst on renal scan, no further evaluation is indicated, but if there are issues in the scan findings, Bosniak Classification system on Computed Tomographic scan can help characterize the lesion with categories...
III and IV needing surgical evaluation as the risk of malignancy is high. In this study, all the cysts studied were clearly characterized by renal scan and only showed features of simple renal cyst.

**Materials And Methods**

This study was performed retrospectively from Jan 1st to March 31st, 2013. Information were extracted from case notes of patients aged between fifty (50) and eighty-six (86) years who were seen in our facility with signs and symptoms suggestive of bladder outlet obstruction. One hundred and six (106) patients were recruited out of which 6 patients were excluded on the basis of inconclusive clinical information. One hundred (100) patients with information from their history, physical examination and investigations were evaluated. History and physical examination took care of such risk factors as age, smoking habits, blood pressure and laboratory investigation for renal function. Cyst characteristic was evaluated with renal ultrasound scan and we looked at the number of cysts, site and location of cyst and any co-existing renal stones. The renal scan diagnostic criteria for renal cyst are; a round lesion of the kidney with echo-free content and no septa. No thickening of the round to oval cyst wall, no calcification and a posterior acoustic enhancement. Tomography scan is normally indicated for suspicious renal scan findings such as septation, clustering of cysts, wall thickening, calcification or echogenic content of cyst.

**Results**

Overall prevalence of simple renal cyst in our study was 64% (64 out of 100 patients). Age range was between 50 and 86 years with a mean age of 68 years (Figure 1). The sonographic findings were cortical lesions of the kidneys with echo free content, no septa or thickening of the wall. Cysts were round to oval and no calcifications with a strong posterior acoustic enhancement (Figure 2 and 3).

The cysts were solitary in 70.3% (45 out of 64 patients) and multiple in 29.7% (19 out of 64 patients), being seen on the right and left kidney in 64.1% (41 patients) and 35.9% (23 patients) respectively, with a bilateral lesion in 15.6% (10 patients). Size criteria was not documented. We did not encounter stones in relation to renal cysts unlike other studies that reported a coexisting renal stones with cyst. Abnormal renal function defined as an elevated serum creatinine >115 mmol/l was affected in 86% of the individuals studied together with proteinuria. This may well be attributed to obstructive uropathy in the population studied.

**Table of Results**

(a) Risk factors:

(i) Age in decades

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<th>6th</th>
<th>7th</th>
<th>8th</th>
<th>9th</th>
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<tr>
<td>Number of patients</td>
<td>15</td>
<td>28</td>
<td>36</td>
<td>21</td>
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<tr>
<td>Number of patients with cyst</td>
<td>3</td>
<td>17</td>
<td>26</td>
<td>18</td>
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<td>Percentage of patients with cyst</td>
<td>20</td>
<td>60.7</td>
<td>72.2</td>
<td>85.8</td>
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(ii) Hypertension (BP > 140/90 mmHg). 85 Patients – 85%.

(iii) Smoking – 16 patients (16%)

(iv) Abnormal renal function; Elevated serum creatinine and proteinuria in 86 patients (86%)

(v) Renal stone – None

(b) Characteristics of cyst:

<table>
<thead>
<tr>
<th></th>
<th>Solitary</th>
<th>Multiple</th>
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<tr>
<td>Number of cysts</td>
<td>70.3% (45/64)</td>
<td>29.7% (19/64)</td>
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<tr>
<th>Site of cysts</th>
<th>Left kidney</th>
<th>Right kidney</th>
<th>Bilateral</th>
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<tr>
<td>Diagnostic</td>
<td>35.9% (23/64)</td>
<td>64.1% (41/64)</td>
<td>15.6% (10/64)</td>
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**Discussion**

The prevalence of simple renal cyst in healthy individuals was seen in 10.7% and 17.4% in the 5th decade or later decade of life. Simple renal cysts are highly prevalent and deemed to correlate positively with increasing age. They occur in up to 50% of individuals more than 50 years of age. It is usually acquired and the origin is uncertain. However in 1930, Helper pointed out the concept of renal infarction and tubular obstruction with increase in age. Recently, the theory that simple renal cyst are derived from diverticulae of the distal collecting duct or collecting tubule was introduced. These diverticulae increased in number in senescent kidneys probably as a result of the weakening of the tubular basement membrane. This explains the relationship between senility and simple renal cyst. Moreover these tubular diverticulae are more common in subjects with urinary obstruction especially in those with symptoms of bladder outlet obstruction.
Cuxart et al. supposed that arterial hypertension accompanied by cyst expansion may lead to the early hypertension. On the other hand, assumed that increase renin released due to renal ischemia caused by that may lead to cystic changes in the kidney. Baert L and Steg A. On the pathogenesis of simple renal cysts in the adult. A microdissection study. Urol Res 1977; 5: 103-108.

Caglioti et al. pointed out that tubular obstruction secondary to renal parenchymal disorganization may account for the higher prevalence of simple renal cysts in patients with renal and urinary tract diseases.

The relationship between hypertension and simple renal cyst is controversial. It was reported that the mean arterial blood pressure was significantly higher in individuals with simple renal cysts. They assumed that increase renin release due to renal ischemia caused by cyst expansion may lead to the early hypertension. On the other hand, Cuxart et al. supposed that arterial hypertension accompanied by simple renal cysts was just owing to senility. In our study, 85% of the individuals evaluated were known hypertensives which could be due to either a complication of impaired renal function consequent upon obstructive uropathy or as a result of aging process with thickening of arterial walls apart from essential hypertension. These risk factors may however be coincidental.

Morphologically, simple renal cysts are oval or circular in shape and have distinct sharply defined outlines, wall are characteristically smooth, transparent, avascular, yellowish or bluish white in color formed by a thin layer of fibrous tissue lined by a single layer of flattened or cuboidal epithelia (Figure 2). Usually filled with a homogenous transudate-like clear or straw colored fluid of low viscosity with a radio-density similar to water of -10 to 20 Hounsfield Unites (HU).

About 70-80% of cysts are solitary, unilateral and cortical. In our study, 59% were solitary and 64% unilateral, all reported to be cortical.

Most simple renal cysts rarely produce symptoms and these seldom require treatment unless they become symptomatic or complicated. In our study all patients were asymptomatic and were diagnosed incidentally when renal scan was done as part of investigations for obstructive uropathy. About 25% of cysts show a trend towards enlargement within 3 years which may cause obstructive symptoms if located proximal to the renal pelvis or encompassing. Clinical symptoms should raise the possibility of an associated malignancy and the need for additional diagnostic studies such as computed tomography (CT) scan. Generally, in events of symptoms or complications and after careful evaluation, treatments consist of percutaneous needle cyst puncture with or without sclerosing agents (Lipiodol, phenol, alcohol, Bismuth phosphate) with ultrasound or CT guidance and percutaneous unroofing, laparoscopic unroofing or open.

Conclusion

Simple renal cyst is strictly a benign lesion of the kidney located cortically. Usually asymptomatic and discovered on renal scan as an incidental finding. Cyst characteristics can be clearly demonstrated on renal scan and when there are issues, CT scan can be used to classify it based on the Bosniak system. In our study, all patients were symptomless and they had no issues to warrant further investigation.

References