# Sclerotherapy of a Symptomatic Renal Cyst

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#### ABSTRACT

Simple renal cysts are not commonly found in children. They occur in a small percentage of cases, with an incidence of 0.2%-0.5%. These cysts are typically solitary and develop in the renal cortex. Pain, infection, hematuria, hypertension, or obstruction of the collecting system are indications for treatment. When intervention is necessary, there are several ways to reduce cyst volume. In this report, we discuss the pediatric case of a solitary giant renal cyst and its therapeutic approach. We present a symptomatic pediatric renal cyst patient treated with a sclerosing agent. A simple renal cyst is a rare condition in children, and its treatment includes conservative management, percutaneous sclerosing agent injection, and surgical approach. Choosing the appropriate treatment according to the patient's condition and clinical symptoms is essential. We think that sclerotherapy should be the first-line therapy before surgery in symptomatic simple renal cysts.

Keywords: Renal cyst, Sclerotherapy, Hypertansion

# INTRODUCTION

Simple renal cysts (SRCs) are not commonly found in children. They occur in a small percentage of cases, with an incidence of 0.2%-0.5%. Typically, these cysts develop in the renal cortex and are usually solitary.<sup>1,2</sup> The pathogenic mechanisms underlying SRC, such as caliceal diverticula or renal tubule obstruction, which can obstruct communication within the collecting system, have given rise to several hypotheses. In relation to the natural progression of SRC, it is hypothesized that spontaneously resolving prenatal cysts are the result of a reversible process such as focal ischemia, whereas the cause of postnatal cysts may be unidentified permanent mechanisms.<sup>1</sup> Sonographic findings reveal a clearly defined anechoic formation with smooth and thin walls. There is posterior acoustic reinforcement, and no signal is observed at color or power Doppler.<sup>3</sup> The Bosniak classification is used to predict the malignant potential of renal cysts through cross-sectional imaging and to determine the treatment strategy. Simple renal cysts are generally considered Bosniak type I and have no malignant potential.<sup>4</sup> The differential diagnosis includes the caliceal diverticulum. A renal calyceal diverticulum is a cystic cavity filled with urine within the renal parenchyma. Transitional cell epithelium lines this nonsecretory outpouching, and it communicates with the main collecting system via a narrow channel. Most of the diverticula are small and asymptomatic.<sup>5</sup> A conservative management approach is recommended for asymptomatic simple renal cysts in children. This involves conducting clinical and ultrasound checks every 6 months during the first year after diagnosis, followed by annual checks for the next 10 years.<sup>1</sup> Pain, infection, hematuria, hypertension, or obstruction of the collecting system are indications for treatment.<sup>2</sup> When intervention is necessary, there are several ways to reduce cyst volume. Treatment options are percutaneous drainage under sonographic guidance with or without sclerotherapy and a surgical approach either open or laparoscopically.<sup>6</sup> In this report, we discuss the pediatric case of a solitary giant renal cyst and its therapeutic

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approach. Verbal and written informed consent was obtained from the patient who agreed to take part in the study.

## **CASE PRESENTATION**

A 9-year-old male patient was followed up due to an antenatal diagnosis of bilateral hydronephrosis, and his hydronephrosis regressed during his follow-up. There is no vesicoureteral reflux or trabeculation in the voiding cystourethrogram, and the bladder capacity is compatible with the expected bladder capacity. A diagnostic cystoscopy was performed at the age of 2 due to an intermittent voiding pattern, and no abnormalities were found in the cystoscopic evaluation. An external urethral meatal web was detected, and a meatotomy was performed. At that time, the patient was diagnosed with a simple cortical cyst with a diameter of 18 mm in the upper pole of the right kidney and was followed up accordingly. The cyst size was found to be  $42 \times 44 \times 38$  mm in the 3-year-old control. There was no hydroureteronephrosis. Even though the cyst size increased, there were no complaints such as abdominal pain, hematuria, urinary system infection, etc. There was no family history of cystic kidney disease. The annual follow-up was continued.

In the 6-year-old control, it was found that the size of the cyst increased to 66 × 55 mm, leading to atrophy of the kidney parenchyma in ultrasonography (Figure 1A). Subsequently, an MR urography was performed. In the coronal section, a thin-walled simple cortical cyst, reaching approximately 65 mm in size and forming a spring in the upper calyceal system but not connected to the calyceal system, was observed in the upper pole of the right kidney (Figure 2A), and it classified as Bosniak type 1. The systolic and diastolic blood pressures of the patient were above the 95th and 90th percentile, respectively.<sup>7</sup> The patient was consulted by a pediatric nephrologist, and causes for hypertension were investigated and excluded. Antihypertensive medication was not recommended for the patient before the treatment. Due to the increase in cyst size, compression of the kidney parenchyma, and hypertension, interventions were decided.

Under general anesthesia, the cyst content was drained by inserting a pigtail catheter under ultrasonography guidance in the left lateral position. A volume of 220 mL clear liquid was drained, and a sample was taken for cytology. Contrast material was injected into the cyst, and fluoroscopy showed that there was no connection with the collecting system (Figure 2B). Following drainage of the contrast material, 80 cc of 95.9% ethanol was injected into the cyst and left for 20 minutes. Afterward, the alcohol and cyst contents were drained again, and the catheter was removed. There was no problems in the early postoperative period. No cells were observed in the cyst fluid cytology. In the last 2 years of follow-ups, the cyst size decreased and regressed. The last ultrasonography showed only fibrotic changes without a cystic lesion in the right kidney's



Figure 1. (A) Cyst of increased size in the right kidney. (B) Renal ultrasonography image 6 months after treatment.



Figure 2. (A) Cyst image in MR urography coronal sections. (B) X-ray taken with contrast injected into the cyst shows that the cyst is not related to the calyceal system.

upper pole (Figure 1B). The systolic and diastolic blood pressure decreased below the 90th and 50th percentiles, respectively. The patient has been uneventful during the follow-ups.

### DISCUSSION

Simple renal cysts are a rare condition in the pediatric population. While ultrasonography plays a crucial role in diagnosis, MR urography is utilized when needed for evaluation.<sup>8</sup> The differential diagnosis includes pediatric caliceal diverticulum. The renal calyceal diverticulum is associated with significant sequelae such as calculus disease, febrile urinary tract infection, and progressive renal damage.<sup>5</sup> Ultrasonography demonstrates the calyceal diverticulum's infundibular connecting channel. Furthermore, the presence of calyceal diverticula is highly supported by changes in the size of a lesion observed during sonographic follow-up, movable hyperechogenic material inside a single renal cystic structure, polylobulated appearance, and variations in the cystic lesion's morphology among different studies.<sup>9</sup> In our patient, ultrasonography was used for follow-up and MR urography was done for the differential diagnosis.

The first-line approach to pediatric simple renal cysts is conservative management. Interventional and surgical treatments are recommended in cases such as rapid increases in cyst size, hematuria, hypertension, pain, and infections.<sup>1,2,10</sup> Our patient remained asymptomatic throughout the follow-up. However, due to the dramatic increase in cyst size, compression on the renal parenchyma, and hypertension, interventional treatment was decided. Percutaneous puncture with or without sclerotherapy to either marsupialization, unroofing, total cyst resection, or nephrectomy by laparoscopy or laparotomy are interventional treatment options.<sup>1</sup> The most commonly used sclerosing agent in percutaneous sclerotherapy is ethanol. Ethanol rapidly destroys the secretory cells in the cystic wall while leaving the renal parenchyma unharmed. It would take several hours for the ethanol to penetrate the cyst's fibrous capsule.<sup>8</sup> Although there are different opinions about the dwelling time of ethanol, different opinions have been reported in the literature, ranging from 5 minutes to 2-4 hours. It is reported that as the period increases, parenchymal damage may occur. The dwelling time for our patient was 20 minutes.<sup>11</sup> Percutaneous sclerotherapy and laparoscopic unroofing methods were compared in the adult literature. It was reported that complications such as bleeding and infection were more common in the laparoscopic treatment group, and the operation time and hospital stay were prolonged as well.<sup>12</sup> Recently, pediatric literature also supports using sclerosing agent injection as the first option for symptomatic renal cysts before considering surgical intervention.<sup>13</sup> Additionally, Koenig et al presented a newborn with a giant renal cyst treated successfully with sclerosing agent treatment, which was treated successfully.<sup>6</sup> Following a single session of alcohol treatment into the cyst in our patient, the cyst size shrank. A 2-year follow-up revealed that the cyst had entirely vanished. In the treatment of symptomatic simple renal cysts, injection of sclerosing material into the cyst, which is less invasive, we think should be the firstline therapy before surgical intervention.

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