
Original article

Ultrasound-Guided Percutaneous Sclerotherapy of Simple Renal Cysts – Five Years Report

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Abstract

Introduction. The sclerotherapy is considered a safe and effective treatment of simple renal cysts, usually performed by urologists. It was a five-year retrospective report on our tertiary clinical experience with simple renal cysts sclerotherapy performed by nephrologists.

Methods. We analyzed the medical histories of patients who underwent sclerotherapy from January 2015 until the end of December 2019 counting overall 23 sessions of sclerotherapy. The method (aspiration or drainage) was chosen according to cyst size and depth. Sclerotherapy with 96% alcohol was performed. The cyst size was recorded, and the curative effect was evaluated by the residual cyst volume; over 20% residua in the cyst size was considered as a failed treatment. Patients were reexamined by ultrasound at 12-month follow-up, or earlier if symptomatic.

Results. The mean age of patients was 58.68±11.08 years and majority of them were females. Most of the cysts [17] induced flank pain, dysregulated hypertension was present in 22% of patients and one have obstructed the urine flow. The mean cyst volume was 540±307.51 ml. All cysts were successfully treated. The mean cyst volume decreased significantly. Concerning the complications, sporadic cases of pain and vomitus occurred during only three treatment procedures. At the follow-up, all patients who suffered from unsatisfactory blood pressure control improved and the hydronephrosis resolved. In five cases there was reoccurrence of a symptomatic cyst, with a need of re-treatment in the follow-up period.

Conclusion. Ultrasound-guided aspiration and sclerotherapy of simple renal cysts is a safe and effective procedure that may be carried out by nephrologists.

Keywords: sclerotherapy, ultrasound, simple renal cysts, complications, cyst volume

Introduction

Renal cysts are spherical, thin-walled, variably sized distentions principally of the cortical or medullary renal tubules and are usually filled with clear, watery fluid. They are most commonly found in the adult population at increasing age that is highly associated with their incidence [1]. As per the current guidelines on renal cystic disease [2,3] and Bosniak cysts classification [4,5], asymptomatic class I and II cysts do not require future follow-up and imaging. In contrast, the other Bosniak cysts categories are at malignancy risk and should be treated. The intervention is also required in symptomatic cysts. The enlarged cyst might cause or worsen hypertension [6], hemorrhage [7], pain [8], urinary flow obstruction [9] and local or systematic infection [10]. The current treatments of simple symptomatic cysts consist of percutaneous aspiration and sclerotherapy techniques performed under ultrasound or CT guidance, up to surgical excision when necessary, done by urologists. After aspiration, sclerotherapy with different agents provides destroying cysts epithelium and cyst ablation. The most frequently used agents are sole alcohol [11-13] or in combination with fibrin glue [14], aethoxysclerol [15] or polidocanol [16]. The sclerotherapy is considered to be an efficient and safe method. Usually after a single episode over 80%-97% of cyst volume reduction is accomplished [11,13,15]. Minor complications include microhematuria, fever, nausea, pain [12,16], and rarely major complication is an aseptic abscess [16]. The effectiveness and long-term results are reported based on various follow-up periods. The recurrence of the cyst, and a high percentage of volume preservation after treatment are usual indices [17]. Although a routine practice intervention in urology departments, in our five-year retrospective study we report on the nephrological tertiary clinical experience with simple renal cysts sclerotherapy that may be quite satisfactory.

Material and methods

We analyzed the medical histories of patients who underwent sclerotherapy from January 2015 until the end of December 2019. It was a single procedure performed in 14 patients, in three of them it was done twice and in one patient three times, counting for overall 23 sessions of sclerotherapy. Before admitting to the hospital, patients were examined by ultrasound and CT scan when necessary. Cyst volume was estimated according to the following formula: $V = \text{length} \times \text{width} \times \text{height} \times \pi/6$. Only symptomatic Bosniak 1 simple renal cysts were eligible for sclerotherapy. A strict protocol was followed: the procedure was explained to each patient and an informed consent was obtained. Antiplatelet or antithrombotic agents (e.g. aspirin, GPII/IIIa inhibitors, dipyridamole and non-steroidal inflammatory drugs) were discontinued at least 5 days before intervention and the prothrombin time had to be normalised. Pentoxifylline was not to be taken 1 day prior to admission. Also, one day before, platelet count, prothrombin time and activated partial thromboplastin time had to be normal. The procedure was not performed in patients with platelets count under 100 and an abnormal coagulation. A team of experienced interventional nephrologists performed the screening and interventions ultrasound-guided. The patients were placed in the prone position, and 2% lidocaine was administered for local infiltration of anesthesia at the puncture site. A 20-gauge coaxial needle (Monopty 2016B Bard, Tempe, AZ, USA) was used to puncture into SRCs, and a three-way drainage tube was used to connect to the coaxial needle. The method (aspiration or drainage) was chosen according to cyst size and depth: catheter drainage was done for larger (>6 cm) and shallow (<7.5 cm) cysts and needle aspiration was done for smaller or deeper (>7.5 cm) cysts. Sclerotherapy with 96% alcohol was performed. Control ultrasound was done and the reduction of the cyst volume was notified. Patients were discharged in a day or two monitoring complication occurrences. The cyst size was recorded, and the curative effect was evaluated by the residual cyst volume; over 20% residual in the cyst size was considered a failed treatment. Patients were reexamined by ultrasound at the 12-month follow-up, or earlier if symptomatic. Statistical analysis: all statistical methods were performed using the SPSS statistical software package, version 17.0. Parametric data were expressed as mean \pm standard deviation, and nonparametric data were expressed as number and percentage of the total. Wilcoxon Signed Rank Test was used to compare cyst volumes pre- and post-procedure. A value of $p < 0.05$ was considered statistically significant.

Results

Demographics, clinical presentation of patients and cyst

indices are given in Table 1. The mean age of patients was 58.68 ± 11.08 years and majority of them were females (72%). Nearly one quarter of patients suffered from hypertension. Diabetes was present in 17 and CKD in 13% of patients. Having a simple renal cyst, fourteen patients were treated only once. In the follow-up period, the reoccurrence of the cyst was the reason for a second sclerotherapy in another three patients and also a third sclerotherapy in one patient has been performed. Overall, 23 cysts underwent sclerotherapy. Most of the cysts [17] induced flank pain, dysregulated hypertension was present in 22% and one have obstructed the urine flow. Cysts with larger diameter than 90 mm were present in 43% of patients while 35% of them exceeded volume of 500 ml. The mean cyst volume was 540 ± 307.51 ml.

Table 1. Demographics, clinical presentation of patients and cyst indices

N° patients =18	
Age (years)	58.68 \pm 11.08
Men (%)	5(28%)
Arterial hypertension	4(22%)
Diabetes mellitus	3(17%)
Chronic kidney disease	2(13%)
N° of Cysts =23	
Clinical presentation	
Flank pain	15(65%)
Flank pain and vomiting	2(9%)
Dysregulated hypertension	5(22%)
Hydronephrosis	1(4%)
Cyst size	
< 90 mm	13(56%)
>90 mm	10(43%)
Cyst volume	
\leq 500 ml	15(65%)
>500 ml	8(35%)
Mean cyst volume (ml)	540.00 \pm 307.51

All cysts were successfully treated. The mean cyst volume decreased significantly to 23 ml as seen in Figure 1 and Table 2. In 78% of the treated cysts, there was a complete disappearance and in 4 cysts (17%)

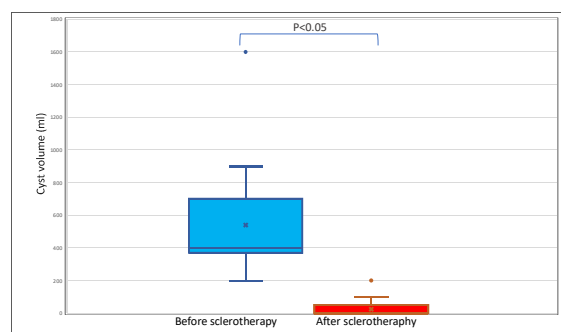


Fig. 1. Significant reduction of cyst volumes after sclerotherapy

only a small residual content up to 10% of the whole volume remained. Concerning the complications, sporadic cases of pain and vomitus occurred during only three treatment procedures. At the follow-up, all patients who suffered from unsatisfactory blood pressure

control improved. In three patients the blood pressure was well controlled with the same antihypertensive therapy and in two patients there was even reduction of doses. The hydronephrosis resolved. In four cases there was reoccurrence of a symptomatic cyst (flank pain), with a need of re-treatment in the follow-up period. The awareness of the re-enlarged cyst and fear of symptoms was the reason of re-intervention in one patient with previous flank pain.

Table 2. Complications and results of sclerotherapy
N° of treated cysts = 23

Mean cyst volume after procedure (ml)	23.9±47.68
Successful treatment	23(100%)
Residual cyst volume 0%	18(78%)
1-10%	4(17%)
10-20%	1(4%)
>20%	0(0%)
Complications during/early post-procedure	
Pain	2(8%)
Vomitus	1(4%)
Recidive at 12 months	5(2%)

Discussion

The aspiration and sclerotherapy of simple renal cysts are routine practice interventions in urology departments [18,19]). In this study, we demonstrated the 5-year experience and results of these interventions in a tertiary nephrology department. Simple renal cysts are occasional findings that increases with age and may be present as a mass lesion [20]. These are more common in older people, and males are more prone to develop simple kidney cysts than females [21,22]. In our adult population, the average age was above 50 years and being predominantly females. It might be to a certain extent explained with the small number of symptomatic patients that needed treatment. Majority of our patients presented with flank pain as was also published in previous studies [8,23]. Cysts cause some degree of collecting system obstruction in 2.5 to 16.0% of cases. Parapelvic cysts may obstruct the ureter or low pelvis, whereas peripheral cortical cysts can cause infundibular or calyceal obstruction [24]. One of our patients presented with a moderate pain, but the main reason for sclerotherapy was the hydronephrosis caused by the cyst. Fortunately, after cyst aspiration the patient was free of symptoms and obstruction. Dysregulated hypertension was correlated with the progressive enlargement of the cysts and was the reason for sclerosation intervention in five of our patients. In another study of 184 patients, an apparent association between the size of a simple renal cyst and hypertension was found and aspiration of cysts resulted in reduction of blood pressure [25] that was in agreement with our findings. After sclerosation and during follow-up, all patients had satisfactory blood pressure control with either reduced or same therapy dosage. Cyst sclerotherapy is shown to be a

safe procedure with rare complications [12,16,26]. Our overall results in 23 sclerosations were comparable with literature reports showing minor and rare complications [13,15]. Still, in five patients (2%) a second intervention was required due to the cyst recurrence and related symptoms. Other studies reported on similar results [18,23,26]. However, the shortcomings of our study were the small number of interventions and rather short duration of follow-up. Nevertheless, with this study we have shown the expanded variety of successful nephrological interventions at our Clinic.

Conclusion

Ultrasound-guided aspiration and sclerotherapy of simple renal cysts is a safe and effective procedure carried out by nephrologists.

Conflict of interest statement. None declared.

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