Percutaneous treatment of simple renal cysts with n-butyl cyanoacrylate and iodized oil

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Simple renal cysts are common. Autopsy studies have demonstrated simple renal cysts in half of all patients older than 50 years. The incidence is about equal in men and women, and there is no evidence of genetic predisposition. Such cysts are frequently multiple and occur in various sizes. Etiology is uncertain, but tubular obstruction and ischemia in the obstructed area have been postulated (1).

Renal cysts are asymptomatic in most patients, and are usually diagnosed incidentally on imaging studies. If the cyst is large, it may cause pain or manifest as a palpable mass. Infection, hypertension, and obstruction of the ureter may be associated with renal cysts (2, 3). When the cyst causes urinary tract obstruction, or is otherwise symptomatic, treatment should be considered. Symptomatic renal cysts can be managed by a variety of surgical and percutaneous methods, including percutaneous aspiration (with or without a sclerosing agent), percutaneous marsupialization, and open and laparoscopic cyst unroofing (2, 4–7).

Percutaneous drainage with single- or multiple-session sclerotherapy has been successfully performed with high success rates; however, with multiple-session sclerotherapy, a decrease in recurrence has been reported by several authors (2, 8–12).

Although favorable therapeutic outcomes have been reported by varying the sclerosing technique and the agent, the optimal technique of treating renal cysts and the optimal agent for renal cyst sclerotherapy remain to be determined.

N-butyl cyanoacrylate (NBCA) (Histoacryl-Blue; Braun, Melsungen, Germany) intracystic injection is a new sclerosing therapy for hepatic cyst and cysts in autosomal dominant polycystic kidney disease (13). The objective of this study was to assess the efficacy and safety of renal cyst sclerotherapy by using NBCA.

Materials and methods

In this study, a prospective series of 23 consecutive patients (17 males and 6 females) who presented with symptomatic simple renal cysts underwent sclerotherapy at our hospital between August 2007 and April 2008. NBCA treatment was performed in 27 simple renal cysts.

Written informed consent was obtained from each subject, and our human ethics committee approved the study protocol. The patients were between 45 and 82 years old (mean age, 57.2 ± 10.5 years). Ultrasound (US) examination was accepted as the baseline imaging modality, to make the diagnosis of simple renal cyst. All cysts were type I Bosniak cysts (14).

All patients underwent computed tomography (CT), and the initial volume of the cysts was calculated just before the treatment.

All 23 patients complained of abdominal and/or flank discomfort due to growing renal cysts. Any patient who had relatively acute symp-
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toms, such as bleeding or infection, was not included in the study. Another criterion for exclusion from the study was an established communication between a simple renal cyst and the pelvicalyceal collecting system during the procedure. Eight patients had undergone percutaneous alcohol sclerotherapy in 10 cysts 1–3 years before this treatment.

All procedures were performed on an outpatient basis. The patients were administered nothing by mouth for 4–8 hours prior to the procedure. Each patient was placed either in the prone or lateral decubitus position depending on the location of the cyst, and local anesthesia was achieved with 2% lidocaine hydrochloride that was applied to the puncture site after sterile preparation. An 18-gauge needle was inserted into the cyst under CT guidance. Cyst fluid was aspirated as completely as possible, and the volume of aspirated fluid was measured. When the 2/3 of the estimated cyst volume had been aspirated, 2–4 ml of contrast medium (iopromide [Ultravist; Schering, Berlin, Germany]) was introduced into the cyst to ensure that there was no communication with the pelvicalyceal system. The remaining cyst volume with contrast medium was then aspirated. Then, a mixture of 0.5 mL of NBCA and 1 mL of iodized oil (Lipiodol; Laboratoire Guerbet, Roissy, France) was injected. Immediately prior to the injection of this mixture, the needle was flushed with 1–2 mL of 5% dextrose water solution to prevent NBCA contact with tissue fluid in the lumen of the needle. After the injection of the mixture of NBCA and iodized oil, the needle was withdrawn, and CT image was obtained (Figs. 1, 2). One to three renal cysts were treated in each patient in different sessions in order to minimize radiation exposure.

The volume of the treated cysts was calculated with periodic noncontrast enhanced CT examinations 1 and 6 months after the procedure. The procedure was considered successful at follow-up CT when the diameter of the cyst was less than 50% of the initial diameter.

Figure 1. a–d. Representative CT images of two simple right renal cysts in a 56-year-old man. Axial nonenhanced CT image shows two simple right renal cysts with diameters of 3 cm and 5.5 cm. The patient is in left lateral decubitus position (a). An 18-G Chiba needle was inserted into the 5.5 cm cyst (b). Contrast medium is instilled into the cyst to ensure that there was no communication with the pelvicalyceal collecting system (c). Follow-up transverse nonenhanced CT scan obtained 6 months after the procedure shows shrunken cyst filled with the mixture of n-butyl cyanoacrylate and iodized oil (d).
We also evaluated complications related to the procedure. No patient complained of pain at the time of injection. Patients were not sedated.

The patients were reevaluated by the same author (A.S.) to determine whether there were any changes in the subjective symptoms after the procedure.

Results

The sclerotherapy was technically successful in all patients. The diameter of the cysts ranged from 3.5 to 8 cm (mean, 5.6 ± 1.3 cm) prior to therapy. After sclerotherapy, the diameters of the cysts were 1 to 3.4 cm (mean, 2.1 ± 0.6 cm) (P < 0.001). The average diameter reduction was 62.5% during the follow-up period. The mean follow-up was 9.1 months (6–14 months).

Flank pain resolved in 20 of 23 symptomatic patients (87%). In three patients, the symptoms were decreased slightly. No patient complained of worsening of symptoms after the procedure. At follow-up CT, the procedure was successful (i.e., the diameter of the cyst was less than 50% of that before treatment) in 25 of 27 cysts (93%). We did not observe any complications related to the procedure.

Discussion

Percutaneous treatment of symptomatic simple renal cysts is a minimally invasive and safe procedure that has been increasingly reported in recent years. Simple drainage without sclerotherapy is associated with a recurrence rate of 30–80% (2, 15) and a high rate of fluid reaccumulation because the cysts are lined with secretory epithelium (7). For a lasting benefit, a sclerosing substance is usually injected after cyst aspiration. Bean (16) was the first to report the use of ethanol as the sclerosing substance for the treatment of a symptomatic renal cyst in 1981; since then, various techniques for sclerotherapy have been proposed (17). Treatment with various agents has been tried, including absolute ethanol (2, 18), iophendylate (19), ethanalamine oleate (20), povidone iodine (21), acetic acid (22), dextrose solution, quiacline hydrochloride (20, 23), tetra-
and in increased risk of ethanol leak-
tient discomfort and inconvenience, mul-
perform repeated aspiration and injec-
tigation (12, 17). The inves-
these factors include the con-
volume in relation to cyst volume, the duration of sclerotherapy per session, the number of injections required in relation to cyst volume, and whether continuous drainage is needed before and after sclerotherapy, and duration of drainage (27).

The most commonly applied tech-
treatment technique (12, 17). The investiga-
with a longer time of ethanol reten-
does achieve a satisfactory thera-
the presence of a communication between the simple renal cyst and the pelvical-
ultrasound is much more dependent upon the skill of the operator than is CT. We preferred CT guidance because of its advantages for determining the presence of a communication between the simple renal cyst and the pelvical-
reduce radiation dose to the patients, and a relatively short follow-up period. Despite these limitations, we conclude that renal cyst sclerotherapy with NBCA is a simple, safe, effective, well tolerated alternative technique for management of simple renal cysts.

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