

Simple Kidney Cysts: Sclerotherapy versus Laparoscopy

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Abstract

Original Research Article

Introduction: The simple kidney cyst is part of a heterogeneous family of cystic kidney disease, and is the most common entity. It is admitted that these cysts are, except for a few anecdotic cases, all benign. **Aim:** The aim of this work is to compare the efficiency of sclerotherapy and laparoscopy in the treatment of simple kidney cysts. **Material and Methods:** This was prospective study of 30 simple kidney cysts cases. We split patients into 2 arms. In arm A, 15 patients were treated by sclerotherapy under local anesthesia and in arm B, 15 patients were treated by laparoscopy under general anesthesia. **Results:** Average operative time was significantly lower in arm A (15 min vs 45 min, $p < 0.001$). No postoperative complication was noted in arm A, whereas conversion was required in arm B (0% vs. 6.7%, $p = 1$). The average length of stay was not significant, 3.2 days versus 2.8 days ($p = 0.52$). The overall radiological success rate was 80% for arm A and 87.5% for arm B. **Conclusion:** This shows that sclerotherapy offers a shorter operative time, and a lower postoperative pain. Although, laparoscopic results are better than sclerotherapy's. We cannot statistically conclude the superiority of one method over the other.

Keywords: Kidney cysts, sclerotherapy, laparoscopy.

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INTRODUCTION

The simple kidney cyst is part of a heterogeneous family of cystic kidney disease, and is the most common entity [1]. It is admitted that these cysts are, except for a few anecdotic cases, all benign. These cysts most often do not require neither monitoring nor surgery. However, when they become symptomatic, a therapeutic intervention is then needed [2]. Minimally invasive treatments, including povidone iodine sclerosis or laparoscopic resection are considered as standard treatments. Indeed, it is imperative to propose, for a benign pathology, the treatment with the lowest morbidity [3]. We led a prospective, non-randomized study that included 30 cases of symptomatic and asymptomatic simple renal cysts, 15 were treated with povidone iodine and 15 treated with laparoscopy at the Urology Department at Moulay Ismail Military Hospital, Meknes. The objectives of this study are to evaluate the indications, benefits, complications and outcomes of each of these two techniques.

MATERIALS AND METHODS

This is a prospective, non-randomized study of 30 patients treated for 30 symptomatic and asymptomatic simple renal cysts. One patient was treated for 2 cysts. The patients were divided into 2 arms of 15 patients. The first arm (arm A) was treated by sclerotherapy with povidone iodine, and the second arm (arm B) was treated with laparoscopic surgery. This study took place at the urology department at Mohammed V Military Instruction Hospital in Rabat between January 2019 and February 2020.

Preoperative Assessment

All our patients had an initial diagnosis, based on ultrasound and/or computed tomography (CT scan). We only included Bosniak type 1 and type 2 cysts. Hydatid serology was requested for patients suspected of having hydatidosis. It was negative in all cases. All patients underwent a standard biological assessment including: a cytobacteriological examination of the urine (CBEU), a complete blood count (CBC), an ionogram, and a hemostasis assessment.

The Surgical Technique

For arm A, all the interventions were performed under local anesthesia, in the prone position, and under ultrasound control. A guidewire is introduced allowing the progressive dilatation of the path, and placement of the nephrostomy tube. The content of the cyst is drained and quantified. After checking the correct placement of the tube by opacification, a volume of povidone iodine, equal to half the volume drained, is then injected into the cyst. The drain is clamped for 30 to 120 hours after each injection. We perform once daily the injection of povidone iodine into the cyst at a volume corresponding to half the amount of volume drained by the nephrostomy tube. The removal of the drain is done when the volume drained is less than 10 ml. For arm B, patients were under general anesthesia, in lombotomy position. Transperitoneal way was performed in 9 patients and retroperitoneal in 6 patients.

Therapeutic Success

Therapeutic success has been defined:

- Clinically, by the disappearance of symptoms or a significant improvement;
- Radiologically, by total regression of the cyst or reduction of the cyst's volume by 50% or more.

Statistical Analysis

All data was gathered and grouped into a Microsoft Excel table. The results were analyzed statistically using SPSS 20.0, in collaboration with the Epidemiology Department of the Faculty of Medicine in Fez. We used the Chi2 method to compare the percentages, and the T-test to compare the averages. The test is considered significant when p-value is less than 0.05.

RESULTS

The average age of our patients was: 53.2 years in arm A and 57.6 years in arm B ($p = 0.25$). There were a total of 16 men (53.3%) and 14 women (46.7%), with a sex-ratio of 1.14. Seven women (46.7%) and 8 men (53.3%) in arm A, and 7 women (46.7%) and 8 men (53.3%) in arm B ($p = 1$). Thirteen patients (86.7%) in each group were symptomatic. For 4 patients (13.3%), 2 from each group, the cysts were

asymptomatic, and in these cases, the therapeutic indication was the large cysts volume. The clinical signs were, lower back pain in 9 patients of arm A (60%) and 11 patients of arm B (73.3%), renal colic in 3 patients of arm A (20%) and 2 patients of arm B (13.3%), abdominal pain in 2 patients of arm A (13.3%). Fifteen cysts were punctured in arm A, and 16 were resected in arm B. The average volume aspirated was 313 ml (100 to 1000 ml) in arm A and 273 ml (60 to 500 ml) in arm B ($p = 0.75$). No complications were reported in arm A. Conversion was required in arm B, for retroperitoneal cyst access difficulty and peritoneal breach ($p = 1$). Average operating time was 15 minutes (range 10-30 minutes) in arm A versus 45 minutes (range 40-75 minutes) in arm B ($p < 0.001$). The number of patients who used analgesics in the first 24 hours was: 1 patient for arm A versus 7 patients in arm B, with good response to treatment. Two patients (13.3%) in arm A had a postoperative fever, resolved spontaneously in 24 hours, without other major complications. Average hospital stay duration was 3.2 days (1-6 days) for arm A and 2.8 days (2-4 days) for arm B (Table 1). The characteristics of the cysts are summarized in (Table 2). Histopathological examination showed the absence of malignancy in all cases. Average follow-up was 11.8 months (range 1 to 24 months) for arm A and 13.8 months (range 1 to 24 months) for arm B ($p = 0.69$). In arm A, 7 out of 13 patients (initially symptomatic) were asymptomatic during follow-ups (53.8%). Six patient's maintained mild to moderate and intermittent pain (EVA: 2 to 4). Of these patients, 4 had a reduction from 50% to 67% of the initial pain. In arm B, 9 out of 13 symptomatic patients before treatment became asymptomatic (69%). Of the 4 symptomatic patients only 2 had a 50% reduction in initial symptoms. The pain was mild to moderate (EVA: 3-4). None of the patients in both groups had an increased pain. Regarding the radiological data (Figure 1): for arm A, 6 have regressed completely (40%). Six had a regression $\geq 50\%$ (40%) (reduction rate of 50 to 75%). Three had a regression $< 50\%$ (20%) (reduction rate from 38.5 to 41.3%). For arm B, 10 have regressed completely (62.5%). Four had a regression $\geq 50\%$ (25%) (reduction rate from 53.3 to 69.5%). Two had a regression $< 50\%$ (12.5%) (reduction rate of 35.2 to 42.9%).

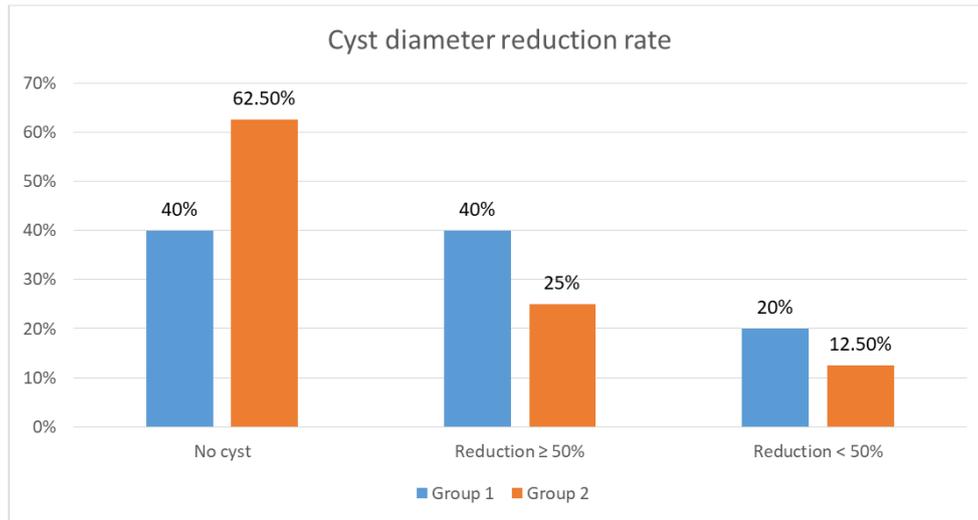


Figure 1: Cyst diameter reduction rate

Table 1: Characteristics of the two groups of patients

		Group A	Group B	P
Age		53.2	57.6	0.25
Gender	Woman	46.7%	46.7%	1.00
	Man	53.3%	53.3%	
Circumstances	Symptomatic	86.7%	86.7%	0.467
	Accidental	13.3%	13.3%	
Intraoperative results	Average aspirated volume (ml)	313 (100-1000)	273 (60-500)	0.75
	intraoperative incidents.	0	1 (6.6%)	1.00
	Average intervention time	15 (10-30 min)	Conversion 45 (40-75)	<0.001
Post operative course	Need for analgesics	1 (6.6%)	7 (46.7%)	<0.001
	Postoperative complications	2 (13.3%)	0	0.356
	Average hospital stay duration (days)	3.2 (1-6)	2.8 (2-4)	<0.001
Clinical results	No symptoms	7 (53.8%)	9 (69.2%)	<0.001
	Decrease ≥50%	4 (30.8%)	2 (15.4%)	0.020
	Decrease <50%	2 (15.4%)	2 (15.4%)	0.035

Table 2: Cysts characteristics

Parameters		Group A N (%)	Group B N (%)	P-Value
Number of cysts	1	10 (66.7%)	11 (73.3%)	0.319
	2	1 (6.7%)	3 (20.0%)	
	≥3	4 (26.7%)	1 (6.7%)	
Side	Right	4 (26.7%)	7 (46.7%)	0.659
	Left	6 (40.0%)	5 (33.3%)	
	Bilateral	5 (33.3%)	(20.0%)	
Localization	Upper pole	4 (26.7%)	6 (40.0%)	0.547
	Lower pole	5 (33.3%)	7 (46.7%)	
	mediankidney	2 (13.3%)	0	
	Multiple (≥2)	4 (26.7%)	1 (6.7%)	
	parapyelic	0	1 (6.7%)	
Diameter	Average	7.8±2.2	8.7±2.0	0.290
	Extremes	(6.0-14)	(5.4-12)	
BOSNIAK	Type 1	11 (100%)	13 (92.1%)	0.188
	Type 2	0	1 (7.1%)	
Other anomalies	Calyceal compression	2 (13.3%)	1 (6.7%)	0.581
	Ipsilateral lithiasis	5 (33.3%)	1 (6.7%)	0.169

DISCUSSION

The simple renal cyst is specific to the adult and the elderly. Studies have shown a rapidly increasing frequency from age 40, with a higher rate after age 70 (30%) [4]. In our series, the average age of the patients at the time of the intervention was 53.2 and 57.6 years, respectively for the sclerotherapy and the laparoscopic group. Several studies have found a male predominance for this condition [4, 5]. In our series, 53% of treated patients were men. The sex-ratio was 1.14. Lower back pain was the most common clinical sign found in 67% of cases in our series, and is the main indication in several other series, including those of MOUFID and ABBASZADEH [6, 7]. Renal colic found in 16% of cases in our series and in 8.7% of cases in the FONTANA series [8]. The average operative time was 15 minutes for sclerotherapy and 45 minutes for laparoscopic surgery. In other comparative studies, AGARWAL found that average operative times were 33.5 and 112 minutes for sclerotherapy and laparoscopic surgery respectively [9]. For SHAO, the average was 30.4 minutes for sclerotherapy and 80 minutes for laparoscopic surgery [10]. In our study, there is a strong statistical link between operative time and type of surgical technique ($p < 0.001$). EL HARRECH reported an average operative time of 18 minutes for sclerotherapy [11]. For the other series of laparoscopic surgery, the operative time was 58 minutes for ABBASZADEH and 50 minutes for MOUFID [6, 7]. This difference is explained by the fact that the laparoscopic treatment involves the opening of the peritoneum and the resection of the cyst. Whereas the puncture is simpler to perform, with an easy to handle equipment, and does not include the resection of the wall. In our series no intra-operative incident was observed during sclerotherapy. On the other hand, in the laparoscopic group, conversion to laparotomy was performed for poor accessibility to the cyst by the retroperitoneal and peritoneal approach. FONTANA reported a case of intracystic hemorrhage after puncture of the cyst [8]. A case of accidental colon puncture was reported by EL HARRECH [11]. The incident was recognized intra-operatively, and had no consequences. The percentage of patients who requested analgesic treatment was higher for the laparoscopic group (46.7%) compared to the sclerotherapy group (6.7%) ($p = 0.03$). In AGARWAL and SHAO series, the rate of patients receiving analgesic treatment was 100% for the laparoscopic group versus 0% for the sclerotherapy group [9, 10]. The hospital stay duration was longer for the laparoscopy group: 50.4 hours for ARGAWAL serie and 48.6 hours for SHAO serie [9, 10]. In general, hospitalisation length for sclerotherapy varies according to the applied therapeutic protocol. It concerns the number of injections, the duration of the drainage, and the type of agent. It can oscillate from a few hours to a few days. As our results, the average hospital stay in the EL HARRECH and FONTANA series was 3 days [8, 11]. In laparoscopic surgery, average hospitalisation length is between 2 and 3 days, conditioned by the

occurrence of intraoperative or postoperative complications [7, 12]. Nevertheless, there are series, such as those of MOUFID and ATUG, where the average duration of hospitalization is quite short, one day [6, 13]. The advantage of laparoscopy is that it provides histological evidence and can confirm the benignity of the cyst. For the cyst's puncture, a cyto-bacteriological and chemical study is suggested as an alternative, since this technique does not provide histological material. However, cytology sensitivity is 85%, lower than histology [6]. RUBENSTEIN reported 2 cases of unidentified cystic cancer despite preoperative cytologic puncture [14]. In our serie, the histological results were in favor of a simple renal cyst for all 16 cysts resected by laparoscopic surgery. During follow-up, asymptomatic patients rate was 53.8% for sclerotherapy and 69.2% for laparoscopic surgery. The results obtained with laparoscopic surgery were better, but not statistically significant to confirm the superiority of this technique over sclerotherapy ($p = 0.439$). Compared to other series of sclerotherapy using polyvidone iodine, our results were less satisfying. GELET and PHELAN reported in their series of respectively 10 and 5 patients, a symptom's disappearance rate of 100%, during an average follow-up of 12 and 7.2 months [15, 16]. Regarding the radiological evolution, the disappearance of the cyst was observed only in 40% of cases for sclerotherapy and in 62.5% of cases for laparoscopic surgery ($p = 0.21$). A reduction of the cyst by 50% or more (compared to its initial size) was observed in 40% of cases for the group of sclerotherapy and 31.3% for laparoscopic surgery group, meaning a success rate of 80% for sclerotherapy and 87.5% for laparoscopic surgery. In fact, the radiological success of the intervention is not a predictor of clinical success. The majority of authors described the lack of association between clinical and radiological outcome. Similarly, decreasing cyst size is not correlated with symptom reduction [13, 17].

CONCLUSION

Percutaneous sclerotherapy and laparoscopic surgery are both feasible and safe techniques, with minimal morbidity, and a short hospital stay, compared to conventional surgery. According to our results, we can say that the percutaneous puncture is more advantageous than laparoscopic surgery, in terms of operating time, with a duration of operation 2 to 3 times lower than the latter. In addition, the percutaneous treatment provides greater immediate postoperative comfort with respect to pain, and therefore reduces the rate of taking analgesic, besides being inexpensive, and easy to perform under local anesthesia.

CONFLICTS OF INTEREST

The authors do not declare any conflict of interest.

Contribution of the authors

The authors participated equally. All authors have read and approved the final version of the manuscript.

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