Laparoscopic Deroofing of Symptomatic Renal Cysts in Al-Jumhoori Teaching Hospital Mosul City

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ABSTRACT:

BACKGROUND:

Laparoscopy offers a safe and efficacious means of ablating symptomatic simple renal cysts with the benefits of shorter hospital stay, quicker convalescence, and reduced postoperative pain. We evaluated the safety and efficacy of laparoscopic cyst deroofing during our early experience in laparoscopic urology work.

OBJECTIVE:

To present the outcome of laparoscopic management of symptomatic simple renal cysts in Mosul Urologic Center.

METHODS:

Between April 2010 and September 2013, 16 patients (had 19 cysts), with male to female ratio of 1:1.6, were underwent laparoscopic deroofing of symptomatic simple renal cysts at urologic theatre in Al-Jumhoori Teaching Hospital in Mosul and their data were collected and analyzed. All procedures were carried out by transperit- oneal approach. Patients underwent clinical review and radiological follow up with ultrasonography ± computerized tomography. Success rate was defined as no recurrence of the cyst and 1ignificant pain relief.

RESULTS:

All 16 procedures were completed laparoscopically, without major complic- ations or conversion to open surgery. Estimated mean blood loss during and after surgery was about 119.6 ml and the mean operating time was 48.8 minutes. Patients were hospitalized for a mean of 1.4 days. Five patients developed postoperative fever, and one had incomplete clearance of all cysts. After a mean radiological and clinical follow up of 12 and 23 months respectively, one patient had symptomatic and one had radiologic failure (6.25% and 5.3% respectively).

Cytological and pathological findings for malignancy or any other abnormalities were negative in all patients.

CONCLUSION:

Laparoscopic transperitoneal deroofing of simple renal cysts represents an effective and safe method of treatment with minimal morbidity.

KEY WORDS: laparoscopy, deroofing, simple renal cyst.

INTRODUCTION:

Simple renal cysts are common finding and increase in incidence with patients' age [(1)]. The prevalence of up to 20% at age 40 years and 33% at age 60 years[(2)]. Renal cysts could be congenital or more commonly acquired type. Most patients with simple renal cyst (90%-95%) are asymptomatic and most of these cysts are detected incidentally and intervention is not necessary unless it develops symptoms or complications [(3)]. Treatment of symptomatic renal cyst (SRC) is generally focused on control of symptoms and preventing further complications [(4)]. The most common symptom requiring intervention has been determined as loin pain; another symptoms or complications; hypertension, urinary infection, upper urinary tract obstruction, haematuria and renal failure rarely [(5,6)]. Any method to distinguish whether or not the symptoms are derived from renal cysts does not exist, therefore, the indication of treatment has to be considered carefully [(7)]. Renal cysts can be classified into simple (Bosniak type I and II) or complex (Bosniak type III and IV) cysts [(8)]. The ideal management of symptomatic SRC should be less invasive and effective with low recurrence rate [(9)]. Symptomatic renal cysts

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have traditionally been treated by percutaneous aspiration, with or without injection of sclerosing agents, and open surgery. Percutaneous aspiration is recommended as the initial therapy by many authors [10,11]. Aspiration only or aspiration sclerotherapy is less invasive, however, the recurrence rate is relatively high [11,12]. The recurrence rate varies between 41% and 78% with simple aspiration alone and between 32% and 100% with sclerosing agent[12,13]. Open surgery offers the best success rate and lowest recurrence rate compared with other different modalities of treatment, however it is invasive procedure with higher morbidity of flank incision [9,10,11].Furthermore laparoscopic deroofing of SRC have become increasingly popular in urological practice due progressive improvement in the quality of laparoscopic instruments and its established feasibility in more complex urological procedures such as nephrectomy, cystectomy, prostatectomy, pyeloplasty and others [4].Laparoscopic ablation of symptomatic renal cyst was first reported by Hulbert et al[14]. Subsequently others have documented the feasibility and safety of this procedure[15,16,17,18]. Okeke AA et al [19],found that laparoscopic treatment of symptomatic cysts is more effective than sclerotherapy, with pain recurrence in all patients treated with sclerotherapy in contrast to pain-free in all those treated by laparoscopy after the same mean follow up time of 17.7 months in both groups . Also it is proved that laparoscopy offers effective treatment with high success rate and low recurrence rate comparable to open surgery with the advantage of being less invasive [13,15].

The laparoscopic approach to renal cysts has been described via a transperitoneal or retroperitoneal method [5]. Both approaches are comparable regarding to improvement of pain, clinical success and radiological findings. Transperitoneal approach has the advantages of large working space, anatomical landmarks, and has the disadvantages of longer operative duration and need to mobilize the colon [20]. Most surgeons prefer a transperitoneal approach in laparoscopic cyst decortication, because they believe that the retroperitoneal approach has limited working space and which can result in difficulty with orientation, visibility, trocar placement and mobilizing the kidney.

Recently, the retroperitoneal approach has become more popular[5]. The most import-ant ant advantage of retroperitoneal approach has been shown that it has a minimal risk of visceral organ injury, urinoma and haematoma confined to retroperitoneum [3,21,22]. In another study, minimal morbidity and high effectivity were reported for large cysts of any localization using the transperitoneal approach [4].

OBJECTIVE:

To present the outcome of our 3 years experience in the treatment of symptomatic simple renal cysts using laparoscopic deroofing technique in 16 patients in Al- Jumhoori Teaching Hospital in Mosul City.

MATERIALS AND METHODS:

Between April 2010 and September 2013, 16 patients (6 males and 10 females) were underwent laparoscopic deroofing (decortication, unroofing) of symptomatic simple renal cysts at urologic theatre in Al-Jumhoori Teaching Hospital in Mosul. The demographic, preoperative, intraoperative and postoperative follow up data were ollected and analyzed retrospectively and prospectively. All cases were symptomatic, while a symptomatic, even if they are large, are excluded from our study. Pain score assessed subjectively according to patient's description as slight, moderate and severe pain, all cyst enrolled in our study were classified as being simple (Bosniak grade I and II).

In all patients absence of calcifications, septations or other lesions in the cysts was confirmed by preoperative ultrasonography and CT.The cysts that can be classified as

Bosniak grade III or IV (complex cysts), were excluded from the study and managed by open surgery. None of cysts included in study were previously aspirated precut- aneously, also we excluded any patient had history of open surgery, a part from one patient who had a history of open surgical intervention for symptomatic renal cyst at the same site, 3 years earlier with recurrence.

The total number of cysts were 19. All cysts were peripheral cortical cysts, with no one was parapelvic. Cysts smaller than 6 cm were excluded from study, even if they are symptomatic, because it could be treated by aspiration with or without sclero- therapy instillation.

Preoperatively, all cysts were localized and characterized by abdominal ultrasound (US) and CT scan with contrast injection, while intravenous urography(IVU) is requested in 10 cases. Urinalysis, urine culture, serum electrolytes, renal function tests and basic hematological tests were carried out before the

procedures. An informed written consent is taken from each patient about laparoscopic surgery, its advantages and disadvantages including the risk of open conversion of surgery.

All procedures were carried out by two urologists with the attendance of a laparo- scopic general surgeon. Patients underwent laparoscopic deroofing of symptomatic simple renal cysts and cyst wall excision, with hemostatic fulguration of cyst wall remnant, but without fulguration of epithelial lining of cyst.

A transperitoneal laparoscopic approach was used in all cases. The sites of ports were one at subumbilical position (10mm), and other two ports of 5 mm at anterior axillary line (at level of umbilicus) and at subcostal (midclavicular) position, the fourth port, if used, usually at midline in epigastrium(5mm). After induction of general anesthesia with endotracheal tube, the patients were positioned in a 45°tilted lateral in decubitus position with free use of pillows padding and flexion of table as needed to support flank. The patients were secured in position to the table with a wide strip at hip level. The procedure initiated with CO2 pneumoperitoneum of 15mmHg pressure through subumbilical 1.5 cm incision by open technique (Hasson technique) with insertion of 10mm port for a 0° telescope, then two 5mm trochar are inserted under direct vision The ascending or descending colon are mobilized medially up to hepatic or splenic flexure by incising the bloodless peritoneal reflections (white line of Toldt). The retroperitoneum now exposed and visual inspection of kidney with surrounding perinephric fat and Jerota fascia. Dissection of the kidney, perinephric fascia and overlying fat was done using blunt and sharp electrical dissection. The cysts now aspirated through a needle inserted percutaneously and its content send for cytological examination. The wall of cysts excised circumferentially at its junction with renal parenchyma using monopolar electrical diathermy hock, and extracted for histopatho- logical assessment.

Hemostasis secured by coagulation of cyst wall remnant with irrigation by normal saline and suction. Tube drain inserted in all cases for an overnight drainage and removed within 24 hours.

Follow up included clinical review and renal US at 1, 6 and 12 months, then annually thereafter. All patients are phoned during writing of this study to document symptomatic and satisfaction status of them. CT scan requested only in patients with sonographic suspicion of cyst recurrence.

Successful outcome of procedures was defined symptomatically and radiologically. Pain relief or decrease considerably as described by patients and patients satisfaction, with clinical improvement of other symptoms as haematuria, infection and hyperten- sion, were defined as symptomatic success. Radiological success was defined as absence of cyst regrowth or recurrence radiologically on the most recent US.

Failure is defined as cyst regrowth at the same surgical site radiologically or lack of symptomatic improvement clinically.

RESULTS:

The age of patients ranges from 30-74 years (mean 48.4 years). Male to female ratio was 1:1.6. All cases were symptomatic and presented with ipsilateral flank pain (100%), five of them had, in addition, features of urinary tract infection (31%), four had associated systemic hypertension (25%), one presented with additional haematuria (6.25%), and the other one with low grade fever (6.25%). No patient presented with urinary tract obstruction.

All cysts enrolled in our study were classified as being simple (Bosniak grade I and II), 12 of them were grade I (63%) and 7 were grade II (37%). One cyst was suspected preoperatively of being hydatid (ecchinococcal) cyst by CT scan imaging.

The total number of cysts were 19. Fourteen patients had single cyst (87.5%), one patient had 2 cysts (6.25%) and one had 3 cysts (6.25%) removed during surgery.

The last patient was suspected to be a case of early autosomal dominant polycystic kidney disease (ADPKD) with three big cyst. The cysts were distributed in both kidneys as the following: 11 cysts in left kidney (58%) and 8 in right one (42%). The distribution of cyst on surfaces and poles of kidneys as that: 2 cysts (10.5%) were on the posterior surface (both of them at the upper pole), and the rest 17 (89.5%) were on the anterior surface (8 at middle pole, 6 at lower pole and 3 at upper pole). The largest cysts dimension ranges from 6-20cm with the average of 8.4cm. All cysts were peripheral cortical cysts, and no one was parapelvic table (1).

Table 1: Demographic and preoperative parameters of present study.

No. of cases	16
Age (years): Range Mean	 30-74 48.4
Gender: Male Female	 6 10
Solitary cyst Multiple cysts	14 (87.5%) 2 (12.5%)
No. of cysts	19
Laterality Right Left	 8 (42%) 11 (58%)
Dimensions of the cysts (cm): Range Mean	 6-20 8.4
Presentation Flank pain Pain + UTI Pain + Hypertension Pain + Hematuria Pain + Fever	 16 (100%) 5 (31%) 4 (25%) 1 (6.25%) 1 (6.25%)

A transperitoneal laparoscopic approach was used in all cases, with 3 ports used in 9 cases (56%), and 4 ports in 7 cases (44%) specially in operations at right kidney (for liver retraction).

All cysts aspirated through a needle inserted percutaneously and its content was amber coloured fluid except two cases. The first one, the fluid was crystal clear (hydatid cyst). After instillation of 10% povidone iodine into the cyst, removal of germinal layer (endocyst) was done and cystectomy of ectocyst layer. The second case, the aspiration was purulent (renal abscess). The content sent for culture and sensitivity, with deroofing of abscess cavity. Also one female patient required right ovarian cystectomy of calcified cyst in addition to renal cyst deroofing.

The total amount of blood loss (intra- and postoperatively through the tube drain) was 30-300 ml, with the average loss of 119.6 ml, without any need for blood transfusion.

No major complications were encountered in any case, including adjacent organ injury or severe bleeding, open conversion rate was zero.

Minor complications such as postoperative pyrexia occurred in 5 patients (31%) for 2-3 days.

Failure of complete clearance of all cysts happened in one patient with ADPKD who had multiple symptomatic cysts (only the largest 3 cysts were excised).

Duration of procedures ranges from 30 minutes - 60 minutes, with a mean of 48.8 minutes. The earlier cases in the study last for longer duration (around 60 minutes) than the last cases. Hospital stay ranges from 1-2 days with average of 34.5 hours (1.4 days) table (2).

Table 2: Outcomes of the procedures in the present study.

Parameter Value Parameter	Value
Approach	All transperitoneal (100%)
No. of ports: 3 4	 9 (56%) 7 (44%)
Operative time (minutes): Range Mean	 30-60 48.8
Hospital stay (days): Range Mean	 1-2 1.4
Blood loss (ml): Range Mean	 30-300 119.6
Pain relief: Complete Partial Persistent Recurrence	 12 (75%) 2 (21.5%) 1 (6.25%) 1 (6.25%)
Clearance of the cysts: Complete Partial Recurrence	 17 (89.4%) 1 (5.3%) 1 (5.3%)
Complications: Bleeding Pyrexia Organ injury Open conversion	 0 5 (31%) 0 0

All patients were followed clinically for 2-42 months (mean 23 months). This included clinical history and physical examination, with radiological follow up for a mean of 12 months by renal US. CT scan was needed in one patient with suspicion of cyst recurrence. Fourteen patients (87.5%) show short and long term complete or considerable subjective improvement of flank pain after procedure, with complete response rate (complete relief of pain) in 12 cases (75%), and partial response rate (residual slight pain or discomfort) in 2 cases (12.5%). One case (6.25%) had persistence of flank pain and never be pain free after the procedure, and another case had recurrence of pain after several months due to growth of further cysts as a part of ADPKD at sites other than the site of previous operation. this recurrence of pain cannot be attributed to failure of operation, so the estimated symptomatic failure rate was 6.25% (symptomatic success rate was 93.75%). The other clinical parameters as infection, and haematuria were resolved completely (success rate 100%), while 2 of 4 cases with hypertension (50%) the blood pressure were normalized.

Eighteen of the 19 cysts that has been treated (94.7%) had no regrowth of excised cyst after variable periods of follow up except one who had history of ADPKD due to enlargement of other residual small cysts at other sites of kidney). One case had radiological recurrence of a cyst that has been deroofed after 3 months of the procedure, with recurrence of pain and infection. Open surgical exploration of kidney done after one year revealed a missed pack at the button of cyst cavity, retained from previous renal surgery that has been done 3 years before laparoscopic procedure, so that the radiological failure rate can be estimated to be 5.3%. Although the recurrence is not due to operation itself, but secondary factor of missed pack play a role.

The results of histopathological assessment showed that 17 cysts were simple cysts, one was hydatid cyst and one was infected cyst (abscess) with pyogenic granuloma.

No malignancy was detected in removed cysts.

DISCUSSION:

Almost all previous studies of laparoscopic management of renal cysts have emonstrated high patient's and urosurgeon's satisfaction rate in

terms of efficacy, high success rate, low recurrence rate, minimal morbidity, operative time, hospital stay, convalescence, and cosmetic outcome over other methods of treating renal cysts [4,10]. These findings were reproduced in the results of the present study.

The success rates may be related to several factors such as cyst location, technique of operation and surgeon's skillfulness, and in previously published series, the overall reported success rates of laparoscopic renal cyst deroofing were ranging between 60% -100% (with a mean of 90%) [4,7,23]. Altug et al. reported the radiological and sympt- omatic successes in their series of consecutive patients (100% and 86.6% respectively), after a mean follow up of 12.08 months[1]. Abbaszadeh et al. have achieved a radiological and symptomatic success rate of 100% in their series of 21 cases operated via laparoscopic transperitoneal approach[4]. Tefekli et al. in a survey of 19 consecutive patients reported a radiological success rate of 88.2% and a symptomatic success rate of 89.5% after a mean follow up period of 14.3 months[7], in contrast to our study, the retroperitoneal approach had been used in all of their cases. Yoder and Wolf reported a favorable long-term symptomatic relief in 78% of cases, after a median final symptomatic follow up of 52 months, while a radiological success rate (complete absence of cyst)was 89% for the peripheral cyst group, after a median radiographic follow up of 23 months[18].

In present study, the radiological and symptomatic success rates were (94.7% and 93.75% respectively) and it was comparable to the above mentioned studies.

Hypertension due to peripheral cortical renal cyst may be a relatively subjective indication for laparoscopy after exclusion of a long list of differential diagnosis [7].

Remission of hypertension after laparoscopic excision of a giant simple renal cyst was documented in young patients by several authors[24,25]. In our series all patients with hypertension have associated with flank pain as a further indication for intervention, and 50% of them had persistent hypertension after procedures, in spite of complete pain relief.

The mean operative times of laparoscopic renal cyst surgery in previously published series were ranging between 30minutes -390 minutes, in which different surgical coagulation devices, as conventional monopolar, bipolar plasma kinetic, and other energy devices were used[7,18,19,22,26,27,28].

Regarding the transperitoneal approach with conventional monopolar coagulation device, Altug et al. reported a mean hospital stay of 2.2 days and the mean operation time was 64.6 minutes [1]. Abbaszadeh et al. reported a mean hospital stay of 2.9 days and the mean operative time was 58 minutes[4]. Atug et al. found that the mean hospital stay was 1.1 days, and a mean operative time was 89 minutes using a transperitoneal approach[12].

Regarding the retroperitoneal approach, Tefekli et al. achieved a mean hospital stay of 2.3 days and a mean operative time of 83 minutes[7]. Gupta et al. reported a mean hospital stay of 2.9 days and a mean operative time of 95 minutes[29]. Lutter et al. reported a mean hospital stay of 3 days and a mean operative time of 70 minutes through a retroperitoneal approach[30].

These results suggest that the hospital stay duration as well as the operation time are relatively better with transperitoneal approach, and this suggestion support the result of this present study, in which the transperitoneal approach had been used in all cases including 2 cases of posteriorly located renal cysts, and the operation time and hospital stay were shorter than that reported by a study of Abbaszadeh et al. (48 minutes vs 58 minutes and 1.4 dayes vs 2.9 days respectively)[4]. Also the radiological and symptomatic success rates were better than that reported by Tefekli et al.(94.7% vs 88.2% and 93.75% vs 89.5% respectively)[7].

Tefekli et al. preferred a retroperitoneal approach in all cases in their series with either anteriorly or posteriorly located renal cyst, and they claimed that it shorten the operation time and hospital stay, and it almost eradicates the risk of adjacent organs injury or ileus[7]. In our study although a transperitoneal approach had been used, the adjacent organ injury, blood transfusion and the open conversion rates were zero.

Altug Tuncel et al. proved that laparoscopic renal cyst decortications using convent-ional monopolar device represent an effective and safe treatment option in the management of renal cyst without any need for more expensive energy sources as bipolar plasmakinetic system, argon beam laser and harmonic devices[1]. This approval is corroborated by the results of present study in which a monopolar electrocoagulation hock were used.

The reported overall recurrence rate of laparoscopic decortications of renal cysts is still up to 19% regardless of technique or approach used[31]. In previously published series, were a

transperitoneal approach had been generally preferred, the recurrence rates ranging between 3% and 10% for peripherally located cysts, while it was increase up to 45% for peripelvic cysts[18,19,28] Yoder and Wolf reported that 5.9% of cysts were categorized as radiological failures during a median 23 months of follow up[19]. Shiraish et al.[31] ,reported a series of 37 patients who underwent laparoscopic decortications between 1993 and 2004; and according to their report, 5 (13.5%) patients had recurrence (above 50% of their preoperative volume), at the first year-follow up evaluation, then after a mean period of 67.2 months, they reported a higher radiological failure rate (19%), which is a rather disappointing compared to the result of Yoder and Wolf[19] .These results are nearly comparable to our study, in which the radiological and symptomatic failure rates were 5.3% and 6.25% respectively.

Recurrence after laparoscopic decortication could be explained by incomplete esection of the cyst wall and the residual secreting cyst wall can become adherent to surrounding tissues with development of a new cyst[9]. Several authors advocated fulgurating the base of renal cysts after decortications to destroy the secretary activity of the residual cyst wall and thereby avoiding recurrence [16].

In those patients with radiological failure or recurrence, almost all were symptomatic [19,29,32], this is also reported in our study. In contrast, Shiraish et al. said that despite the radiological failure, the symptoms were improved after surgery[31].

We have only one case of cyst recurrence that occurred in our study which was detected by ultrasound and CT scan within 3 monthes, also Kattan et al. reported one case recurrence after 3 monthes[32].

CONCLUSION:

From all that we concluded that transperitoneal laparoscopic technique using monopolar electrocoagulation device for deroofing is highly effective and safe with minimal morbidity and rapid convalescence.

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