

## **Laparoscopic retroperitoneal deroofing of simple renal cyst in coparism with open surgery**

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### **خلاصة البحث:**

الهدف من هذه الدراسة هو لتقييم كفاءة وسلامة عمليات إزالة سقف كيس الكلية البسيط بواسطة العمليات المنظارية لأحد عشر مصابا ومقارنتها مع عمليات تقليدية أجريت لخمسة عشرة حالة. خلال الفترة ما بين شهر شباط من عام ٢٠٠٨ إلى شهر تشرين الأول عام ٢٠١٠ تم علاج ١١ مريض وكان لديهم أكياس الكلية البسيطة ويعانون من الألم المقاوم للمسكنات المتوفرة وكان معدل حجم أكياس الكلي (٩,١) سم ومعدل العمر كان (٤٦,٦) سنة وكان ستة منهم ذكور ستة أكياس في الجانب الأيسر وثمانية أكياس في الأقطاب العليا والوسطى وقد اجري لهم عمليات منظارية ومن جانب آخر تم علاج ١٥ مريض يعانون نفس الأعراض وكان معدل حجم أكياس الكلي لديهم (١١,٨) سم ومعدل العمر كان (٥٠,٨) سنة, ٩ منهم ذكور ثمانية في الجانب الأيسر, وعشرة في الأقطاب العليا والوسطى, وقد اجري لهم عمليات تقليدية. من خلال العمل لكلتا المجموعتين, لم يتم مشاهدة فرق في ما يتعلق بالوقت المستغرق لإجراء العملية وكمية فقدان الدم ومعدل عودة أو رجوع كيس الكلية مع ظهور نتائج أفضل تابعة للعمليات المنظارية في ما يتعلق بفترة رقاد المريض في المستشفى وسرعة الشفاء وعودة المريض إلى نشاطه اليومي مع جروح بسيطة تاركة ندباً صغيرة. العمليات المنظارية, عمليات آمنة وناجحة مع مضاعفات بسيطة بالمقارنة مع العمليات التقليدية.

### **Abstract:**

**Background:** Is to evaluate efficacy and safety of laparoscopic retroperitoneal deroofing of 11 cases of simple renal cyst in comparison with 15 open deroofed cases.

**Patients and methods:** Over period between February 2008 to October 2010 , 11 patients with symptomatic simple renal cysts (pain recalcitrant to available analgesia), the mean cyst diameter was 9.1cm  $\pm$  2.7SD, mean age was 46.6 years  $\pm$  12.9SD, 6 patients were males (54.5%), 6 on left (54.5%), 8 on upper or middle poles (79.3%) underwent laparoscopic retroperitoneal deroofing and another 15 patients with same symptoms, the mean cyst diameter was 11.8 cm  $\pm$  3.7SD, mean age was 50.8 years  $\pm$  9.2SD, 9 patients were males (60%), 8 on left (53.3%), 10 on upper and middle poles (66.6%) underwent open deroofing.

**Results:** Insignificant difference between both procedures regarding operative time, blood loss, recurrence rate, with better results for laparoscopic retroperitoneal deroofing regarding hospital staying ( $p \leq 0.01$ ) and convalescence period.

**Conclusion:** Laparoscopic retroperitoneal deroofing of simple renal cyst is safe and effective procedure with minimal complications in comparing with open one.

## **INTRODUCTION**

Simple renal cyst (SRC )is the commonest benign cystic lesion of the kidney. Of incidence from birth to 18 years ranges from 0.1% to 0.4%, with an average incidence 0.22% <sup>(1)</sup>. In adults, incidence gradually increases with age and by age of 40 years, is about 20%, while at age 60, it rises to 35% <sup>(1)</sup>. men were affected more frequently than women <sup>(2-3)</sup>. The SRC in adults seems to be mainly an acquired disorder. Micro-dissection of the nephron in the adult kidney points to the presence of diverticula on the distal tubule as the starting point of affection . A degree of obstruction in the urinary tract together with normal involutinal phenomena of the basal membrane , both typical of the aging process, are believed to be precipitating factors <sup>(4)</sup>.

Majority of renal cysts are asymptomatic, some renal cysts can cause symptoms such as flank pain, palpable lump in the abdomen , repeated infections, hematuria (secondary to rupture into the pelvicalyceal system), hypertension (secondary to segmental ischemia) or rarely urinary tract obstruction <sup>(5-9)</sup>. US represents the most cost effective modality to confirm the presence of SRC and when all the criteria of a benign SRC are present, further evaluation is not indicated <sup>(10)</sup>.

Typical features of SRC on US are shown in following points :

- 1-Arounded homogeneous echo-lucent mass.
- 2-Sharp interphase with the surrounded renal parenchyma.
- 3-Acoustic enhancement posterior to the lesion.
- 4-Afew thin septa may occasionally be seen within the lesion.
- 5-Bleeding will produce internal echoes and these may be mobile <sup>(11-12)</sup>.
- 6- A simple renal cyst is avascular on color or power Doppler US <sup>(11-14)</sup>.

If these ultrasonic features are not met, we have to exclude malignant cyst or benign hydatid cyst.

A simple renal cyst at plain CT scan (present as a well defined lesion of water density, slightly lower in density in comparison to adjacent renal cortex) <sup>(15-17)</sup>.

At present, the commonly used treatment methods include :

- [1] Percutaneous aspiration with or without sclerosing agent (instillation after aspiration )
- [2] Laparoscopic deroofing, either transperitoneally <sup>(18)</sup> or retroperitoneally <sup>(19,20)</sup>.
- [3] Cysto-retroperitoneal shunt; a new technique using cysto-retroperitoneal catheter and removal of catheter after 3 months with high success in comparison with aspiration <sup>(21)</sup>.
- [4] Antegrade percutaneous nephroscopy with the cyst marsupialization into the collecting system in posterior cysts <sup>(22)</sup>.
- [5] Open surgical resection.

## **PATIENTS AND METHODS:**

Eleven patients with symptomatic SRC diagnosed by US were included in this interventional prospective clinical study in which we evaluated the efficacy of laparoscopic retroperitoneal deroofing of the cyst in comparison with open deroofing in 15 patients who were the controls over a period from February 2008 to October 2010. The US diagnostic criteria for SRC were a well defined, thin walled, round shaped, homogenously anechoic lesion with posterior wall enhancement. We had exclude any malignant or hydatid cyst by US. All of them were associated

with a flank pain that is refractory to analgesia, complained for many months, some patients for many years, and insist on surgical intervention (no patient had hematuria or a pelvicalyceal obstruction by history, physical examination and investigations including urinalysis and imaging). We classified these patients into 2 groups ;

Group(1) open surgical deroofing.

Group(2) laparoscopic retroperitoneal deroofing .

In open surgical deroofing group(1); 15 patients underwent open deroofing. In laparoscopic deroofing group, group(2); 11 patients underwent laparoscopic retroperitoneal deroofing , these patients were placed in the lateral flank position .

The incision of the 1<sup>st</sup> trocar (10mm) size is made below tip of 12<sup>th</sup> rib at the mid-axillary line at length of 1.5cm transverse incision. Using a blunt finger dissection (with index finger) a space is created anterior to the psoas muscle and outside Gerota´s fascia .

The working space in the retroperitoneum is created by modified balloon (similar to Gaur´s balloon) and inflation of about 800 ml of room air (35 pumps by sphygmomanometer bulb) .The balloon is removed and CO2 insufflation was made to create pneumoretroperitoneum up to 15 mmHg .Usually 2 secondary ports are inserted. During port placement , a care must be taken to avoid pleural, peritoneal, visceral or vascular injury. Ports must be placed in away to prevent clashing of trocars and instruments that might occur when the trocars were placed too close. A 2<sup>nd</sup> and 3<sup>rd</sup> trocars (5mm) are placed under laparoscopic vision, one along the anterior axillary line and the other was placed posterior to 1<sup>st</sup> trocar (placed in an angle between the 12<sup>th</sup> rib and lateral border of paraspinal muscles).

The wound was closed around the port using a silk suture to prevent gas leakage. The posterior portion of Gerota´s fascia was opened by laparoscopic dissector, then we dissected the perirenal fat to find the cyst. When the cyst had been located , we puncture the dome of the cyst by hook, grasping and incising the wall of the cyst, and the cyst is drained for decompression . Then the cyst wall was excised along the junction between the cyst and cortex. All specimens were sent for histopathological examination. The inner wall of the cyst was electro -cauterized, and the base of the cyst was carefully inspected for any suspicious lesions. Tube drain was left in situ.

## **RESULTS:**

Patients characteristics are listed in table [1,2]. There were no significant differences in age, gender, laterality, position, or preoperative size between 2 groups. Of 15 patients group (1) who underwent open deroofing(n=15), one case was recurred during the mean follow up period (11.8) months by US with resolution of symptoms for other cases. Mean blood loss was (83.6) ml (calculated by weighing of gauze and adding of contents of urine bag from tube drain to gauged bottle ). The mean hospital stay was (3.6) days, the mean operative time (excluding anesthetic time) was (57.7) minutes. Analgesic requirement was high frequent doses. The patients discharged with long wound , it´s length rated from 10cm to 20cm with disfigurement. There were 2 postoperative complications in different patients (wound infection in case number 4 and incisional hernia in case number 9). No fistula was seen.

In patients treated with laparoscopic retroperitoneal deroofing group(2)(n=11), one case was recurred during mean follow up period (14.09) months by US with resolution of symptoms for all other cases, mean blood loss was (82.7) ml . The mean hospital stay was (1.2) days, and the mean operative time (excluding anesthetic time) was (58.9) minutes. The analgesic requirement was low

doses. The patients discharged with 3 very small wounds, their lengths ranged from 1-1.5cm without disfigurement, Two cases were converted to open procedure due to anatomical difficulties(one case ; number 3 due excess fat led to difficult dissection and another case ; number 7 due to opening of peritoneum led to no progression in dissection)

Comparison of Perioperative criteria between the 2 groups are listed in table [3].

Table 1: patients criteria for 2 groups

Patient characteristics	Open deroofing n=15	Laparoscopic deroofing n=11	P- value
Age ( years)			
mean	50.867	46.636	0.367 NS
Standard Deviation	9.242	12.917	
cyst diameter ( cm )			
mean	11.8	9.1	0.077 NS
Standard Deviation	3.749	2.729	

Table 2: patients criteria for 2 groups

Patient characteristics	Open deroofing n=15 No(%)	Laparoscopic deroofing n=11 No(%)	P- value
Laterality			
right	7(46.67)	5(45.45)	0.777 NS
left	8(53.33)	6(54.55)	
position ( pole )			
lower	5(53.33)	3(20.73)	0.055 NS
middle or upper	10(66.67)	8(79.37)	
Gender			
male	9(60)	6(54.54)	0.474 NS
female	6(40)	5(45.45)	

Table 3: perioperative criteria for 2 groups

Parameters	Open deroofing n=15	Laparoscopic deroofing n=11	P- value	
Operative time ( min.)				
mean	57.733	58.909	0.860 NS	
Standard Deviation	14.557	19.175		
Blood loss ( ml )				
mean	83.667	82.727	0.935 NS	
Standard Deviation	31.308	26.397		
Hospital stay ( day )				
mean	3.6	1.273	0.000**	p≤0.01
Standard Deviation	0.632	0.467		
Follow up ( months)				
mean	11.8	14.091	0.201 NS	
Standard Deviation	3.876	4.678		
Post operative Complication				
Complicated No., (%)	2(19.36)	1(6.67)	0.019*	p≤0.05
Uncomplicated No., (%)	13(80.64)	10(93.33)		

## DISCUSSION

Management of renal cysts includes reassurance if they are asymptomatic and if they are symptomatic the treatment include conservative treatment, percutaneous aspiration with or without sclerotherapy, laparoscopic deroofing, and deroofing by open surgery<sup>(3)</sup>. Minimally invasive surgical techniques are more frequently used in treatment of various urological conditions. A previous trend for the treatment of SRC consist of percutaneous aspiration with or without instillation of a sclerosing agents, or of an open deroofing<sup>(22-24)</sup>.

Okeke, Hanna, Bean, and Ozgur in period between 1986-2003 mention the percutaneous aspiration with or without sclerosing agents associated with recurrence rates may reach up to 90% in case of aspiration alone and up to 78% if the aspiration is combined with sclerosing agents<sup>(25-27)</sup>.

Open surgery is now rare because of its invasiveness, and more complications regarding wound infections, incisional hernias, more pain, and more hospital staying with delayed convalescence period and disfiguring scar.

On the other hand, laparoscopic treatment is an attractive alternative to open deroofing with same effectiveness and less complications( regarding wound infection, hernias), better cosmeses, hospital staying, and early convalescence, the laparoscopic deroofing proved to be safe, reliable, and efficacious<sup>(16,25,28,29)</sup>.

The laparoscopic treatment was proposed as 1<sup>st</sup> line treatment in renal cyst more than 6cm in diameter as recommended by Rane<sup>(20)</sup> or more than 8cm in diameter as recommended by Gubta<sup>(30)</sup>. In the current study, the patients were randomly chosen (the least cyst size was 5.3cm).

In early 90s , retroperitoneoscopic approach was less popular than transperitoneal approach (due to smaller working space) but 1999, Keeley mentioned that the main advantages of retroperitoneoscopy over transperitoneoscopy are better exposure of renal hilum, avoidance of intraperitoneal organ injury, avoidance of paralytic ileus and confinement of postoperative hematoma and urinoma into retroperitoneum , but the main disadvantage is a relatively small working space and this may cause difficulty in mobilizing the kidney to enable complete deroofting of the cyst.

Retroperitoneoscopy can be performed by (a gaseous) technique with pneumoretroperitoneum or by( gasless) technique<sup>(20)</sup> as both of them are described by Ou Y-ch et al, we have adopted the gaseous pneumoretroperitoneum in our hospital as a safe surgical technique for 11 cases.

Many studies show efficacy, safety, and advantages of laparoscopic retroperitoneal deroofting. Yi- Hsiu Huang from Taipei, Taiwan(2007) compare cases underwent aspiration, open, laparoscopic deroofting and found better results with laparoscopic retroperitoneal deroofting. Abhay Rane from East Surrey hospital, UK(2004), He was evaluate 10 cases laparoscopy with 5 open surgical cases found the laparoscopic retroperitoneal deroofting of SRC is more effective with less complications<sup>(20)</sup>.

In current study, Despite of no difference between open and laparoscopic retroperitoneal deroofting regarding criteria which are mentioned in results (age, gender, position, laterality, size of the cyst) and expense of laparoscopic instruments, Our study explains advantages of laparoscopic retroperitoneal deroofting of SRC. Although the recurrence rate and operative time are comparable with open deroofting( $p \geq 0.05$ ) but with the advent of laparoscopic technique, 11 cysts were safely managed with less complications regarding length of wound and its related complications inform of infection and pain which needs less analgesia( $p \leq 0.05$ , significant) and short hospital staying( $p \leq 0.01$ , highly significant) , early convalescence period and small scars, and these results are similar to results of Rane's study . So, our aim is to decrease operative time (we think it is a matter of experience which is accumulated with the time), decreasing need for analgesia, avoidance of wound complications, shortening of hospitalization and early returning of daily activities.

In the current study also, 2 cases were converted from laparoscopy to open surgery due to anatomical difficulties (because of presence of excess retroperitoneal fat, difficulty in dissection and opening of peritoneum ) and primitive experience which necessitate prolonged operative time and risk of complications, that led to conversion. Our aim is to encourage laparoscopic working beginning with simplest cases.

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