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Laparoscopic Nephrectomy for a Giant Multi-cystic Kidney: Case Report and Review of Literatures

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ABSTRACT

Giant renal cysts (more than 15 centimeters) are extremely rare, and frequently mandates surgery due to pain, and possible development of complications, laparoscopic nephrectomy after being done for the first time in 1991, gradually gained acceptance as a sufficient and safe treatment modality for benign, inflammatory, and localized malignant renal pathologies, in this manuscript we present a case of a giant multi-cystic kidney that occupied nearly all the left side of the abdomen which we removed by laparoscopic approach.

KEYWORDS: Renal cysts, laparoscopic, nephrectomy.

INTRODUCTION

After being firstly described for Oncocytoma in 1990 by Clayman et al (1), laparoscopic radical nephrectomy was performed for the first time in Europe by Coptcoat et al in 1991 (2,3).

Gradually, the interest in this type of procedures has been grown as an effective treatment for benign (4,5), inflammatory (6), and even cases of localized renal cell carcinoma, carrying the well- known advantages of laparoscopic surgery like less post-operative pain, better wound outcome, faster return to normal activities, with no increase in the incidence of port site, or retro-peritoneal metastases in comparison to open nephrectomy (7,8).

Renal cysts are commonly reported in adults, with the condition becoming more common with advancing age (9), these cysts can be divided into small cysts which are less than five centimeters, and large which are more than five but less than fifteen centimeters, while the cyst of more than fifteen centimeters in diameter with serous fluid contents of more than 1500 milliliter are classified as the extremely rare giant renal cysts (10).

Small simple renal cysts are mostly asymptomatic, However, large cysts may cause dull pain, and may be complicated with infection, causing fever and abdominal pain, and also in some cases may progress to malignancy (11), so they mandate surgical intervention which is preferred to be done laparoscopically since the success of the first laparoscopic nephrectomy for a poly-cystic kidney in 1996 (12).

In this manuscript we present a challenging case of giant multi-cystic kidney that occupied most of the left side of the abdomen, extending from the diaphragm to the pelvis, for which we did laparoscopic nephrectomy.

CLINICAL PRESENTATION

A sixteen-year-old boy, presented with recurrent attacks of heaviness sensation and abdominal pain mainly in the left side of the abdomen with radiation towards the pelvis. His past medical, past surgical, and drug history was unremarkable. On examination, the general condition and the vital signs were normal. Abdominal examination showed moderate tenderness in the left upper quadrant and the left loin regions. Regarding investigations his complete blood count, C-reactive protein, and general urine examination readings were within normal limits. The ultrasound examination revealed severe Lt Side hydronephrosis with thinning of the parenchyma. CT scan of the abdomen and pelvis revealed that the left kidney was replaced by a large multiloculated cystic mass (Figure 1,2) which is about (20cm*15cm*30cm) occupying the left side of the abdomen extending from the left hypochondrium to the pelvic region, which indicated severe hydronephrosis . Dimercaptosuccinic acid (DMSA) scan was done and showed that the split function of the left kidney is zero% (Figure 3). So, we decided to do laparoscopic nephrectomy for this challenging case.

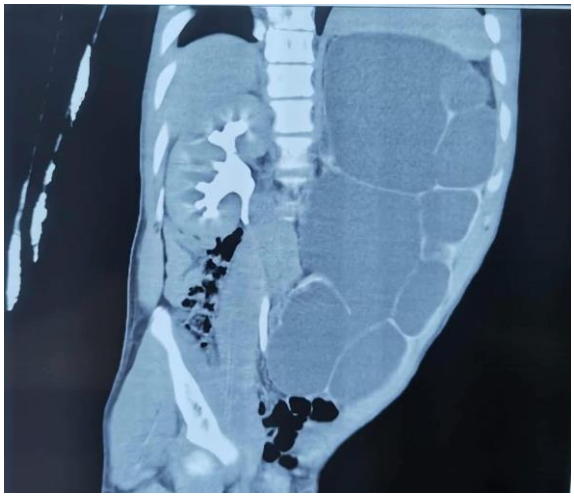
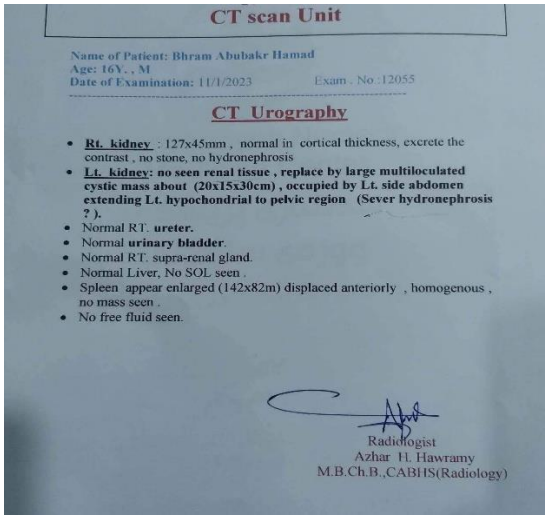


Figure 1: CT image of the giant kidney.



CT scan Unit

Name of Patient: Bhram Abubakr Hamad
Age: 16Y. , M
Date of Examination: 11/1/2023 Exam . No :12055

CT Urography

- **Rt. kidney** : 127x45mm , normal in cortical thickness, excrete the contrast , no stone, no hydronephrosis
- **Lt. kidney: no seen renal tissue , replace by large multiloculated cystic mass about (20x15x30cm) , occupied by Lt. side abdomen extending Lt. hypochondrial to pelvic region (Sever hydronephrosis ?).**
- Normal RT. **ureter.**
- Normal **urinary bladder**.
- Normal RT. supra-renal gland.
- Normal Liver, No SOL seen .
- Spleen appear enlarged (142x82m) displaced anteriorly , homogenous , no mass seen .
- No free fluid seen.

Radiologist
Azhar H. Hawramy
M.B.Ch.B.,CABHS(Radiology)

Figure 2 : CT Abdomen report.



Sulaimanyah Nuclear Medicine Center

Dear Colleague

Patient's name: *Bhram Aboobakr*

Date: *Jan 19, 2023*

Renal Cortical Imaging (DMSA Scan)

Procedure:

Three hours after IV injection of 4 mCi ^{99m}Tc-DMSA, imaging was performed in multiple projections.

Findings:

Left kidney shows globally decreased radiotracer uptake. Right kidney reveals normal distribution of tracer.

Interpretation:

- ***Normal DMSA scan of the right kidney.***
- ***Absent cortical functioning tissue of the left kidney.***

Split cortical function: Right = 100 % Left = 0%.

Sincerely yours

K. Kerwan, MD
Nuclear physician

Kosar Nuclear Medicine Center
Radiologist

M. Gharaei, MD
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HONOR 20 QUAD CAMERA

Figure 3: DMSA scan report.

PROCEDURE

The operation was done on January – 2023 as a team-work with Dr. Ali Al-Allaf (a specialist in urologic surgery) The patient was admitted to the hospital forty eight hours before surgery for the pre-operative checking and status optimization, two pints of compatible blood was prepared in case of intra or post-operative need , the operation was done under general anesthesia, we started by putting the patient in supine position, veress needle was introduced in the midline just below the umbilicus, aspiration was done which directly revealed a yellow colored fluid, so, the needle was immediately removed and then reintroduced to the right side of the umbilicus at the level of the mid-clavicular line, here aspiration revealed nothing, also irrigation and saline drop tests were done and all were normal.

Co2 insufflation was calibrated to 12mmHg, and after that we used the same site of the veress needle to place the 10mm camera port, then the other three ports were placed as follows: (1) 5mm port at the right midclavicular line 4cm below the costal margin. (2) 10mm port at mid-clavicular line 5cm below the 10mm (camera) port. (3) 5mm port at the midline 7cm below the umbilicus.

The port sites were decided intra-operatively after making sure that the kidney had crossed the midline, in addition to occupying most of the left side of the abdomen, extending from the spleen to the pelvis.

Careful dissection was undertaken to separate the kidney from the splenic flexure, descending colon, and part of the sigmoid colon.

Due to the huge size of the kidney, we faced difficulties in controlling it sufficiently, so, we did aspiration of the fluid contents which proved to be very beneficial.

After complete release of the upper and lower poles we turned to the hilum and here we faced multiple large vessels that needed careful dissection, clipping with the vascular clips, and division. This condition could be due to the increase of the size of the marginal branches of the renal vessels. After complete control of the renal vessels, we clipped and divided the ureter 5cm below the hilum, and then we did complete release of the kidney from the posterior abdominal wall.

Complete aspiration of the kidney contents was done, and we extracted the kidney by the use of sterile endobag through one of the 10mm ports sites after increasing the size to 20mm. meticulous hemostasis was regained, drain was placed at the left side of the abdomen, co2 deflation, closure of ports sites, and dressing were done respectively (Figure 4) .



Figure 4: Post-operative demonstrating the ports sites.

POST-OPERATIVE COURSE

The patient was vitally stable, the bowel sounds were positive ten hours post-operatively, and the patient reported mild pain sensation which was managed mostly by paracetamol tablet 500mg, with occasional need of oral ibuprofen 200mg tablets. The drain contents were serosanguinous fluids about 300 ml per day in the first two post-operatively, which changed to serous fluids in the third day that kept decrease in amount until we removed the drain in the seventh post-operative day, stiches were removed in the tenth post-operative day and the patient was discharged well.

DISCUSSION

The duration of laparoscopic nephrectomy was reported to be different according to the original pathology, so, due to huge volume, fibrosis, and adhesions to the adjacent structures it was reported that laparoscopic nephrectomy for poly-cystic kidney disease is about 6.3 hours in average (13), which is a longer time as compared to other studies that performed radical laparoscopic nephrectomy for other non-inflammatory causes who mentioned a time range between 2hours – 4hours: 30 minutes (8,14), which is still longer than the time needed for open nephrectomy, but keeping in mind the benefits of laparoscopic approach to the patient. In our case the duration of surgery was 3hours: 10 minutes, this time gain could be due to the early evacuation and aspiration of the kidney fluids that made the manipulation easier, in this particular move we made benefit from a previous study which reported that evacuation is associated with less operative time, less bleeding, less use of post-operative analgesia, and less incidence of post-operative incisional hernias (13). Regarding the approach we chose to operate trans-peritoneally, because in spite of that there is no significant difference between the two approaches (15,16), the trans-peritoneal approach provides a larger working space and better exposure than the retro-peritoneal approach (17), also it facilitates the separation of the kidney from the large bowel and other structures adherent to it. Our decision was supported by the fact that we did not have any contra-indication to operate trans-peritoneally like prior surgery adhesions, severe bowel distension, active peritonitis, untreated coagulopathy, or hypovolemic shock (3,18,19). For the vascular control we know that the hilar en-bloc stapling has been described (6), but due to the marked increase in size of the marginal vessels we did the individual ligation after careful dissection of each vessel separately. It is supposed that the cyst aspiration at time of nephrectomy may cause peritonitis due to spillage of the cyst's contents (20), and that the extensive dissection and the large raw area left after nephrectomy may cause post-operative ileus (21), thankfully we did not encounter these complications.

CONCLUSION

The laparoscopic approach may be suitable for giant cystic kidney removal, and could be done safely gaining all the known benefits of laparoscopic surgery. Ports sites could be manipulated according to the extension of the kidney which may cross the midline in some cases. Also, care should be taken in such cases as the marginal branches of the renal vessels may increase in size to the limit that they may resemble the main renal vessels.

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