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Research Article

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A Prospective Evaluation of Laparoscopic Management of Renal Hydatidosis: Our Experience

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ABSTRACT

Introduction: Hydatid cyst is a parasitic disease affecting various organs like liver, lungs, spleen or rarely kidneys, caused by the tapeworm *Echinococcus granulosus*. Its presentation may be atypical leading to diagnostic and management difficulties. A high index of suspicion for hydatid disease should be maintained while evaluating complex cystic renal masses. Accurate diagnosis of primary renal hydatid disease is difficult in spite of latest imaging modalities. With the technological advancements and increasing experience in laparoscopy, nowadays renal hydatid disease has been reported to be managed by transperitoneal and retroperitoneal laparoscopic approach.

Objective/Aim: To present a prospective evaluation of renal hydatidosis managed laparoscopically.

Material Methods: All 22 consecutive patients underwent laparoscopic management of renal hydatid disease from August 2019 to July 2021. Prior to surgery all patients were preoperative evaluated with CT urography. All patients operated with total laparoscopic transperitoneal route by standard three ports as for renal surgery. Patients demographic and perioperative data recorded prospectively and analysed. Outcome measures were demographic data, peri operative data, complications and follow up at 12 months.

Results: The mean operative time was 190.3 minutes and average blood loss was 180.4 ml in our study. There were 4 cases converted to open method in our study. There were 7 cases managed with cyst excision, 3 cases managed with cyst deroofing and marsupilisation, 9 cases required pericystectomy and 3 cases required nephrectomy as there was no salvageable parenchyma in our study.

Conclusion: Laparoscopic treatment of renal hydatid cyst is safe, feasible and effective due to its advantages to open surgery, if surgical expertise is available. It can minimize morbidity, as surgery is the treatment of choice.

Key Words: Cystic renal mass, *Echinococcus granulosus*, Hydatid cyst, Laparoscopy, Pericystectomy, Renal hydatidosis

INTRODUCTION

Hydatid disease is caused by a parasite, *Echinococcus granulosus* and is commonly found in South of America, Mediterranean and Indian subcontinent.[1] Human beings are accidental intermediate hosts. They become infected by handling soil, dirt or animal hair containing eggs of the parasite.[2] Echinococcosis is common in the liver and the lungs. The most common organs involved are liver, lungs and kidneys.[3] Kidney is affected in only 2-3% of cases. Unfiltered larvae from the liver traverse the pulmonary circulation to reach the kidney and give rise to primary renal hydatid disease. Clinical symptoms include chronic, dull aching flank pain, lower back discomfort due to mass effect of cyst, less commonly hydatiduria, ureteropelvic junction obstruction or rarely renal failure when both kidneys are affected.[4] Medical treatment includes albendazole alone or combined with praziquantel to sterilize the cysts.[5,6]

Surgical management options are cyst marsupialization, pericystectomy, and nephrectomy if cysts involve the entire kidney. Minimally invasive surgery can be beneficial in such patients in today's era.[7,8] A major challenge in treating large renal hydatid cysts is spillage of cyst contents during dissection. To decrease spillage, every attempt should be done to prevent cyst rupture during dissection. This is difficult due to large size of the cysts and dense pericystic and perirenal adhesions. In order to deliver the specimen intact, incision

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needs to be extended, thereby depriving the patient of the advantages of laparoscopy.

Although less case of renal involvement in hydatid disease are cited in the literature, there is lack of uniformity in approach due to scarcity of data; So we present a prospective evaluation of renal hydatidosis managed laparoscopically to increase knowledge of this unusual condition and outline the safety and efficacy of laparoscopic approach in the management of renal hydatid disease.

MATERIAL & METHODS

All 22 consecutive patients underwent laparoscopic management of renal hydatid disease from August 2019 to July 2021. Prior to surgery all patients were given oral albendazole 400 BD for 2 weeks and preoperative evaluation were done with CT urography and sonography. Hydatid serology & Casoni test were also done. All patients operated with total laparoscopic transperitoneal route by standard three ports as for renal surgery. The cyst was gradually mobilized all around without rupture and contents were aspirated after puncture. Before punctuation 10% betadine soaked guaze rolls were placed all around the cyst to prevent contamination after accidental spillage of content while aspiration. After aspiration the cavity of cyst was irrigated with 10% betadine to kill any residual daughter cysts. After excising the cyst roof, part of cyst wall communicating to pelvicalyceal system was found by injecting methylene blue via ureteric catheter and communication was closed. Patients were discharged inpost operative period after removing drain and catheter with tab albendazole for 2 weeks. Patients demographic and perioperative data recorded prospectively and analysed. Outcome measures were demographic data, peri operative data, complications and follow up at 12 months.

RESULTS

The mean operative time was 190.3 minutes and average blood loss was 180.4 ml in our study. There were 4 cases convertedto open method in our study. Mean renal hydatid cyst size was 6.2 cm in our study. There were 7 cases managed with cyst excision, 3 cases managed with cyst deroofing and marsupilisation, 9 cases required pericystectomy and 3 cases required nephrectomy as there was no salvageable parenchyma in 2 cases and in 1 case there was cyst which was involving hilum so it required to managed with nephrectomy in our study. Mean drain removal time, ureteric catheter removal time and mean catheter removal time were 1.5 day,2.1 day,3.3 day respectively in our study. Intra and post operative complications like blood transfusion 2 cases(9%),wound infection 5 cases(22%), atelectasis 2 cases(9%) and ileus 4 cases(22%) were noted in our study. Mean convalescence period was 1.48 weeks and no recurrence werefound onmean follow up of 12 months.

DISCUSSION

Kidney involvement by Echinococcus granulosus is extremely rare 2-3%.[9,10] Renal hydatid cysts usually remain asymptomatic for many years. The exact mechanism of how the hydatid embryo implants in kidney is unknown.[11] Intact hydatid cyst has three layers pericyst, ectocyst and endocyst. When there is no pericyst, it is considered to be an exposed cyst. A cyst is said to be open or communicating, if cyst is devoid of all three layers.

Gross hydatiduria is uncommon as it occurs only in few cases, but whenever present, it is a pathognomic feature of renal hydatid disease. Rupture of hydatid cyst into pelvicalyceal system leads to microscopic hydatiduria, though found only in 10-20% of cases. We found similarity in the 4 cases of our present study. In primary renal hydatidosis, serological tests are generally negative. Eosinophilia is noted in about 22% cases. There are various chemical tests available which are sensitive like Casoni test (90% sensitivity) and Ghedine-Weinberg test (80% sensitivity). However, because of lack of specificity they are not recommended routinely. [13,14] Likewise in one of our cases, the hydatid serology was negative but the histopathological report proved it to be hydatid disease. Plain X ray films are usually nonspecific and nonrevealing. With the advent of Ultrasonography, the diagnosis of hydatid disease by demonstrating daughter cysts and hydatid sand has become relatively easier. Characteristic feature of Hydatid disease is the presence of "falling snow flake pattern" which occurs due to shifting of hydatid sand on changing patient's posture. CT and MRI remain the mainstay of diagnosis of hydatid disease. CT scan delineates echinococcal cyst as a thin rim of calcification.(Figure 4) CT scan detects daughter cyst (Figure 1) with accuracy of 98%. CT depicts hydatid disease as a parent cyst which is expansile, hypo-attenuating mass having a well-defined wall and daughter cysts within. A wheel-like or rosette appearance with a central cystic part [30-40 HU], in contrast to the fluid in the surrounding cysts with much lower attenuation value [5-10 HU], is characteristic. (Figure 1,4) Magnetic resonance imaging reveals a solitary mass having multiple thin-walled lesions within, outlined by a thick and hypointense rim. However, MRI has no real advantage over T scan.[10] Treatment options of renal hydatid disease include medical management, percutaneous intervention, surgery including open and minimally invasive approach. Anthelminthic drugs like albendazole and mebendazole decrease volume and size of the cyst. The usefulness of medical treatment is limited because of serious side effects and low efficacy.[15-17] The efficacy of medical management in renal hydatid disease is doubtful, unlike its utility in treating hydatid disease of liver & lung. In our cases prophylac-

tic preoperative and postoperative Albendazole therapy was used against spillage risk. Percutaneous management has been reported in literature[18] Ultrasound-guided PAIR (puncture, aspiration, injection of scolicidal agent, re-aspiration) can be tried in cases of non-communicating renal hydatid cysts. Due to high risk of dissemination of daughter cysts and fatal anaphylaxis, this procedure is rarely performed.[18,19] Surgery remains the mainstay of management in renal hydatid disease. With the technological advancements and increasing experience in laparoscopy, nowadays it has been reported to be managed by transperitoneal and retroperitoneal laparoscopic approach.[20,21]

In laparoscopic approach, special precaution should be taken to prevent cyst rupture during dissection of the hydatid cyst. As there is risk of spillage and systemic dissemination, the anesthesia team should be well prepared with epinephrine and atropine in the event of anaphylaxis.[22] Use of scolicidal agents like silver nitrate(0.5%), cetrimide(10%), povidone-iodine(10%) or hypertonic saline solution(20%) is recommended for instillation in to the cyst cavity prior to exploration of cyst, and packing the surrounding area with the gauze pieces soaked with a forementioned solutions.[22] (Figure 2) We have use 10% povidone iodine solution in our cases. Superficial renal hydatid cysts can be managed by cystectomy or cystopericystectomy(Figure 3) as there is no involvement of renal parenchyma in these cases. Zmreliet al.[23] Kumar et al.[22] Bileu et al.[24] had described closed cyst pericystectomy, we have done the same in 9 patients of our study. Prabhudessai et al.[25] reported laparoscopic transperitoneal approach in which aspiration of the cyst is done, followed by deroofing of the cyst wall and cyst excision. A similar approach was followed in 10 of our cases.

However, in cases where in the cyst is located at one pole of the kidney or extends deep into the renal parenchyma, laparoscopic partial nephrectomy should be done to conserve parenchyma.[20-26] However, tissue preservation should be attempted as much as possible.[23] To cover huge defects left after excision of hydatid cyst, pedicled omentoplasty is used for reconstruction.[27] When whole kidney is replaced by the cyst total nephrectomy can be done.(Figure5) Laparoscopic transperitoneal nephrectomy can be performed for cases in which the kidney is totally replaced by hydatid cyst; In our study three patients required a nephrectomy. As laparoscopic approach provides better working space outside Gerota's fascia it is consider superior as it minimizes the chances of rupture[16] We chose laparoscopic transperitoneal approach in all our casesincluding nephrectomy. Shah et al.[21] had done uneventful laparoscopic transperitoneal nephrectomy for renal hydatid disease. However, retroperitoneoscopic approach by laparoscopy was also used for treating renal hydatid cysts in few case reports.[20,28,29]

CONCLUSION

Hydatid cyst may be kept as differential diagnosis for any cystic lesion in the abdomen. Laparoscopic treatment of renal hydatid cyst is safe, feasible and effective due to its advantages to open surgery, if surgical expertise is available. Prognosis remains good if patient is diagnosed and treated timely. Laparoscopy approach should be considered for all type of surgical management of renal hydatid disease to minimize morbidity, as surgery is the treatment of choice. Laparoscopic aspiration of the cyst and subsequent deroofing of the cyst wall may be the most appropriate management option, as maximum preservation of renal parenchyma can be done in this benign disorder.

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Conflict of Interest

Author declare no any conflict of interest.

Authors' Contribution

Dr. Hritik as laparoscopic surgeon and Dr Anup have worked starting from data compilation to patient operative management tremendously, we have together sincerely to fulfill this study work. It was team work and other staff support that made be possible.

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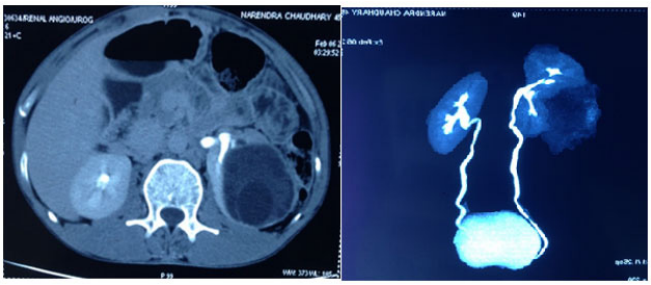

Figure 1: CT Urogram showing hydatid cyst over the lower pole of left kidney involving PCS.

Figure 2: Laparoscopic view showing junction between normal renal tissue and cyst (right), Controlled puncture and aspiration of the cyst with surroundings packed with 10% betadine-soaked Gauze(left).

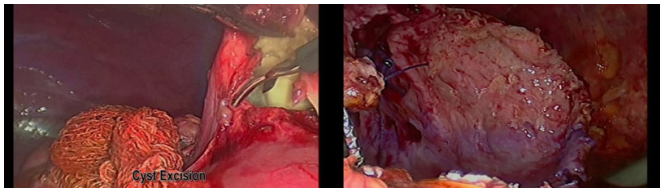

Figure 3: laparoscopic view showing cyst excision (right), bare area of the cyst showing repaired pelvicalyceal system which showed no leak after performing a leak test with methylene blue

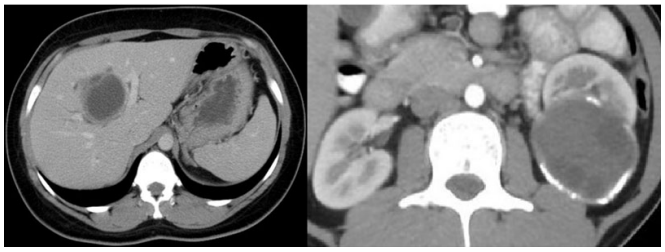

Figure-4: CT of Abdomen showing hydatid cyst of liver AND left renal hydatid cyst.

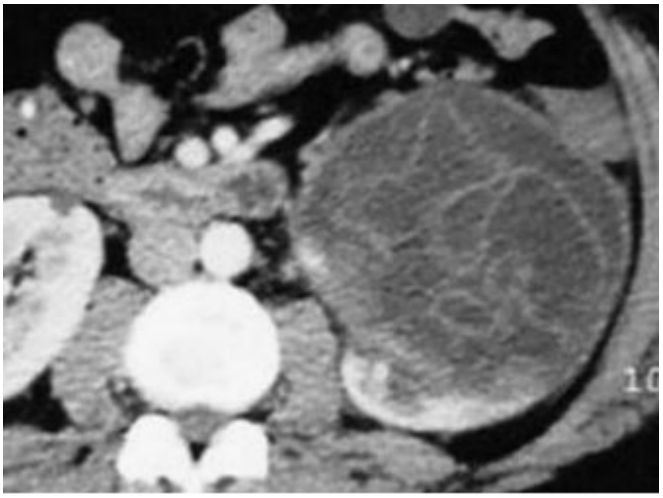

Figure 5: CTUrogram showing large left renal hydatid cyst with compromised parenchyma.