NEPHRON SPARING SURGERY IN RENAL HYDATIDOSIS: AN EXPERIENCESajad Ahmad Malik¹, Rouf Khawaja², Sahil³, M. Saleem Wani⁴, Arif Hameed⁵**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: CONTEXT: Cystic hydatid disease is a parasitic infestation caused by echinococcus granulosus and is endemic in India. Isolated renal echinococcal disease is uncommon. We present our experience with ten patients in our centre. **AIMS:** The purpose of this study was to evaluate the role of Nephron Sparing Surgery in Renal Hydatidosis. **SETTINGS AND DESIGN:** This was a retrospective study in which hospital records of patients with renal hydatidosis were reviewed. The presentation, diagnostic tests and therapeutic procedures performed were noted along with the complications there in. **RESULTS:** The disease can present in any age group and there is no sex predilection. Half of the patients were asymptomatic and the main complaint was flank pain. Majority had a solitary lesion. On imaging the cysts may appear multiloculated due to presence of daughter cysts. Immunological tests are not of much value because of low specificity. Partial Nephrectomy was performed in eight cases (80%) and Total Nephrectomy was performed in two cases (20%). Lumbar extraperitoneal approach was used in majority of cases. No significant complications were observed. **CONCLUSIONS:** The use of ultrasound examination has resulted in early diagnosis of renal hydatidosis and nephron sparing surgery is a feasible, safe and effective method of treatment.

KEYWORDS: Renal hydatid, Echinococcus, Nephron sparing surgery.

MESHTERMS: Renal hydatid, Echinococcus, Nephron sparing surgery.

INTRODUCTION: Cystic hydatid disease is a parasitic infestation caused by the larval form of echinococcus granulosus.¹ It is endemic in North Africa, Middle East, India and some parts of South America.^{2,3} Dogs are typically the definitive host but many herbivorous livestock animals called intermediate host contain parasites in their intestines and are also the sources for transmission to humans. Human are accidental hosts for Echinococcus and food contaminated by eggs of the parasites are key in transmission. After the entry of embryos (oncospheres) into the blood stream, the oncosphere can invade various organs and develop into a Hydatid Cyst. Kidney is the third most common organ involved after the liver (75%) and the lung (15%). The kidney is usually involved as a part of disseminated disease and isolated renal echinococcus is uncommon (2%).^{4,5} We present our experience with six patients who were diagnosed as Renal Hydatidosis and underwent nephron sparing surgery at our department during a period of five years.

MATERIALS AND METHODS: A total of ten cases with Renal Hydatidosis were hospitalized and treated between 2009 and 2014 at the Department of Urology, Sher I Kashmir Institute of Medical Sciences, Srinagar, Kashmir. This is an 800 bedded tertiary care institute also involved in undergraduate and postgraduate teaching. This was a retrospective study and the data was obtained from Hospital Records Department. The case records were reviewed, the diagnostic tests performed and therapeutic procedures performed were noted along with the complications there in.

The history and physical examination findings were noted. Investigations performed in all cases were complete blood count, serum biochemistry, urinalysis, the Casonis (skin intradermal

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test) and Weinberg (complement fixation test) tests, Indirect Hemagglutination Test and Immuno-electrophoresis.

Patients also underwent radiologic evaluation with plain x-ray, excretory urography (IVP), Ultrasonography and CT scan. All patients underwent surgery and renal hydatidosis was confirmed on pathological examination.

RESULTS: Patient age ranged from 20-72 years (mean age 39.5). No sex predominance was observed (male to female ratio 1:1). Out of 10 patients 8 lived in rural areas and were farmers, while two others had different occupations. Renal hydatid disease is rare in children, and no cases were seen below 20 years.

Almost 50% cases in our study were asymptomatic and were diagnosed with renal cyst when an ultrasound was done for some other complaints and were then referred to the Department of Urology. Of the other 50% the main symptom was flank pain which was seen in 3(30%) cases, two (20%) had a palpable mass, one (10%) also had hydatiduria.

On Imaging, the renal cyst was found to be on the left side in 7(70%) cases and on right side in 3(30%) cases. The lesion was more frequently solitary (80%). Maximum diameter of the lesion according to sonography or computerized tomography (CT) ranged from 2 to 18cm (mean 8.4cm). In one (10%) case extra renal hydatid was noted in liver.

None of our cases had calcification on plain abdominal radiographs. In 4 (40%) cases IVP revealed some degree of distortion of the upper tract, Caliectasis was seen in 2(20%) cases and non-functional cyst was seen in 1(10%) case.

In our series the cystic lesion was found to be multiloculated (40%) and daughter cysts could also be seen on ultrasound. CT in 6 cases (60%) showed a unilocular or multilocular cyst with a well-defined wall enhancing with contrast medium. Multilocular cysts with mixed density due to variable daughter cysts were useful diagnostic sign in 4 cases (40%). In one patient (10%) lesion appeared solid on CT due to secondary infection.

Eosinophilia was present in 6 cases (60%). In our series Casoni's test was performed in eight cases with positive results in only 40% cases. Indirect hemagglutination test was performed in six cases and was positive in 80% cases, suggesting a low sensitivity for hydatidosis for Casoni's test compared to Indirect Hemagglutination test. Counter Immuno-electrophoresis against "arc-5" was performed in 3 cases with positive result in all three.

In our series Partial Nephrectomy was performed in eight cases (80%) and Total Nephrectomy was performed in two cases (20%). A lumbar approach was used in nine cases (90%). Transperitoneal approach was used in one case (10%) for combined renal and hepatic surgery. Percutaneous puncture was performed for diagnostic purposes in two cases but no information was obtained.

Total nephrectomy was performed in two cases, one of these had fistulous opening with the pelvicalyceal system and significantly decreased renal function. In the other case the whole kidney was replaced with the cyst with absent renal function.

There were no significant intraoperative or post-operative complications except post-operative fever in one of the patients who underwent Total Nephrectomy. Broad spectrum antibiotics were given and the patient responded within 48 hours.

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One case that refused surgery despite hepatic and renal disease was excluded from review. Two cases were elderly with presumptive inactive disease followed for two years without evidence of progression.

Routine serological investigations, for example the complement fixation test, were not performed to document healing postoperatively.

DISCUSSION: Hydatid cyst is a parasitic infestations caused by the larval form of *ecinococcus granulosus*. The adult worm of *echinococcus granulosus* is present in the small intestine of dogs. Echinococcal eggs excreted in the feces of dogs are ingested by intermediate hosts. Humans are also intermediate hosts for echinococcal cysts. Infection occur by contact with dogs carrying embryonic eggs. Ingested eggs hatch in the duodenum, penetrate the intestinal mucosa and then enter the portal system.

The most affected organs are liver and lungs and renal involvement develops only in 2-4% of all cases. Most affected patients are between third and fourth decade of life and renal hydatidosis in children is rare.

There are no specific signs or symptoms but common urological presentation of renal hydatidosis is of chronic dull flank or low back discomfort from cystic pressure. It rarely presents as with hydatiduria, Ureteropelvic junction obstruction.

There is no serological or immunological tests pathognomic for hydatid disease.⁶ Eosinophilia was present in 6 cases (60%), but poor efficacy of eosinophilia is due to a high incidence of false positive results due to other parasitic infections.^{2,7} A skin test (casonis test) produces positive results in 20 to 50% of patients.^{4,8,9} In our series casonis test was performed in 8 patients with positive results in 40% had the lowest sensitivity for hydatidosis compared with indirect hemagglutination test.

Although indirect hemagglutination test has a higher false negative and false positive results due to cross reactivity with other parasitic infections.^{4,6} Positive results donot confirm the diagnosis. In our study it was performed in 6 patients and were interpreted as positive in 80%. Counter Immunelectrophoresis against "arc-5" was performed in three cases with positive result obtained in all three. In view of higher sensitivity and specificity we suggest that counter immune electrophoresis should be accepted as a better serological test for diagnosing hydatid disease in the future.

Radiological studies have more important place in the pre-op diagnosis of renal hydatid disease. On plain x-ray ring shaped or peripheral curvilinear calcification can be visualized. IVP reveals mostly distortion of calices or caliceal ectasia as a result of renal mass involving the collecting system. A nonfunctional kidney or a filling defect in the renal pelvis may rarely be evident on IVP. Ultrasound and CT scan are the usual investigations performed for the preoperative diagnosis of hydatid disease with higher specificity and sensitivity. Ultrasonography is usually the primary radiologic investigation with the advantages of cost effectiveness and noninvasiveness. Ultrasonography usually demonstrates the typical appearance of an echinococcal cyst.¹⁰ This cyst form may be unilocular or multilocular.^{4,10}

The determination of daughter cysts, which is characteristic of hydatid disease, is also possible on ultrasonography.¹⁰ However CT scan can more easily detect calcifications and daughter cysts, and it is more sensitive and accurate than ultrasonography.^{8,10,11} It also provides more detailed information about communication with the urinary tract and extrarenal disease.^{4,10} Magnetic resonance imaging has been performed in some studies but it has shown no advantage over CT Scan.¹²

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Retrograde pyelography may be helpful for showing the cyst and renal pelvis communication clearly. In our study we did not use retrograde pyelography for the diagnosis in any patient.

Treatment for renal echinococcosis is mainly surgical. Total or Partial Nephrectomy is the treatment of choice. Enucleation, marsupialization and cystectomy have been also described.⁴

A lumbar approach, in our opinion, should be used in patients with isolated renal hydatid disease to avoid disseminating the disease into peritoneal cavity. On the other hand transperitoneal approach should be used in cases with other organ involvement. In contrary to others, we do not believe that partial nephrectomy causes a risk of dissemination of disease. Thus, total nephrectomy was not offered as the preferred treatment in our cases. Preoperative albendazole therapy can be administered in cases suspicious for spillage. As scolecidal agents, 30% sodium chloride, 2% formalin, 1% iodine or 0.5% silver nitrate solutions can be used.¹¹ We prefer to use 10% betadine solution, and it has no irritative effects on the surgical team. The only complication observed was postoperative minor wound infection in one case.

Hydatid disease is a systemic disorder that affects many organs, such as the liver, lungs, brain and kidney. The anthelmintic agent albendazole can be used in patients with systemic disease but the overall success rate is about 25%.¹³ Except one case all our patients had only isolated renal hydatidosis. As only one of our patients had received systemic therapy and none had recurrence of disease, we believe that surgery alone is the best choice. Though some studies advocate using post-operative anthelmintic therapy with albendazole or mebendazole to prevent recurrence⁶ but there is inadequate data to support the effectiveness of these drugs. In addition, in such cases it should also be remembered that these drugs have many serious side effects, such as hepatotoxicity, abnormal liver function test results, leucopenia, allergic reactions¹.

The frequent use of ultrasound results in early detection of the cases and nephron sparing surgery is possible in a majority of these patients, as was possible in our series. As was the case in our series, recurrence has rarely been documented following nephron sparing surgery. Anaphylaxis and allergic reactions because of intraoperative spillage are possible in nephron sparing surgery but are very rare if intraoperative precautions are taken by placing betadine soaked gauze around the kidney during surgery. This treatment modality can be tried in patients who present with hydatiduria with good function on renogram. These patients can receive scoliceidal agents via ureteric catheter placed at the time of surgery but studies in future would clarify the usefulness of this technique in renal hydatidosis surgery.

CONCLUSION: Renal sparing surgery is a feasible, safe and effective method. This case series is unique as isolated renal hydatid is rare and there are few reports of renal sparing surgery being performed for it. Nephron sparing surgery was possible in these cases because all were diagnosed preoperatively but high index of suspicion is needed for preoperative diagnoses of renal hydatid disease, since this is difficult even in endemic areas.

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Fig. (a): CT demonstrates hydatid cyst of right kidney with mixed density

Fig. (b): Post-operative CT images after nephron sparing surgery.

Fig. (a)

Fig. (b)

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Fig. (c): CT reveals large hydatid cyst with daughter cysts.

Fig. (d): Hydatid cyst in liver and right kidney.

Fig. (c)

Fig. (d)

Fig. (e): CT demonstrates bladder hydatid cyst in pelvis.

Fig. (f): Nephrectomy specimen with daughter

Fig. (e)

Fig. (f)

Fig. (g): Ultrasound demonstrates hydatid cyst in right kidney.

Fig. (g)

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