

# “Nephrectomy unmasked: A nephrectomy case series through histopathology and hurdles”



Rupesh Bharatbhai Shah<sup>1\*</sup>, Priyank Rajeshkumar Shah<sup>2</sup>, Ketan Bhupatray Rajyaguru<sup>3</sup>, Akash Alpesh Shah<sup>4</sup>

<sup>1,2</sup>. Assistant professor,

Department of Urology, SVPIMSR, Smt. NHL Municipal Medical College, Ahmedabad, India

<sup>3</sup> Professor and Head

Department of Urology, SVPIMSR, Smt. NHL Municipal Medical College, Ahmedabad, India

<sup>4</sup>. Senior Resident,

Department of Urology, SVPIMSR, Smt. NHL Municipal Medical College, Ahmedabad, India

**\*Corresponding Author:** Rupesh Shah

\*Assistant professor, Department of Urology, SVPIMSR, Smt. NHL Municipal Medical College, Ahmedabad, India, 380006, Email: [drupesh.shah@gmail.com](mailto:drupesh.shah@gmail.com), ORCID: 0009-0001-5795-2438

## Abstract

**Introduction:** Nephrectomy remains a cornerstone procedure in the management of various renal pathologies, both benign and malignant. This case series emphasizes the unusual pathological entities and intraoperative complexities faced during nephrectomy. This case series aims to analyse the clinical indications, intraoperative findings, postoperative outcomes, and complications among patients who underwent nephrectomy at our hospital over the past 3 months.

**Materials and Methods:** We have done retrospective observational study of 15 patients who underwent nephrectomy for both benign and malignant conditions between June 1, 2025 and August 30, 2025 at Department of Urology – at our hospital. We had collected socio-demographics data, clinical details (presenting symptoms, Preoperative CT scan findings, site of disease), intraoperative findings (operative time, blood loss, surgical approach, intraoperative complications), postoperative complications, mean hospital stay duration and histopathology report. We have done follow up of patient for 3 months postoperatively.

**Results:** Among 15 patients (mean age-48.8 years), 9 patients (60%) underwent surgery for benign indication and 6 patients (40%) underwent surgery for malignant disease. A total of 8 patients (53.3%) underwent surgery with laparoscopic approach and 7 patients (46.7%) were underwent surgery with open approach (3 patients were converted to open surgery. Mean operative time was 160 minutes with average blood loss of 110 ml. Mean hospital stay was 4.2 days (range 3-9 days). Post operative wound infection was seen in 2 patients. We had discussed cases with xanthogranulomatous pyelonephritis, communicating ruptured hydatid cyst, mixed epithelial and stromal tumour, leiomyosarcoma of kidney, renal transitional cell carcinoma in nonfunctioning pyonephrotic kidney. We have managed two cases of duodenal perforation occurring intraoperatively during right nephrectomy

**Conclusion:** Even in the minimally invasive era, open nephrectomy retains a vital and irreplaceable role. In our experience, judicious and patient-centered decision of timely conversion to open surgery ensures safety, complete disease control and favourable perioperative outcomes. In the current era, open nephrectomy continues to complement minimally invasive approaches rather than compete with them.

**Keywords:** Nephrectomy, Duodenal perforation, Renal hydatid cyst

## Introduction

Nephrectomy, the surgical removal of a kidney, is performed for various renal disease like renal tumours (benign and malignant) and various inflammatory renal conditions like chronic pyelonephritis, pyonephrosis, xanthogranulomatous pyelonephritis (1). It represents complex urologic challenges due to various pathologic nature. Chronic inflammatory nature of disease-causing significant tissue adhesions and radical resection in malignant cases make surgery challenging (2,3). Although many nephrectomies were done in our department, we would like to highlight these cases due to unusual

pathology and intraoperative events. This case series aims to analyse the clinical indications, intraoperative findings, postoperative outcomes, and complications among patients who underwent nephrectomy at our tertiary care center over the past 3 months. The choice between open and laparoscopic approach depends on patient-specific factors, nature of disease, surgeon expertise and institutional preferences (4).

## Materials and Methods

We have done retrospective observational study of 15 patients who underwent nephrectomy with open

or laparoscopic approach for both benign and malignant conditions. We have included all patients who underwent nephrectomy between June 1, 2025 and August 30, 2025 at Department of Urology – at our hospital. We have excluded patients with incomplete medical records and 2 patients of partial nephrectomy. 1 patient, operated for distal pancreatectomy with right radical nephrectomy was also excluded. Data was obtained from hospital medical records, operation theatre registers, pathology reports, and follow-up opd visit. We had collected socio-demographics data, clinical details (presenting symptoms, Preoperative CT scan findings, site of disease), intraoperative findings (operative time, blood loss, surgical approach, intraoperative complications) and early (<2 weeks) and late (>2 weeks) postoperative complications, mean hospital stay duration and histopathology report. We have done follow up of patient for 3 months postoperatively. Data was entered into Microsoft Excel 2021 and analysed using SPSS version 25.

### Results

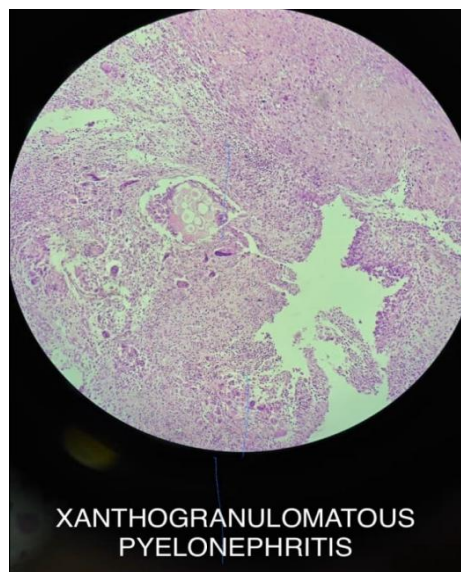
A total number of 15 patients were analysed retrospectively at our hospital. Among 15 patients, 9 were male and 6 were female with age range of 17 – 65 years (mean-48.8 years). Among them, 10 patients (66.6%) had loin pain as presenting symptom, 3 patients had fever, 1 patient had haematuria and 1 patient was asymptomatic. Total 9 patients (60%) underwent surgery for benign indication and 6 patients (40%) underwent surgery for malignant disease. Surgery was performed in 9 patients (60%) on right side and 6 patients (40%) on left side. A total of 8 patients (53.3%) underwent surgery with laparoscopic approach and 7 patients (46.7%) were underwent surgery with open approach. 3 patients were converted to open surgery from laparoscopic approach due to complexity of disease. Intraoperative duodenal perforation was occurred in 2 cases (13.3%) of right nephrectomy. Mean operative time was 160 minutes with average blood loss of 110 ml. Mean hospital stay was 4.2 days (range 3-9 days). Post operative wound infection was seen in 2 patients. 2 patients had intraoperative duodenal perforation.

### Discussion

Majority of nephrectomies were performed for inflammatory conditions in this study. In the era of minimally invasive surgical approach, almost half of the patients were managed with laparoscopic approach and remaining underwent surgery with open approach.

We encountered two instances of intraoperative duodenal perforation during right-sided nephrectomy, one of the patients was 63-year male with Xanthogranulomatous pyelonephritis (XGP) and other one was 20-year-old male with gross hydronephrotic kidney with PUJ obstruction with chronic pyelonephritis. The duodenum is at risk for injury during right renal procedures because Kocherization of the duodenum is necessary for exposure of the renal hilum. The reported incidence of bowel injury is approximately 0.2% during urological procedures (5). The pathogenesis of XGP is associated with 3 primary aetiological factors including nephrolithiasis, obstruction, and infection (6). In XGP, the kidney is densely adherent to surrounding structures including duodenum, colon, psoas which makes dissection difficult and increases risk of adjacent organ injury (7). During surgery if adhesiolysis is performed with careful countertraction on the bowel loops, mechanical shears and perforation can be avoided. In cases with dense adhesions where safe intraperitoneal laparoscopic or robotic dissection is not feasible, conversion to open surgery may be the most judicious approach to minimize the risk of complications. In case series of XGP by Kally et al (8), open approach was used in 10 patients out of total 11 patients.

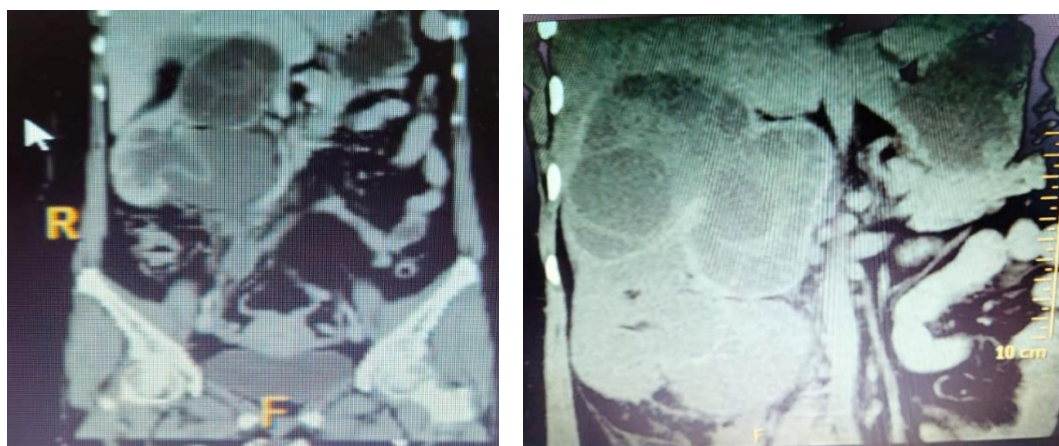
We had initiated nephrectomy in both cases with laparoscopic approach. In the case of xanthogranulomatous pyelonephritis, during laparoscopy we found that kidney was firmly adherent to bowel and psoas muscle, hence we have converted to open nephrectomy. Duodenum was firmly adherent to kidney, part of duodenum was almost invaginating into Gerota fascia, during sharp dissection between Gerota fascia and duodenum, single 5mm\*5mm duodenal perforation happened. We had done primary repair of duodenal perforation in 2 layers, inner layer full thickness interrupted with vicryl 3-0 and outer layer sero muscular interrupted with silk 3-0. In 2<sup>nd</sup> case with gross hydronephrosis, duodenum was firmly adherent to the renal hilum, during separation from hilum two, small duodenal perforations were noted. We have taken timely decision to convert to open approach in view of lack of expertise to repair duodenal perforation laparoscopically. After converting to open surgery, we had done primary closure of duodenal perforation same as previous case. In both the cases we had passed Ryles tube beyond perforation repair to maintain decompression and kept patient nil by mouth for 5 days. After 5 days liquids orally were started initially. Post operative recovery was uneventful in both patients and drain removed on post operative day 7 and discharged by post operative day 9.



**Figure 1: Histopathology of xanthogranulomatous pyelonephritis**

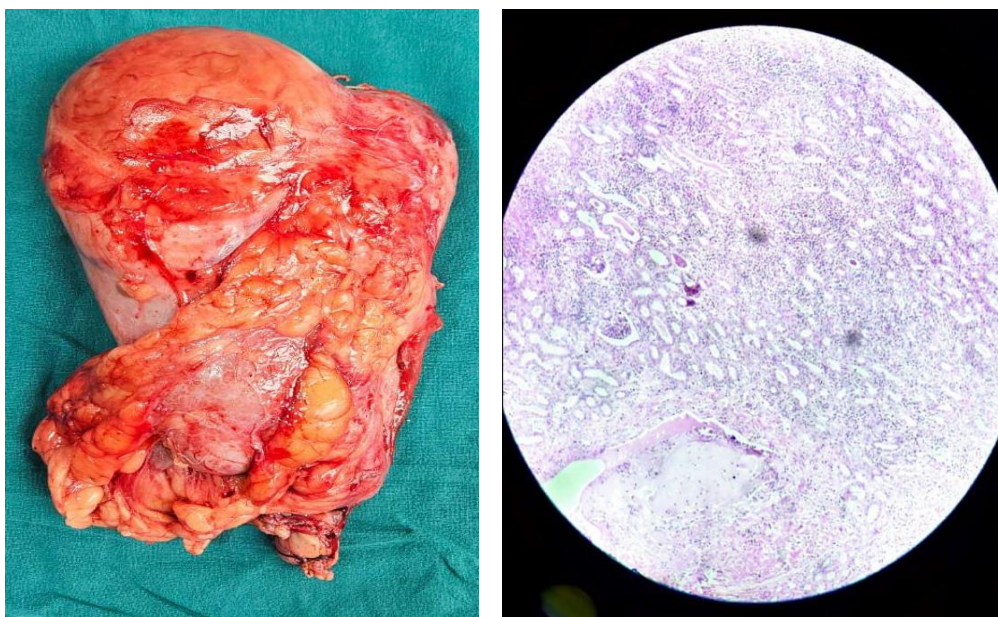
In 2 cases, we had performed nephroureterectomy. In one patient laparoscopic radical nephroureterectomy with bladder cuff excision was done for left lower ureter mass-poorly differentiated transitional cell carcinoma with left poorly functioning kidney. Other one was 33-year-old female with 10 x 11 x 11.5 cm right mid pole communicating ruptured hydatid cyst into pelvicalyceal system with gross hydronephrosis and hydroureter. Hydatid disease is a zoonotic parasitic infection caused by *Echinococcus granulosus*. The definitive hosts for this cestode are carnivorous animals such as dogs, wolves, and other canines, where the adult parasite resides in the small intestine. Humans become accidental intermediate hosts through ingestion of *E. granulosus* eggs, typically transmitted via consumption of contaminated food or water, or through direct contact with infected dogs or other intermediate hosts. (9). Medical therapy alone is generally

considered insufficient for the management of renal hydatid cysts. When used as standalone treatment, antiparasitic drugs have demonstrated limited efficacy, and their therapeutic effectiveness remains a subject of debate among clinicians (10,11). Although uncommon, the kidney represents the third most frequently involved organ in hydatid disease, accounting for approximately 2–3% of reported cases (12). Renal hydatid cysts are more commonly observed as part of disseminated echinococcosis, whereas isolated renal involvement is exceedingly uncommon. The condition lacks specific clinical manifestations, making diagnosis challenging. The presence of hydatiduria is considered pathognomonic and indicates a communicating cyst rupture into the collecting system (13). We have done open right nephroureterectomy. We had kept 3% NaCl hypertonic saline-soaked packs to prevent spillage. Post operative recovery was uneventful. On 3 months follow up there is no recurrence.



**Figure 2: CT scan of right renal communicating ruptured hydatid cyst**





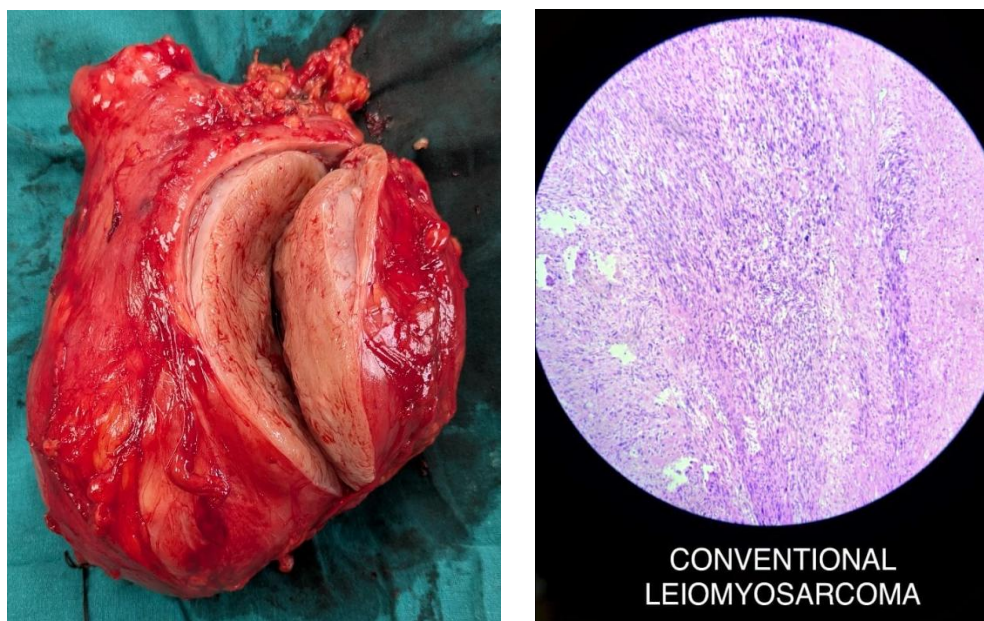
**Figure 3: Specimen of left nephrectomy with hydatid cyst (left) and histopathology of renal hydatid cyst (right)**

We had done laparoscopic right radical nephrectomy of 43-year-old female with 78\*71\*77 mm right mid pole multicystic mass. We had ensured complete removal of specimen without cyst rupture. Tumour was confirmed histopathologically as Mixed epithelial and stromal tumor (MEST). Mixed epithelial and stromal tumors (MEST) of the kidney are rare, typically benign neoplasms that occur predominantly in middle-aged women. They are usually discovered incidentally and most often present as solitary, unilateral, well-circumscribed cystic masses with multiple septations. On imaging, these lesions can closely resemble cystic variants of renal cell carcinoma, making preoperative differentiation challenging (14). They have excellent prognosis after complete excision with rare possibility of malignant transformation (15).

A 63-year-old female admitted with 13\*12.4\*17 cm left renal mass involving mid and lower pole. In view of very large renal tumor, anterior transperitoneal approach was chosen for left radical nephrectomy, this patient had round 450ml of blood loss during intraoperative period. 2 units of blood transfusion was done for the same. Final histopathology report was suggestive of leiomyosarcoma. Among primary renal sarcomas, leiomyosarcoma (LMS) represents approximately 50%–60% of cases. It demonstrates a clear female predominance and most commonly presents in individuals between the fourth and sixth decades of life. (16). aging findings may not reliably distinguish renal leiomyosarcomas from renal cell carcinomas in all cases, as both can exhibit overlapping radiologic features (17).



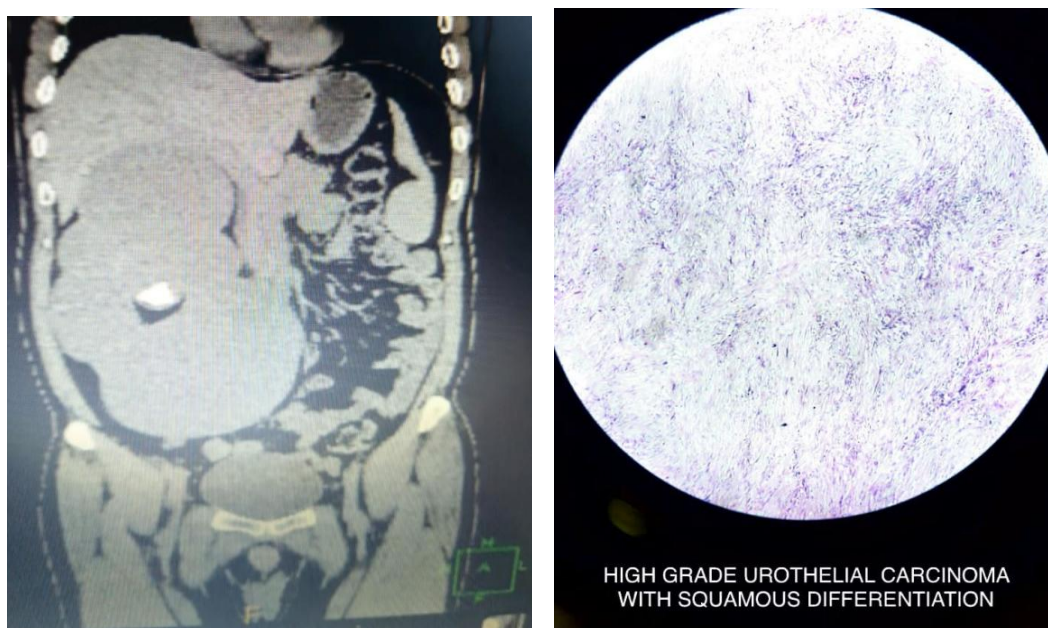
**Figure 4: CT scan of left renal leiomyosarcoma**



**Figure 5: specimen (left) and histopathology (right) of renal leiomyosarcoma**

A 48-year-old male patient presented with right loin pain. CT Intravenous urography (CT IVU) showed that 154\*111\*234 mm right gross hydronephrotic kidney with 31 mm right pelvi ureteric junction stone with left normal kidney. DTPA renal scan was suggestive of non-functioning right kidney. Initially percutaneous nephrostomy was done for decompression, but only 100 ml pus drained. We had planned laparoscopic nephrectomy. The operation was challenging for many reasons; first difficulty in establishing the pneumoperitoneum due to large kidney size. Hence, we had placed veress needle more

medially and inferiorly. Four laparoscopic ports were inserted, 10mm for the camera, one 10mm and two 5mm working ports. The second challenge we faced was the excessive adhesions with surrounding structure. The third challenge was the large surface area of the hugely hydronephrotic kidney which makes the handling of the kidney difficult in laparoscopic nephrectomy. Total of 3.5 liters of purulent fluid drained. Post operative recovery was eventful. Final histopathology report was suggestive of high-grade transitional cell carcinoma with sarcomatous differentiation.



**Figure 6: CT scan of Right hydronephrotic non functioning kidney with renal pelvis stone (left), Histopathology suggestive of High-grade urothelial carcinoma with squamous differentiation**



5 patients had chronic pyelonephritis with nonfunctioning kidney for which simple nephrectomy were performed, all had uneventful intraoperative and post operative period. 3 patients had renal tumors for which radical nephrectomy were performed, all had uneventful intraoperative and postoperative period. Out of 3 patients, 2 patients had grade 3 clear cell RCC and 1 patient had grade 2 clear cell RCC.

## Conclusion

- Even in the minimally invasive era, open nephrectomy retains a vital and irreplaceable role. In our experience, judicious and patient-centered decision of timely conversion to open surgery ensures safety, complete disease control and favourable perioperative outcomes. In the current era, open nephrectomy continues to complement minimally invasive approaches rather than compete with them.

## References

1. Peña PA, Torres-Castellanos L, Patiño G, Prada S, Villarraga LG, Fernández N. Minimally invasive nephrectomy for inflammatory renal disease. *Asian journal of urology*. 2020;7(4):345–50. <https://doi.org/10.1016/j.ajur.2019.09.002>.
2. Hemal AK, Mishra S. Retroperitoneoscopic nephrectomy for pyonephrotic nonfunctioning kidney. *Urology*. 2010;75(3):585–8. <https://doi.org/10.1016/j.urology.2008.07.054>.
3. Papadopoulou A, Campain N, Abu-Ghanem Y, Shanmugathas N, Poullas M, Mumtaz F, Barod R, Tran M, Bex A, Patki P. Not-so-simple nephrectomy: Comparative analysis of radical and simple nephrectomy in a high-volume tertiary referral center. *International journal of urology: official journal of the Japanese Urological Association*. 2024;31(2):160–8. <https://doi.org/10.1111/iju.15330>.
4. Alsmadi JK, Nofal MN, Alriyalat S, Yousef AJ. Laparoscopic vs. Open nephrectomy for inflammatory renal conditions: a meta-analysis emphasizing safety. *BMC Urol*. 2025 Apr 21;25(1):96. doi: 10.1186/s12894-025-01781-z. PMID: 40254599; PMCID: PMC12010633.
5. Wein AJ, Kavoussi LR, Partin AW, Peters CA, editors. *Campbell-Walsh-Wein Urology*. 13th ed. Philadelphia: Elsevier; 2025. Vol. 1, p. 299.
6. Gregg CR, Rogers TE, Munford RS. Xanthogranulomatous pyelonephritis. *Curr Clin Top Infect Dis*. 1999;19:287–304. PMID: 10472491.
7. Dawoud S, Solomon RJ, Eyerly-Webb SA, Abrahams NA, Pedraza F, Arenas JD, Hranjec T. Pyeloduodenal Fistula in Xanthogranulomatous Pyelonephritis: A Series of Two Cases. *Perm J*. 2018;22:17-150. doi: 10.7812/TPP/17-150. PMID: 30005725; PMCID: PMC6045498.
8. Kelly C, Anderson S, Looney A, Shannon N, Senaratne R, O'Connor E, Breen K, Lennon G, McGuire B, Murphy M, Moran D, Galvin D. Nephrectomy for xanthogranulomatous pyelonephritis-a not-so-simple solution. *Ir J Med Sci*. 2024 Apr;193(2):1055-1060. doi: 10.1007/s11845-023-03496-2. Epub 2023 Aug 23. PMID: 37610600; PMCID: PMC10961261.
9. Eckert J, Deplazes P. Biological, epidemiological, and clinical aspects of echinococcosis, a zoonosis of increasing concern. *Clin Microbiol Rev*. 2004 Jan;17(1):107-35. doi:10.1128/CMR.17.1.107-135. PMID: 14726458; PMCID: PMC321468
10. Göğüş, O, Bedük Y, Topukcu Z. Renal hydatid disease. *Br J Urol*. 1991; 68: 466-469.
11. Buckley RJ, Smith S, Herschorn S, Comisarow RH, Barkin M. Echinococcal disease of the kidney presenting as a renal filling defect. *J Urol*. 1985; 133: 660-661.
12. Moscatelli G, Moroni S, Freilij H, Salgueiro F, García Bournissen F, Altcheh J. A five-year-old child with renal hydatidosis. *Am J Trop Med Hyg*. 2013 Sep;89(3):554-6. doi: 10.4269/ajtmh.13-0243. Epub 2013 Jul 29. PMID: 23897992; PMCID: PMC3771299.
13. Mudholkar, Vishal G.; Suwarnkar, Suparna V.; Deshpande, Shubha A.; Kadam, Panjabrao N. Isolated renal hydatid disease with gross hydatiduria. *Indian Journal of Pathology and Microbiology* 54(3):p 640-641, Jul-Sep 2011. | DOI: 10.4103/0377-4929.85129
14. Domae K, Ichikawa Y, Kubooka M, Nagata M, Ishida M, Kitagawa K, Masui S, Hattori Y, Yoshio Y, Uchida K, Ogawa T, Sakuma H. Mixed epithelial and stromal tumor of the kidney with long-term imaging follow-up. *Radiol Case Rep*. 2023 Jun 30;18(9):3212-3217. doi: 10.1016/j.radcr.2023.06.044. PMID: 37448598; PMCID: PMC10336348.
15. Mohanty SK, Parwani AV. Mixed epithelial and stromal tumors of the kidney: an overview. *Arch Pathol Lab Med*. 2009;133(9):1483-1486. PMID: 19737388.
16. Ozturk H., "High-Grade Primary Renal Leiomyosarcoma," *International Brazilian Journal of Urology* 41, no. 2 (2015): 304–311, 10.1590/S1677-5538.IBJU.2015.02.17.
17. Dhawan S, Chopra P, Dhawan S. Primary renal leiomyosarcoma: a diagnostic challenge. *Urol Ann*. 2012 Jan-Apr;4(1):48-50. PMID: 22346103; PMCID: PMC3271452.