

# Robot Assisted Nephron-sparing Surgery for Renal Leiomyoma

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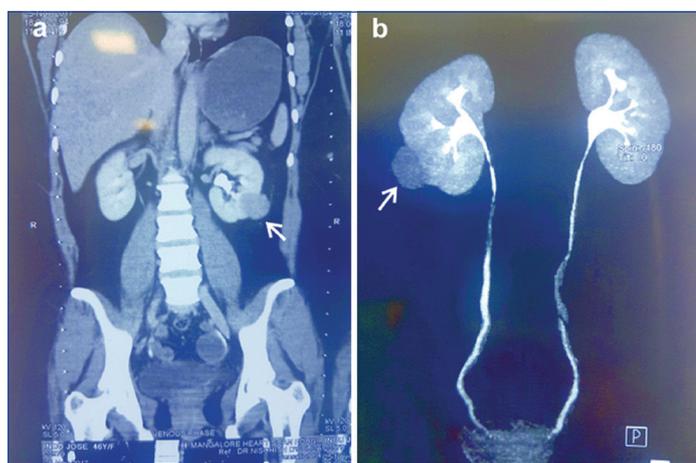
## ABSTRACT

Leiomyomas are benign mesenchymal tumour originating from muscle cell. Renal leiomyomas an unusual primary renal tumour of the kidneys originating from smooth muscle cell. Here, authors describe a rare case of renal leiomyoma in a 46-year-old female patient who presented with recurrent haematuria and flank pain. Authors report their first experience in robot-assisted nephron-sparing surgery for renal leiomyoma. Easier resection and suturing was a potential advantage of this approach. The patient improved after tumour removal and the prognosis is excellent without recurrence after six months postsurgically. Authors also discuss the summary of clinical features of renal leiomyomas.

**Keywords:** Muscle cell, Primary renal tumour, Resection

## CASE REPORT

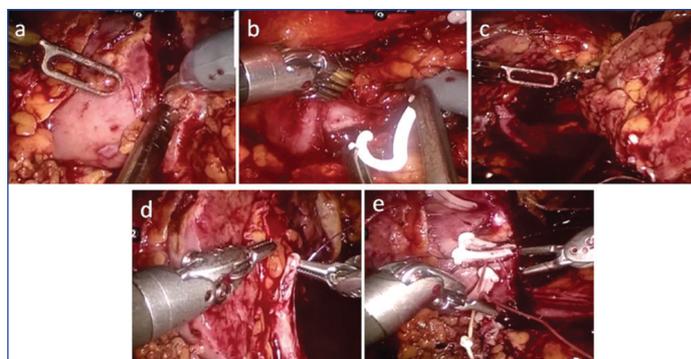
A 46-year-old woman presented to the Department of Urology with complaints of pain in left flank. The patient underwent a baseline assessment including a detailed medical history, physical examination, urinalysis, complete blood count, ultrasonography of abdomen and CT urogram. All routine blood investigation results were normal. Ultrasonography detected a mass in the left kidney 4 cm×3 cm occupying the posterolateral aspect of the lower pole of the left kidney. CT urogram demonstrated a more precise heterogeneously enhancing well circumscribed, predominantly exophytic mass lesion in posterolateral aspect of lower pole of the left kidney [Table/Fig-1a,b].



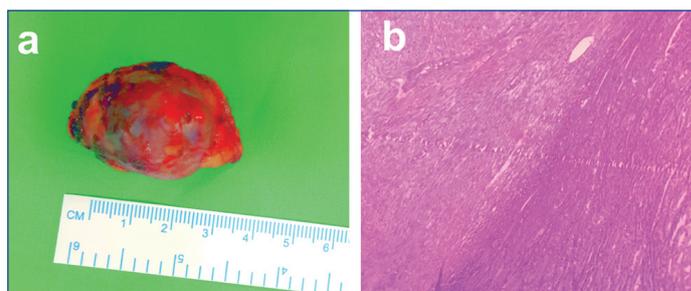
**[Table/Fig-1]:** (a and b) Contrast-enhanced CT scan showing well-defined, exophytic mass lesion in posterolateral aspect of lower pole of the left kidney (arrow).

The patient underwent left nephron-sparing surgery with assistance of the da Vinci robotic system [Table/Fig-2a-e]. This robotic set enabled the authors to perform surgery through a few small incisions. The main features include the 3D high definition view of patient's body. The total operation time was 90 minutes and the intraoperative blood loss was around 50 mL. The visual analogue score for pain was 2 (Visual analogue scale is a psychometric scale for response to severity of pain). Tramadol (50 mg) was required for one day. No intraoperative or postoperative complications were observed. Patient was discharged on third postoperative day.

Gross examination of the specimen demonstrated a 4 cm×3 cm globular tissue mass [Table/Fig-3a]. Outer surface was capsulated, soft glistening with fibrofatty tissue attached to one area. Cut surfaces revealed a well-circumscribed pale white area measuring



**[Table/Fig-2]:** Nephron-sparing surgery with assistance of the da Vinci robotic system: (a) Cutting the tumour with 5 mm of normal margin; (b) Clamping the segmental artery; (c) Tumour with normal parenchyma is seen on the right side; (d) Repair of the opened collecting system; (e) renorrhaphy stitch.



**[Table/Fig-3]:** (a) Renal leiomyoma gross appearance showing well circumscribed tumour; (b) Microscopic image reveals well circumscribed neoplasm composed of interlacing fascicles of fairly uniform spindle shaped cell.

2.7 cm×2.2 cm×1.5 cm, normal looking area measuring 0.5 cm seen. Microscopically, the tumour showed a circumscribed neoplasm composed of interlacing fascicles of fairly uniform spindle-shaped cell [Table/Fig-3b]. No mitotic figures were seen in the sections examined. Necrosis and haemorrhage were absent and many mast cells were seen. Morphological features and histological features were consistent with renal leiomyoma. The patient was followed-up for six months with abdominal CT which showed no signs of local recurrence and metastases.

## DISCUSSION

Here, authors report a case of renal leiomyoma in a female patient who underwent robot-assisted nephron-sparing surgery. Authors also discuss the summary of clinical and histological features of renal leiomyomas. Leiomyomas are benign mesenchymal tumour originating from muscle cell. Renal leiomyomas are one

such example and are classified into capsular, subcapsular or subpelvic type, which is originating from smooth muscle cells in the renal capsule, tunica media of the renal cortical vasculature or muscularis of the renal pelvis respectively [1] Advances in technology and modern analytical tools such as ultrasonography and CT scan have allowed early recognition of renal tumours. In the present case, contrast-enhanced CT showed a heterogeneously enhancing well circumscribed, predominantly exophytic mass lesion in posterolateral aspect of lower pole of the left kidney. The patient underwent left robot assisted nephron-sparing surgery and tumour was completely excised and histopathological examination confirmed the diagnosis of renal leiomyoma. Macroscopically renal leiomyoma is a well-defined, solid encapsulated mass and elastic consistency [2].

Robotic assisted surgeries are having advantage due to its significant improvements in visibility and manipulation compared to conventional laparoscopic surgery [3]. In addition, robot assisted surgeries are safe, feasible and have less perioperative complications compared to laparoscopic and open surgeries [4]. Moreover, robotic assisted surgeries have minimum blood loss, conversion rates are lower and less hospital stay. The major limitations of laparoscopic surgery are restricted range of motion of the laparoscopic instruments, and poor ergonomic positioning of the surgeon [5] Radical nephrectomy and kidney-sparing surgery are recommended treatments for large and smaller leiomyoma respectively [6]. Nephron-sparing surgery has high success rate and less operative morbidity and mortality rate [7]. For small size tumours, nephron-sparing surgery can be performed using robot assisted approach. This has potential advantages such as easier excision, suturing and less warm ischaemia time. In addition, lesser blood loss and shorter hospital stay. The indicates robotic assisted nephron-sparing surgeries performed in India and abroad. Robotic assisted nephron-sparing surgeries for renal leiomyoma are very less from India [Table/Fig-4] [8-14].

## CONCLUSION

Robot-assisted nephron-sparing surgery is a safe and potential approach for the management of small renal masses. However, care should be taken to rule out the associated recurrence and a long-term follow-up is recommended.

**Declaration of patient consent:** Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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Case series/Reference	Country	Outcome
Robot-assisted partial nephrectomy in renal masses over 4 cm [8]	France	Median warm ischemia time: 23 min (10-59). Median operation TIME: 180 min (110-425) Estimated blood loss: were:100 cc (0-2500) Median hospital length of stay: 5 days
Robotic-assisted transperitoneal nephron-sparing surgery (n=37) [9]	Italy	Mean warm ischemia time: 21.5 min Mean total procedure time: 149.2 min. Mean estimated blood loss: 187.1 mL. Mean hospital stay was 4.4 days.
Robotic nephron sparing surgery in cases of high renal nephrometry scores (n=18) [10]	India	Mean operative time: 73.61±52.66 min Mean estimated blood loss: 363.89±296.45 mL. Mean hospital length of stay: 5.39±1.91 days
Robotic-assisted laparoscopic partial nephrectomy (n=13) [11]	USA	The mean operative time was 215 minutes (range 130 to 262), and the mean blood loss was 170 mL (range 50 to 300). The mean warm ischemia was 22 minutes (range 15 to 29). The length of hospital stay averaged 4.3 days (range 2 to 7).
Robot-assisted Partial Nephrectomy (n=100) [12]	United States	Median tumour size was 2.8 cm (range, 1.0-8). Mean warm ischemia time was 25.5 minutes (range, 0-53).
Robotic assisted Partial Nephrectomy (n=48) [13]	United States	The mean operative time was 152 minutes. The mean warm ischemia times were 14 min. The estimated blood loss was 122 mL
Robot-Assisted Partial Nephrectomy [14]	USA	Mean tumour size was 2.87 cm. Mean total operative time was 210 min. Mean ischemic time was 23.9 min. Mean estimated blood loss was 131.5 mL.

**[Table/Fig-4]:** Robotic assisted nephron sparing surgery performed in India and other countries [8-14].

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**FINANCIAL OR OTHER COMPETING INTERESTS:** None.

Date of Submission: **Dec 30, 2018**  
Date of Peer Review: **Jan 29, 2019**  
Date of Acceptance: **Feb 22, 2019**  
Date of Publishing: **Apr 01, 2019**