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Evaluation of Robotic Simple Nephrectomy Outcomes Using the modified Clavien-Dindo Classification System

Sadia Laraib, Arif Ali, Ayesha Khan, Naresh Kumar Valecha, Abdul Mujeeb, Hassan Siddiqui

ABSTRACT

Objectives: To determine frequency and severity of post-op complications in patients undergoing robotic simple nephrectomy by using modified Clavien–Dindo classification.

Study Design and Setting: This longitudinal descriptive study conducted in the Department of Urological Surgery and Transplantation, Jinnah Postgraduate Medical Centre (JPMC), Karachi.

Methodology: This study was carried over a six-month (6) period. A total of 68 patients undergoing robot-assisted simple nephrectomy for benign, non-functioning kidneys were included through non-probability consecutive sampling. Sample size was calculated using OpenEpi, based on an expected postoperative complication rate of 16%, using 95% confidence and taking 5% margin of error, applying finite population correction. Postop complications occurring within 30 days or one month were graded according to the modified Clavien–Dindo classification. Data were analyzed using SPSS version 24.0. Associations were assessed using t-tests and chi-square tests, with a p-value less than <0.05 considered statistically significant.

Results: Among 68 patients, prolonged operative time was associated with increased intraoperative blood loss, higher overall complication rates, greater Clavien–Dindo grades, and the development of CKD (Chronic kidney disease) at follow-up. Higher body mass index was significantly related to prolonged hospital stay and delayed postoperative recovery. Surgical indication was also associated with increased bleeding and greater complication severity.

Conclusions: Prolonged operative time and higher body mass index were important predictors of postoperative morbidity following robot-assisted simple nephrectomy.

Keywords: Body Mass Index; Clavien–Dindo Classification; Nephrectomy; Postoperative Complications; Robotic Surgical Procedure

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INTRODUCTION

Robotic assisted nephrectomy has essentially changed and evolved how in urology surgeons approach nephrectomy, it offers minimally invasive alternative to more traditional open method. Compared to open surgery, robotic approach carries amazing clinically proven set of benefits which includes significantly reduced intraoperative blood loss, less post-operative pain, shorter hospital days, and faster than normal return to normal daily activities.[1?2] The use of robotic platforms in the operating theatre brings a lot of conveniences including 3D visualization, and effective tremor removal, each of which eventually contributes to improved operative precision and control.[3?4] These advantages eventually allow surgeons to navigate most complex anatomical dissections with confidence, with added benefits for positive peri-operative outcomes and patient overall safety.

Reported perioperative complication rates in robotic nephrectomy are 19.3% as compared to open 29.5% surgery, This reflecting a significantly lower risk is associated with the robotic approach (OR 0.53, p < 0.00001).5 In addition to these lower complication rates, robotic procedures have

positively shown to reduce average intraoperative blood loss by approximately 107 mL and effectively shorten the duration of hospital stay by nearly 2.8 days.5 These significant above mentioned findings highlight the potential of robotic surgery to decrease surgical morbidity while promoting enhanced post-op recovery.

Even though robotic nephrectomy have these advantages, It is not completely free from complications. Complications always occur with any surgical procedure, and robotic nephrectomy is no exception. Accurate and consistent complication reporting is therefore essential for evaluating surgical outcomes. We are using Clavien–Dindo classification which has become the most widely used grading system for postoperative complications.6?7 The classification categorizes complications based on the type of therapeutic intervention required, from Grade I (medical or minimal intervention or small deviations from the normal postop course not requiring significant intervention) to Grade V (death).8 By providing a structured and reproducible approach, the Clavien–Dindo system enhances transparency in surgical outcome reporting and will support evidence based evaluation of robotic nephrectomy side effects. Its use across different specialties of surgeries including urology, shows and speaks to its clinical value and broader applicability.??[1°] Multiple studies have shown to validate its reliability in both academic centers and community hospitals settings. A large multicenter study out of the United States looked at outcomes in over 886 patients who underwent robotic assisted nephrectomy. The overall complication came out to be 15.6%: intraoperative complications accounted for 2.6%, while postoperative 13%. Among the postoperative events, most of them, 77% fell under Clavien Grade I–II, meaning they were minor, remaining 23% were Grade III–IV and required either surgical, endoscopic, and/or radiological intervention. Notably, the series recorded no deaths.[11] These findings speak volume to the safety of robotic nephrectomy, but at the same time it highlights the importance of careful complication monitoring and consistent reporting.

That being said, published data specifically looking at Clavien–Dindo grading in robotic simple nephrectomy remains scarce. Most of the pre-existing literature has concentrated on robotic partial nephrectomy, radical nephrectomy, and/or nephroureterectomy, only few studies have directly addressed simple nephrectomy performed for benign, non-functioning kidneys secondary to PUJ or stone disease. Research from our department by systematically recording Clavien–Dindo Grades I–V in these patient populations would therefore contribute meaningful, institution-specific data to an otherwise sparse literature.

Such data will significantly help us identify risk factors, and benchmark our outcomes against international standards, and will help develop targeted preventive strategies. This research will help us get a better understanding of complications and their patterns and their severity would also strengthen preoperative counseling, perioperative planning, and will support more informed decision making between surgeon and patient.

METHODOLOGY:

This descriptive longitudinal study was conducted in Department of Urological Surgery and Transplantation (Ward 19), Jinnah Postgraduate Medical Centre, Karachi, over a six-month period. Before initiation of the study, we got IRB approval (No. F2.-81/2025-GENL/263/JPMC) from JPMC IRB and formally made sure all procedures conformed to the ethical principles laid down in the Declaration of Helsinki (2013 revision, which govern research involving human participants). Every patient was explained regarding the procedure and signed a written informed consent for study prior to enrollment. Each patient was explained the nature of the procedure, risks and benefits to expect, their right to withdraw at any point without any disruptions to their ongoing care, and informing them that their data that would be used will be annonymized. Enrollment ran from January 1, 2025 through June 1, 2025.

Sample size was calculated using online epidemiological tool OpenEpi, a widely used online epidemiological tool in clinical research settings. Our calculation drew on a reported postoperative complication rate of 16% from comparable tertiary care urology centres,[13?14] and we applied a 95% confidence level, a 5% margin of error, and finite population correction. Given that our institution handles roughly 100 eligible cases per year and we were collecting data over a 6-month window, this worked out to a final sample size of 68 patients.

We included patients aged 18 to 65 years male or female. All included patients had a non-functioning kidney attributable to benign causes: chronic pyelonephritis, pelviureteric junction obstruction, recurrent stone disease with significant parenchymal damage, or congenital renal dysplasia, and all were scheduled to undergo robotic simple nephrectomy.[13?14] Complete medical records with operative notes, postoperative documentation, and at least 30 days follow-up were required for inclusion. Patients were excluded if they had another surgical procedure done in the same sitting, such as contralateral renal or other abdominal surgery, as this could independently affect complication rates. Those with prior open renal surgery or transplantation were also excluded because of adhesions and altered anatomy. Patients with serious comorbidities: uncontrolled diabetes, significant cardiac disease, severe COPD, coagulopathy, or immunosuppression, were left out as these conditions affect healing and surgical risk.[15] Patients with missing records or lost to follow-up within 30 days were excluded from analysis. Data was collected prospectively using a pre-designed questionnaire made for this study, following the Declaration of Helsinki. Complications within 30 days were graded using the modified Clavien–Dindo classification.

Recorded variables included patient demographics like age, gender, BMI and past medical history; BMI was categorised according to World Health Organization (WHO) criteria: underweight (<18.5Êkg/m²), normal weight (18.5–2/4.9Êkg/m²), overweight (25.0–29.9Êkg/m²), and obese (=30.0Êkg/m²); operative details such as operative time, blood loss, conversion to open surgery and intraoperative events; and postoperative outcomes including hospital stay, time to return to daily activities, renal function at follow-up, and all complications with their Clavien–Dindo grades. Data was analysed on SPSS version 24.0. Descriptive statistics were used to summarise patient characteristics and outcomes. Continuous variables were given as mean ± SD or median with interquartile range depending on distribution. Categorical variables were reported as frequencies and percentages. Independent sample t-test was used for continuous variables and chi-square or Fisher's exact test for categorical ones, depending on expected cell counts. A p-value of less than 0.05 was considered significant, reflecting roughly a 5% chance of type I error. All tests were two-tailed. Complications were assessed at follow-up within one month of surgery and graded using the modified Clavien-Dindo system. (Table 1)

All patients had transperitoneal robot-assisted simple nephrectomy using the Da Vinci system. After general anaesthesia with endotracheal intubation, patients were placed in full lateral decubitus with the operative side up. Pressure points were padded and the table was flexed to open up the space between the costal margin and iliac crest. The pneumoperitoneum was created using a Veress needle at Palmer's point or an optical trocar (Visiport), maintaining intra-abdominal pressure somewhere between 12 and 15 mmHg throughout. Each case ran on a four-port setup. We placed the camera port lateral to the umbilicus and arranged three robotic working ports in an arc toward the upper quadrant; giving us the triangulation we needed. When the situation called for it, we dropped in an assistant port to handle suction, retraction, or clipping.

Once the robot was docked, white line of Toldt was divided and the colon was swept medially. the iliac vessels followed it upward, and carefully skeletonized it all the way to the hilum; we kept its blood supply intact right until point of division. From there, dissected the hilar vessels methodically. the renal artery and vein were ligated separately; for smaller vessels we used Hem-o-lok clips, and for larger ones we brought in vascular staplers the choice was made on case to case basis, ultimately came down to vessel size and what the operating surgeon was comfortable. Segmental or early branching vessels were handled the same way. The kidney was then freed all around by dividing lateral peritoneal attachments and working through the perirenal fat, keeping the adrenal gland in place unless there was a reason to remove it.Once the kidney was fully freed, the ureter was clipped and cut near the pelvic brim. The specimen was put in a retrieval bag and taken out through an extended assistant port incision or a Pfannenstiel incision. Haemostasis was checked after dropping the pneumoperitoneum pressure and going over the whole field. A drain was left in selectively, mainly in cases with heavy retroperitoneal dissection or any worry about lymphatic leak. Ports were taken out under vision to check for any bleeding. Fascia was closed at all sites 10 mm or larger to prevent herniation, and skin was closed with subcuticular absorbable sutures.[22]

RESULTS:

68 robotic nephrectomy cases were included in the analysis. To determine the complications in patients undergoing robot-assisted simple nephrectomy using the modified Clavien–Dindo classification. The Baseline patient and procedural characteristics were assessed using age, sex, BMI category, and indication for surgery. (Table 2) Bivariate analysis using the Pearson chi-square test and independent samples t-test revealed many statistically significant associations ($p < 0.05$). On independent samples t-test, mean operative time was significantly longer in patients who developed postoperative complications compared to those who did not (178.4 ± 28.6 min vs 138.2 ± 32.1 min; $t = 5.14$, $df = 66$, $p < 0.001$). Similarly, mean age was higher in the complication group, though this did not reach statistical significance (57.3 ± 11.8 years vs 53.9 ± 12.5 years; $t = 1.08$, $df = 66$, $p = 0.284$).

Longer operative time was strongly associated with increased intraop blood loss (÷², $p = 0.000$), higher overall postoperative complication rates (÷², $p = 0.017$), and greater complication grades as per the Clavien–Dindo classification (ordinal ÷², $p < 0.05$). On independent samples t-test, mean estimated blood loss was significantly higher among patients with operative time =180 minutes compared to those with shorter procedures (312.5 ± 84.3 mL vs 198.7 ± 61.2 mL; $t = 5.92$, $df = 66$, $p < 0.001$). Mean operative time was also significantly longer in patients who developed any postoperative complication compared to those without complications (178.4 ± 28.6 min vs 138.2 ± 32.1 min; $t = 5.14$, $df = 66$, $p < 0.001$). In addition, operative time was associated with the presence of chronic kidney disease at the last follow-up (÷², $p = 0.038$).

Higher BMI categories was significantly linked to prolonged hospital stay (÷², $p = 0.001$) and delayed return to normal activities (÷², $p = 0.001$). On independent samples t-test, obese patients had a significantly longer mean hospital stay compared to non-obese patients (5.8 ± 1.9 days vs 3.6 ± 1.2 days; $t = 5.63$, $df = 66$, $p < 0.001$). Mean time to return to daily activities was also significantly prolonged in the obese group (18.4 ± 4.7 days vs 12.1 ± 3.3 days; $t = 6.41$, $df = 66$, $p < 0.001$).

Surgical indication, as PUJ obstruction or stone disease, was associated with higher blood loss (÷², $p = 0.025$) and with more severe complication grades (÷², $p = 0.001$)

Table 1: Modified Clavien–Dindo Classification

Grade	Definition
Grade I	Minor deviation from normal postoperative course without need for pharmacological or procedural intervention
Grade II	Complications requiring pharmacological treatment, blood transfusion, or nutritional support
Grade IIIa	Complications requiring intervention without general anaesthesia
Grade IIIb	Complications requiring intervention under general anaesthesia
Grade IVa	Life-threatening complication involving single organ dysfunction requiring ICU care
Grade IVb	Multi-organ dysfunction requiring ICU care
Grade V	Death related to surgical complication

Table 2: Baseline Characteristics

Variable	**n (%)**
Age (Mean ± SD)	54.8 ± 12.3
<50 years	26 (38.2)
=50 years	42 (61.8)
Male	41 (60.3)
Female	27 (39.7)
Normal/Underweight	18 (26.5)
Overweight	31 (45.6)
Obese	19 (27.9)
PUJ obstruction/Stone	24 (35.3)
Operative time mean ± SD	145 ± 35

Table 3: Complications Based on Clavien-Dindo Classification (n = 68)

Clavien-Dindo Grade	**Number of Patients n (%)**	**Specific Complications**
Grade I	**4 (5.9%)**	
	2 (2.9%)	Ileus
	2 (2.9%)	Serous discharge in drain
Grade II	**11 (16.2%)**	
	6 (8.8%)	Fever
	3 (4.4%)	Wound Infection
	2 (2.9%)	Intra-op Hemorrhage
Grade IIIa	**3 (4.4%)**	
	2 (2.9%)	Port-site Abscess
	1 (1.5%)	Port-site Seroma
Grade IIIb	**1 (1.5%)**	
	1 (1.5%)	Bowel injury
Grade IVa	**0 (0%)**	
Grade IVb	**0 (0%)**	
Grade V	**0 (0%)**	
Total complications	**19 (27.9%)**	

Table 4 Comparison of Clavien-Dindo Complication Grades with Age Group, BMI Category, and Operative Time

Variable	**No Complications n=49**	**Complications n=19**
Age <50	20	6
Age =50	29	13
Male	30	11
Female	19	8
Normal BMI	16	2
Overweight	25	6
Obese	8	11
PUJ obstruction	18	6
Stone disease	31	13
Operative time <180 min	43	12
Operative time =180 min	6	7

Age category was also significantly related to intraoperative blood loss (÷², $p < 0.05$). On independent samples t-test, patients aged ?50 years had a significantly higher mean estimated blood loss compared to younger patients (248.3 ± 74.1 mL vs 186.5 ± 58.9 mL; $t = 3.47$, $df = 66$, $p = 0.001$). As this was unadjusted bivariate analysis, older age should be regarded as associated with, rather than an independent predictor of, intraoperative bleeding in this cohort.

DISCUSSION

Our findings demonstrate a clinically important and statistically significant association between prolonged operative time particularly procedures lasting =180 minutes and adverse perioperative outcomes in patients undergoing robotic simple nephrectomy. Patients with longer operative times showed significantly higher postoperative complication rates ($p = 0.049$), greater intraoperative blood loss ($p = 0.000$), higher Clavien–Dindo grades, and greater CKD incidence at follow-up ($p = 0.038$). On independent samples t-test, mean operative time was significantly longer in patients who developed postoperative complications compared to those who remained complication-free (178.4 ± 28.6 vs 138.2 ± 32.1 min; $t = 5.14$, $df = 66$, $p < 0.001$), and mean estimated blood loss was significantly greater in cases lasting =180 minutes (312.5 ± 84.3 vs 198.7 ± 61.2 mL; $t = 5.92$, $df = 66$, $p < 0.001$). These associations are consistent with published robotic nephrectomy literature, where operative duration consistently emerges as an important correlate of perioperative morbidity across diverse institutional settings.[15] Prolonged operative time likely reflects underlying surgical complexity rather than mere inefficiency — many such cases involve dense adhesions, chronic inflammatory scarring, distorted tissue planes, and vascular anatomical variations such as accessory or aberrant vessels, all of which increase operative difficulty and prolong dissection. Prolonged anaesthesia and extended pneumoperitoneum exposure may further contribute to physiological stress through cardiovascular strain, reduced pulmonary compliance, and systemic inflammatory changes, thereby increasing postoperative morbidity. Importantly, prolonged operative time should not automatically be interpreted as a marker of poor surgical technique; in many complex cases it reflects deliberate, meticulous dissection in technically demanding anatomy. Distinguishing careful surgical precision from inexperience is particularly relevant when comparing outcomes across low- and high-volume centres. Although robotic surgery may require somewhat longer operative times than conventional laparoscopy owing to docking, instrument exchanges, and setup, it continues to offer advantages in visualisation, precision, and reduced tissue trauma that overall support its perioperative safety profile.

Additionally prolonged anaesthesia together with extended pneumoperitoneum exposure may also additionally contribute towards physiological stress responses through cardiovascular effects respiratory compromise reduced pulmonary compliance and systemic inflammatory changes thereby increasing postoperative morbidity delayed recovery and poorer overall postoperative outcomes in some patients. These findings broadly aligns with already existing robotic nephrectomy literature where prolonged operative duration repeatedly and consistently emerges as an important predictor of adverse perioperative outcomes across multiple different patient populations institutions healthcare systems and surgical settings worldwide. Although robotic surgery may naturally require somewhat longer operating times when compared with conventional laparoscopic surgery mainly because of robotic docking instrument exchanges setup time and learning curve related factors robotic approaches still continue to provide several advantages including reduced blood loss improved precision enhanced three dimensional visualization and comparatively much less tissue trauma when compared with open surgery and traditional operative approaches.[15] Therefore prolonged operative time should not always and necessarily be interpreted as inefficiency or lack of surgical skill because in many difficult and complicated cases it may instead represent careful slow meticulous deliberate and cautious surgical dissection in technically demanding anatomically difficult and complex patients. Distinguishing deliberate careful surgical precision from surgeon inexperience therefore becomes particularly important when comparing outcomes between low volume and high volume centres hospitals and institutions.

BMI emerged as another significant correlate of postoperative morbidity. Obese patients demonstrated higher complication rates compared to those with normal BMI ($p = 0.002$). Higher BMI categories were also significantly associated with prolonged hospital stay ($p = 0.001$) and delayed return to normal activities ($p = 0.001$). On independent samples t-test, these differences were quantitatively pronounced: obese patients had a significantly longer mean hospital stay compared to non-obese patients (5.8 ± 1.9 vs 3.6 ± 1.2 days; $t = 5.63$, $df = 66$, $p < 0.001$), and their mean time to return to daily activities was similarly prolonged (18.4 ± 4.7 vs 12.1 ± 3.3 days; $t = 6.41$, $df = 66$, $p < 0.001$). From a technical standpoint, surgery in obese patients is considerably more demanding because of thicker abdominal walls, increased difficulty with trocar placement, a restricted operative field, and more challenging tissue dissection and visualisation. These technical difficulties frequently prolong operative duration and contribute to increased perioperative burden. Beyond operative factors, obesity is associated with impaired wound healing, reduced baseline mobility, metabolic syndrome, sleep apnoea, and altered pharmacokinetics of anaesthetic medications — all of which may collectively delay postoperative recovery and increase morbidity. These findings are broadly consistent with existing literature: while most studies report no significant increase in mortality among obese patients undergoing robotic nephrectomy, prolonged operative duration, modestly increased blood

loss, and longer hospital stay are consistently observed, particularly at BMI >35 kg/m².¹6?¹7 Patients with morbid obesity often require greater perioperative resources and experience slower recovery, although long-term functional outcomes remain generally comparable when surgery is completed successfully. Robotic assistance may partially offset technical challenges through superior visualisation and instrument dexterity, but does not eliminate the physiological limitations of obesity. These findings reinforce the importance of preoperative optimisation strategies — including weight reduction, nutritional assessment, metabolic workup, and enhanced recovery protocols — specifically for obese patients undergoing robotic nephrectomy. It should be noted that all associations in this study are unadjusted bivariate findings and should not be interpreted as evidence of independent predictive relationships without multivariable confirmation.

The association between prolonged operative time and CKD at follow-up ($p = 0.038$) is a finding that deserves further investigation in larger studies. Longer procedures may involve prolonged hilar manipulation, sustained renal traction, extended pneumoperitoneum exposure, and transient reductions in renal perfusion — all of which may negatively influence postoperative renal function and long-term kidney outcomes. However, renal outcomes after unilateral nephrectomy are multifactorial and influenced by numerous variables including baseline renal reserve, diabetes, hypertension, preoperative eGFR, fluid balance, nephrotoxic medication exposure, and duration of follow-up. This association should therefore be interpreted cautiously until validated using larger multivariable analyses that adequately control for these confounding factors.

Interestingly, age and gender did not show statistically significant associations with postoperative complication occurrence in our cohort ($p = 0.671$ and $p = 1.000$ respectively). Similarly, the indication for surgery whether PUJ obstruction or stone disease did not significantly influence overall complication rates ($p = 0.814$), although it remained associated with increased blood loss and greater complication severity in subgroup analysis. Most complications observed were minor Clavien–Dindo Grade I and II events, while major complications remained relatively uncommon, and no Grade IV or Grade V complications occurred in our study population. These findings support the acceptable safety profile of robotic simple nephrectomy in carefully selected and appropriately managed patients, and are consistent with the broader literature showing that robotic renal surgery carries a low rate of serious complications in experienced hands.

Across studies published between 2020 and 2025, our findings broadly mirror reports from high-volume international centres demonstrating that operative complexity and patient-related factors such as obesity remain central determinants of perioperative outcomes following robotic nephrectomy.¹8?¹? The consistency of these associations across different healthcare systems, institutional settings, and tertiary care hospitals strengthens confidence that these relationships are clinically meaningful rather than reflecting statistical chance alone. Nonetheless, all findings in this study are based on unadjusted bivariate analysis, and multivariable confirmation is required before any variable can be designated an independent predictor of outcomes.

Limitations of the study: First and foremost one of the the biggest limitation of this study is that the analysis we ran was unadjusted and exploratory. We did no multivariable modelling, which means it can not account for confounders that may have shaped our results. Several variables were not formally controlled: preoperative kidney function such as baseline eGFR and creatinine, warm ischaemia time during dissection, and surgeon experience and its known effects on speed and complication rates. Smoking history of patients, glycaemic control in diabetic patients, and use of anticoagulation use also did not get systematically captured. Without a properly adjusted model, we cannot say with any real confidence which variables are true independent predictors and which ones are just are associated along because they may happen to correlate with something else we never controlled or measured. This was a single centre study with only 68 patients. Single centre work carries known selection bias in how our patients get chosen, how the surgeons operate, and how the complications get spotted and recorded, none of which necessarily reflects what happens elsewhere. Small numbers also hurt and effects our ability to detect effect sizes, and subgroup become unreliable, particularly for severe and uncommon complications where event counts are very low.The study had no comparison arm. No laparoscopic group, no open nephrectomy group to hold our robotic assisted nephrectomy results up against. The robotic only design only let us look closely at these complications specific to this technique, but robotic vs laparoscopic vs open like head to head data comparing approaches will be far more useful for guiding and surgical planning. We recommend that future studies tackle these shortcomings. Multivariable logistic regression or similar adjusted modelling would help locate out independent risk factors. Multicentre designs with larger sample sizes will eventually improve both generalisability and statistical reliability. Prospective randomised comparisons between surgical approaches (Open vs lap vs robotic), where feasible, would strengthen the evidence further. Follow up should be extended well past 30 days to find late complications and and to test how long lasting functional outcomes actually are. Future researches built along these lines would put findings much firmer ground and give urological robotic surgeons something more pronounced and reliable.

CONCLUSION:

In conclusion, our study showed that robotic simple nephrectomy is generally a safe and effective procedure for

management of benign non-functioning kidneys, with most complications being minor according to the modified Clavien–Dindo classification. Major complications were relatively uncommon and no mortality was observed in our study population, which overall supports the acceptable safety profile of robotic surgery in experienced hands and tertiary care settings.[20] Our findings demonstrated that prolonged operative time and higher BMI were significantly associated with increased postoperative morbidity and delayed recovery. Patients with surgeries lasting =180 minutes had higher complication rates, greater blood loss, and more difficult postoperative course. Similarly, obese patients experienced more postoperative complications, prolonged hospital stay, and slower return to normal daily activities. These findings probably reflects the increased technical difficulty and physiological stress associated with prolonged surgery and obesity. Interestingly, age, gender, and surgical indication itself did not show significant association with overall complication occurrence in our cohort. Most of the complications observed were low grade and manageable conservatively, while severe complications remained fortunately rare. Overall, our results generally aligns with current international literature suggesting that operative complexity and patient related factors are important determinants of outcomes after robotic nephrectomy. Even though our study was limited by relatively small sample size and single centre design, it still provides useful local data regarding complication patterns following robotic simple nephrectomy.

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Authors Contribution:
Sadia Laraib: Data Collection, Analysis and Interpretation, Manuscript Drafting, Conceived Original Idea
Arif Ali: Critical Revision of the Manuscript, Data Interpretation and Manuscript Drafting.
Ayesha Khan: Critical Revision of the Manuscript, Data Collection and Input on Study Design
Naresh Kumar Valecha: Critical Revision of the Manuscript, Data Collection and Input on Study Design
Abdul Mujeeb: Supervision of Study, Input on Study Design, Critical Revision of Manuscript
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