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OUTCOMES OF NEPHRECTOMY APPROACHES: OPEN VS. LAPAROSCOPIC IN 156 PATIENTS A CROSS SESSIONAL STUDY

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Abstract:

Objectives

This study compares the outcomes of laparoscopic and open nephrectomy procedures at the Institute of Kidney Diseases, Hayatabad, focusing on operative details, complications, and patient outcomes.

Study Design: A Cross sessional study

Duration and Place of Study: Conducted between 05-March 2020 and 05-March 2021 at the Institute of Kidney Diseases, Hayatabad Peshawar, Pakistan

Materials and Methods

In this Cross sessional study, we analysis of 156 nephrectomy cases was performed between 05-March 2020 and 05-March 2021 at the Institute of Kidney Diseases, Hayatabad. Data on patient demographics, operative details, complications, and outcomes were collected from medical records. Statistical analysis was performed using SPSS Version 22, with comparisons made between laparoscopic and open nephrectomy groups. Chi-Square test and Student's t-test were utilized, with a significance level set at $p < 0.005$.

Results

The study included 156 nephrectomy cases, with 80 undergoing open nephrectomy and 76 laparoscopic nephrectomy. Laparoscopic nephrectomy demonstrated several advantages over open nephrectomy, including shorter operative time (125.4 vs. 145.2 minutes), reduced blood loss (54.75 vs. 359.24 ml), lower transfusion rates (11.04% vs. 52%), fewer postoperative complications (20.4% vs. 51.4%), shorter hospital stays (02.6 vs. 03.8 days), and superior pain control (06.8% vs. 96.4%). Additionally, laparoscopic nephrectomy resulted in smaller incisions and better cosmesis. No intraoperative complications were reported in the laparoscopic group, compared to two cases of minor inferior vena cava injury in the open group. The mean tumor size was smaller in the laparoscopic group (05.43 cm vs. 08.2 cm). Overall, laparoscopic nephrectomy demonstrated superior perioperative and postoperative outcomes compared to open nephrectomy, indicating its potential as the preferred approach for nephrectomy procedures.

Conclusion
Laparoscopic nephrectomy emerges as the preferred approach due to superior perioperative and postoperative postoperative outcomes compared to open nephrectomy. Increased training in laparoscopic surgery is recommended to align with global trends favoring minimally invasive techniques in nephrectomy procedures.

Keywords: Nephrectomy, Laparoscopic, Open, Outcomes.

INTRODUCTION:

Nephrectomy, the surgical removal of a kidney, remains a cornerstone in the management of various renal pathologies, including renal cell carcinoma, renal trauma, and non-functioning kidneys due to chronic diseases such as diabetes and hypertension(1). Over the years, advancements in surgical techniques have led to the development of minimally invasive approaches, notably laparoscopic nephrectomy, which offer potential advantages over traditional open surgery(2).Open nephrectomy has long been considered the standard surgical approach for nephrectomy, providing surgeons with direct access to the kidney and surrounding structures. However, it is associated with significant morbidity, including postoperative pain, prolonged hospital stays, and increased blood loss, leading to higher transfusion rates. Moreover, open nephrectomy often results in larger incisions, contributing to greater postoperative discomfort and delayed recovery(3).In contrast, laparoscopic nephrectomy has emerged as a viable alternative to open surgery, characterized by smaller incisions, reduced blood loss, and shorter hospital stays. With the aid of laparoscopic instruments and video-assisted technology, surgeons can perform nephrectomy with enhanced precision and visualization, potentially minimizing intraoperative complications and accelerating postoperative recovery(4).Several studies have compared the outcomes of open and laparoscopic nephrectomy, highlighting the advantages and disadvantages of each approach. For instance, a study by Gill et al. (2002) demonstrated that laparoscopic nephrectomy resulted in shorter hospital stays, reduced analgesic requirements, and faster return to normal activities compared to open surgery(5). Similarly, Fergany et al. (2000) reported comparable oncological outcomes between laparoscopic and open nephrectomy for renal cell carcinoma, emphasizing the feasibility and safety of the laparoscopic approach in oncological resection. Despite the growing body of evidence supporting laparoscopic nephrectomy, concerns persist regarding its technical complexity, steep learning curve, and potential for intraoperative complications(6). Moreover, certain patient populations, such as those with extensive adhesions or complex renal anatomy, may not be suitable candidates for laparoscopic surgery, necessitating a personalized approach to surgical decision-making (6). Given the evolving landscape of nephrectomy techniques and the need for evidence-based practice, the present study aims to provide a comprehensive analysis of open versus laparoscopic nephrectomy in a cohort of 156 cases. By evaluating various perioperative parameters, including operating time, blood loss, transfusion rates, postoperative complications, and hospital stay, we seek to elucidate the comparative effectiveness and safety of these two surgical approaches(7).Through a thorough examination of clinical outcomes and patient characteristics, this study endeavors to inform surgical decision-making and optimize patient care in the management of renal pathologies necessitating nephrectomy. By identifying the strengths and limitations of each approach, we aim to contribute to the ongoing dialogue surrounding surgical innovation and the pursuit of optimal outcomes for patients undergoing nephrectomy(8).

MATERIALS AND METHODS:

This retrospective study analyzed 156 cases of nephrectomy, comparing open (n=80) and laparoscopic (n=76) approaches. Data on patient demographics, surgical variables, perioperative outcomes, and postoperative complications were collected and analyzed. Statistical comparisons were performed using appropriate tests to assess differences between the two surgical techniques.

RESULTS:

Our research included 156 cases, 76 (47.2%) men and 82 (52.8%) women. The patients were 15–65 years old, with a mean age of 41.56. 82 (52.4%) got right-sided nephrectomies, whereas 74 (48.6%) had left-sided ones. Thirty (20.2%) had diabetes and sixty-two (40.6%) hypertension. Eighty patients received open nephrectomy (36 Simple and 46 Radical), whereas seventy-six got laparoscopic (30 Simple and 15 Radical). Open nephrectomy averaged 148.4 minutes (minimum 60 min, maximum 220 min) and laparoscopic averaged 125.4 minutes (64 min, 210 min) (p-value). Open and laparoscopic nephrephremas averaged 251.24 ml (48–728 ml) and 57.74 ml (12–290 ml) blood loss, respectively (p-value). Blood transfusion rate

Table 1: Patient Demographics and Characteristics

Variable	Total (n=156)	Open Nephrectomy (n=80)	Laparoscopic Nephrectomy (n=76)
Gender			
- Male (%)	76 (47.2%)	36	40
- Female (%)	82 (52.8%)	40	42
Age (years)			
- Mean (Range)	41.56 (15-65)	41.52 (20-35)	41.32 (25-65)
Laterality			
- Left-sided (%)	74 (48.6%)	40	34
- Right-sided (%)	82 (52.4%)	42	40
Comorbidities			
- Hypertension (%)	62 (40.6%)	30	32
- Diabetes Mellitus (%)	30 (20.2%)	15	15

Table 2: Surgical Characteristics

Variable	Open Nephrectomy (n=80)	Laparoscopic Nephrectomy (n=76)
Surgical Type	80	76
- Simple (%)	36	30
- Radical (%)	46	15
Operating Time (minutes)	148.4 (60-220)	125.4 (64-210)
Blood Loss (ml)	251.24 (48-728)	57.74 (12-290)
Blood Transfusion Rate (%)	54	11.6

Table 3: Postoperative Complications

Variable	Open Nephrectomy (n=80)	Laparoscopic Nephrectomy (n=76)
Complication Rate (%)	50.4	23.6
Postoperative Pain (%)	0.6	6.8
Fever (%)	60.6	25.6

Table 4: Hospital Stay and Tumor Size

Variable	Open Nephrectomy (n=80)	Laparoscopic Nephrectomy (n=76)
Hospital Stay (days)	4.6 (2-28)	2.6 (2-6)
Tumor Size (cm)	8.2 (3.4-15.6)	5.42 (4.0-8.0)

Table 5: Catheter and Drain Removal

Variable	Open Nephrectomy (n=80)	Laparoscopic Nephrectomy (n=76)
Catheter and Drain Removal (days)	2.32 (1-10)	1.12 (1-3)

DISCUSSION:

The study analyzed various perioperative parameters, including operating time, blood loss, transfusion rates, postoperative complications, hospital stay, tumor size, and catheter and drain removal(9). Previous research has extensively compared the outcomes of open and laparoscopic nephrectomy, providing valuable insights into the advantages and disadvantages of each approach. Gill et al. (2007) conducted a study comparing 1,800 laparoscopic and open partial nephrectomies and found that

laparoscopic nephrectomy was associated with shorter hospital stays and reduced analgesic requirements(10,11). This finding is consistent with our study, which demonstrated a shorter average hospital stay for laparoscopic nephrectomy (2.6 days) compared to open nephrectomy (4.6 days) (12). Similarly, Fergany et al. (2000) reported comparable oncological outcomes between laparoscopic and open nephrectomy for renal cell carcinoma, highlighting the feasibility and safety of the laparoscopic approach in oncological resection(13). the tumor size was smaller in laparoscopic cases (mean: 5.42cm) compared to open cases (mean: 8.2cm), suggesting that laparoscopic nephrectomy may be effective in managing smaller tumors. Regarding perioperative complications, our study revealed a significantly lower postoperative complication rate in the laparoscopic approach (23.6%) compared to the open approach (50.4%). This finding aligns with previous studies by Gill et al. (2007) and Fergany et al(14). (2000), which demonstrated lower complication rates in laparoscopic nephrectomy compared to open surgery. Blood loss and transfusion rates are important parameters to consider in nephrectomy procedures. Our study showed significantly lower blood loss and transfusion rates in laparoscopic nephrectomy compared to open nephrectomy(15). This is consistent with the findings of Gill et al. (2007), who reported reduced blood loss and transfusion requirements in laparoscopic partial nephrectomy compared to open surgery. Postoperative pain management is another crucial aspect of surgical outcomes. Our study demonstrated a higher incidence of postoperative pain in the laparoscopic approach (6.8%) compared to the open approach (0.6%)(16). This contrasts with the findings of Gill et al. (2007), who reported reduced analgesic requirements in laparoscopic nephrectomy. Further investigation is warranted to explore the factors contributing to postoperative pain in laparoscopic nephrectomy. Fever is a common postoperative complication following nephrectomy, often attributed to inflammatory responses or infectious etiologies(17). Our study revealed a higher incidence of postoperative fever in the open approach (60.6%) compared to the laparoscopic approach (25.6%). This finding suggests that laparoscopic nephrectomy may be associated with a lower risk of postoperative fever, possibly due to reduced tissue trauma and inflammatory responses. Catheter and drain removal are important milestones in the postoperative recovery process(18). Our study demonstrated earlier catheter and drain removal in the laparoscopic group compared to the open group, indicating a faster recovery trajectory in laparoscopic nephrectomy patients. This finding is consistent with the study by Gill et al. (2007), which reported shorter hospital stays and faster return to normal activities in laparoscopic nephrectomy patients.our study provides valuable insights into the comparative efficacy and safety of open versus laparoscopic nephrectomy. Consistent with previous research, laparoscopic nephrectomy was associated with shorter hospital stays, reduced blood loss, lower transfusion rates, and fewer postoperative complications compared to open nephrectomy. However, further studies are needed to elucidate the factors influencing postoperative pain and fever in laparoscopic nephrectomy(19). Overall, laparoscopic nephrectomy appears to be a promising alternative to open surgery, offering potential benefits in terms of surgical outcomes and patient recovery.

CONCLUSION:

our study highlights the favorable outcomes of laparoscopic nephrectomy compared to open surgery, including shorter hospital stays, reduced blood loss, and lower complication rates. These findings support the preference for laparoscopic techniques in nephrectomy, contributing to improved patient care and recovery.

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