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ORIGINAL ARTICLE

Laparoscopic vs Open Radical Nephrectomy for Renal tumors in resource limited countries.

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ABSTRACT… Objectives: To evaluate the perioperative efficacy of laparoscopic radical nephrectomy in comparison with open radical nephrectomy for the management of localized (T1bN0M0) renal cell tumor of less than 7cm. **Study Design:** Prospective, Comparative study. **Setting:** Armed force Institute of Urology (AFIU). **Period:** July 2020 – July 2024. **Methods:** 90 patients (mean age: 56 ± 2.5) with clinical stage T1bN0M0 renal cell carcinoma were treated using two different approaches i.e., laparoscopic radical nephrectomy in Group-I patients and Open radical nephrectomy in Group-II. The choice of the approach was non randomized and it was depended on patient preference and surgeon experience. **Results:** Mean age of the patients and mean tumor size was comparable in both groups. To assess the efficacy of both techniques, perioperative outcomes that include estimated blood loss, operative time, length of hospital stay, need of post-operative analgesics and convalesce time were compared. Patients in Group-I showed greater operative time but less estimated blood loss, shorter hospital stay, less need of analgesics and early recovery to normal activities compared to patients in group-II. Follow up of 18 months in each group showed no cancer specific mortality or local recurrence. **Conclusion:** Laparoscopic radical nephrectomy for clinical stage T1bN0M0 renal carcinoma is associated with better perioperative results and is more effective as compared to open radical nephrectomy approach.

Key words: Laparoscopic Radical Nephrectomy, Localized Renal Cell Tumor, Open Radical Nephrectomy.

INTRODUCTION

Renal cell tumor also called renal adenocarcinoma is one of the most commonly occurring type of malignancy, accountable for 90-95% kidney neoplasms in adults.[1] It developed in the proximal renal tubules that make filtration system of the kidneys. It is more common in males than females with ratio of 1.5:1. Its incidences markedly increase between the age of 60-70.[2]

Up to date, Radical nephrectomy is considered the only possible cure for renal cancers, because they show resistance to radiotherapy and chemotherapy treatments.[3] Roson[4] was the first who popularized the use open radical nephrectomy for treatment of kidney neoplasms in 1968, which afterward became the standard surgical treatment procedure, until 1991, when Clayman[5] magnificently introduced laparoscopic nephrectomy. Shortly, Laparoscopic radical nephrectomy became globally accepted as a gold standard for the treatment of localized renal tumors. Although its role in management of widely spread renal tumors or in cases where tumor sizes is >10cm is still debatable.

In many past literature studies[6,7,8], LRN has shown comparable oncological outcomes to open radical nephrectomy. However, the current study, aims to evaluate the clinical effectiveness of laparoscopic radical nephrectomy compared to open radical nephrectomy at different pre-operative and post-operative parameters.

METHODS

This prospective study was conducted over a period of 4 years (July 2020 – July 2024) in the department of Urology at Armed force Institute of Urology (AFIU) after ethical approval from the research board (Uro-Trg-1/IRB/2025/01).

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Informed consents were taken from all the patients.

A convenience sample of 90 patients were taken. The inclusion and exclusion criteria are described as follows:

Inclusion Criteria:

- Well localized Renal cell tumor.
- All patients with clinical stage T1bN0M0.
- Tumor size range is greater than 4cm but < 7cm.

Exclusion Criteria:

- Tumor thrombi involving renal veins or inferior vena cava.
- Regional lymph nodes involvement.
- Distant metastasis to liver or bones present.

Total of 90 patients (58 males, 32 females) with clinical stage T1bN0M0 were included in the study. Depending on surgeon and patient's preference, we have non randomly divided the patients into two groups, with 45 patients in each group.

Group -I :(n=45) includes patients treated by laparoscopic radical nephrectomy.

Group-II :(n=45) includes patients treated by using open radical nephrectomy approach.

TNM staging was done according to 2002 cancer TNM staging system. Computer based pre and pos-operative data including operating time, estimated blood loss, time of hospital stay, post-operative analgesic requirement and time required to return to normal activities, of all these patients were collected and evaluated.

RESULTS

Mean age (years) of the patients in the study was 56 ± 2.5. On comparison, perioperative results were significantly different between two groups. (Table-I).

Group-I shows significantly longer operative time (220 vs 160 min) with significantly shorter hospital stay (48 vs 96 hrs.) and convalescence time (5 vs 10 days) compared to group-II.

Moreover, Group-I also shows less estimated blood loss (150 vs 450 ml) and less need of post-operative analgesic compared to Group-II. (Table-I)

Clinical Parameters	Group-I LRN	Group-II ORN
Operative time (min)	180-220	130-160
Estimated blood loss (ml)	100-150	300-450
Length of hospital stay	24-48 hrs.	72-96 hrs.
Requirement of analgesics (Tramadol HCL)	IV for 24 hrs. followed by oral analgesics.	IV for 3-4 days followed by oral analgesics.
Convalescence time	5 days	10 days

Table-I. Showing comparison of different perioperative outcomes in both groups.

DISCUSSION

Renal cell carcinoma is one of the most commonly diagnosed malignancy in the kidneys.[3] Depending upon the stage and extension of the tumor different treatment options are available. For well localized renal cell carcinoma of stage I-II surgical removal of early lesion is the potentially curable therapy.[2,3] Radical nephrectomy is done as a primary treatment for the removal of localized renal cell tumor. It can be done by using both open or laparoscopic approach.

Laparoscopic radical nephrectomy being less invasive option available to patients is most widely used approach.[9] Multiple researches[6,10,11,12] in the past have already proven equivalent oncological outcomes of both approaches. Present study was carried out to compare the perioperative efficacy of both techniques in the management of renal cell tumor of 4-7cm.

In our study, there was no statistically difference in the size of tumor in each group. Mean tumor size was 5.3± 1.5cm. possibly because of small cohort sample and distinct inclusive and exclusive criteria. Thus, increasing the validity of the study.

Peri-operative results of the study showed LRN group associated with greater operative time (Table-I) compared to ORN, this is probably because it is technically demanding procedure and depend upon surgeon's experience and dexterity. Similar findings were observed in other studies conducted by Hemal and Dun et al.[13,14]

LRN group shows superior peri-operative results i.e., significantly less estimated blood loss, less need of postoperative pain management and decreased length of hospital stay and convalescence time. Studies conducted by McDougall et al.[15] and Ono et al.[16] also showed similar results.

In summary, with both approaches, successful removal of the tumor can be accomplished but LRN have proven to be superior in terms of all the perioperative parameters except for longer operative time which however, can be compensated with relatively shorter period of hospital stay and early recovery. Moreover, LRN also provide additional benefits of better wound healing, less patient discomfort and is relatively less invasive. Follow up was done for up to 18 months, there were no significant difference noted for cancer specific mortality and local recurrence between both groups.

Further studies need to be conducted with relatively greater sample size and randomized double blinded experiments to obtain high quality evidence-based outcomes.

CONCLUSION

Laparoscopic radical nephrectomy approach can be stated as a gold standard treatment modality for the patients of localized renal carcinoma because of significantly superior perioperative benefits compared to open nephrectomy technique.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Musab Umair Khalid:** The acquisition analysis, interpretation of data for the work.
2	**Khubaib Shahzad:** Substantial contribution to conception, design of the work.
3	**Badar Murtaza:** Drafting of the work, revising it critically for important intellectual content.
4	**Muhammad Nouman Khan:** Final approval of the version to be published.
5	**Eram Shahzadi:** Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy.
6	**Aneela Shabbir:** Integrity of any part of the work are appropriately investigated and resolved.