

## LONG TERM OUTCOME OF LAPAROSCOPIC RADICAL NEPHRECTOMY FOR PATHOLOGICAL T1, T2 RENAL CELL CANCER AT VIET DUC HOSPITAL

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### ABSTRACT

**Background:** To evaluation of the long term outcome of laparoscopic radical nephrectomy for pathological T1, T2 renal cell cancer at Viet Duc Hospital. **Methods:** We retrospectively identified 73 patients who underwent RN between 2015 and 2022. We divided patients into three groups based on tumour size: <4 cm, 4– 7 cm, >7 cm. Clinical and paraclinical characteristics include age, gender, back pain, tumor size, tumor location, disease stage on computed tomography scans, histopathological results, postoperative outcomes and complications, postoperative survival time, and accumulated survival time. **Results:** the average age was  $53.52 \pm 12.17$  years. CT scans classified renal cell carcinoma stages preoperatively according to IUAC 2009: 53.4% were stage T1a, 42.4% were stage T1b, 2.8% were stage T2a, and 1.4% were stage T2b, 2 patients experienced infection at the trocar site used for kidney extraction, 4 patients developed postoperative fever, and 1 patient had postoperative bleeding requiring a blood transfusion. One patient underwent emergency open surgery immediately after discharge due to bleeding through the drainage. The postoperative complication rate according to the Clavien-Dindo classification was 11% (8 patients). The results show that 63 patients are still alive, 5 patients have passed away due to the disease, and 5 patients have died from other causes such as traffic accidents, cardiovascular diseases, and

cerebral vascular accidents. The average follow-up time is  $46.7 \pm 26.5$  months. The cumulative survival rates at 3, 4, 5, 6, and 7 years after radical nephrectomy for the treatment of renal cell carcinoma were 100%, 97.6%, 94.8%, 90.9%, and 83.3%, respectively. The average additional survival time after surgery was  $84.11 \pm 1.80$  months. **Conclusions:** Laparoscopic radical nephrectomy for early-stage renal cell carcinoma (T1 and T2) demonstrates high surgical safety and absolute efficacy in oncology.

**Keyword:** *Laparoscopy radical nephrectomy, tumour size*

### I. INTRODUCTION

Renal cell carcinoma is a malignant lesion of the kidney, with renal cell carcinoma (RCC) accounting for 90% of cases, internationally known as Renal Cell Carcinoma (RCC), representing 2-3% of all cancer cases<sup>1,2</sup>. Along with the overall development of various medical fields, minimally invasive surgery is increasingly applied in the treatment of renal cell carcinoma, including laparoscopic surgery after comprehensive evaluation, laparoscopic and 3D laparoscopic surgery, and robotic surgery. Viet Duc Hospital has employed laparoscopic surgery for the treatment of renal cell carcinoma, both transabdominally and after comprehensive evaluation. However, there are not many studies assessing the results of laparoscopic surgery after comprehensive evaluation in the treatment of renal cell carcinoma. There are various options for treating early-stage renal cell carcinoma, but complete nephrectomy seems to be the best choice for patients of

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**Date of receipt:** 25/9/2023

**Date of scientific judgment:** 30/10/2023

**Reviewed date:** 6/11/2023

any age due to the excellent prognosis. Therefore, we conducted a study titled: "Long term outcome of laparoscopic radical nephrectomy for pathological T1, T2 renal cell cancer at Viet Duc Hospital."

II. PATIENTS ANH METHOD

**Selection criteria:** 73 patients were diagnosed with renal tumors and underwent total nephrectomy through a laparoscopic transperitoneal approach at Viet Duc Hospital. The selection criteria were based on the diagnosis of renal tumors PT1 PT2 without regional lymph node metastasis and without distant metastasis (as determined by computed tomography images and postoperative pathological results). The function of the contralateral kidney was assessed using normal renal scintigraphy images

Exclusion criteria: **pt3a, 3b, kidney unique, CKD**

**Research Methods:**

Research design: Retrospective study (retrospective from January 2015 to June 2022

Study sample size: convenient sample size, data collected through electronic medical records and reports stored in Viet Duc Hospital.

Research variables: Clinical and paraclinical characteristics include age, gender, back pain, tumor size, tumor location, disease stage on computed tomography scans, histopathological results, postoperative outcomes and complications, postoperative survival time, and accumulated survival time

III. RESULTS

**Table 1. Some Clinical and Paraclinical Characteristics:**

<b>Pathological Feature</b>	<b>Percentage</b>
Age	53.53 ± 13.64 (23-84)
Gender (Male/Female)	49%/41%
Back Pain	62.5%
Tumor Size / CT Scan	
- <4cm	52%
- 4-7cm	46.6%
- >7cm	1.4%
Tumor Location	
- Upper Pole	42.1%
- Lower Pole	36.8%
- Middle	21.1%
Disease Stage	
- pT1a	53.4%
- pT1b	42.4%
- pT2a	2.8%
- pT2b	1.4%
Histopathological Result	
- Clear Cell	86.4%
- Tubular Pattern	8.2%
- Chromophobe	2.7%
- Other	2.7%

**Table 2. Complications according to Clavien - Dindo classification**

Clavien	Postoperative Complications	Number of Patients
Grade I	Surgical site infection	2 (2.7%)
	Fever	4 (5.5%)
Grade II	Postoperative bleeding	1 (1.4%)
Grade III	Reoperation	1 (1.4%)
Total		8 (11%)

Comment: After surgery, 2 patients experienced infection at the trocar site used for kidney extraction, 4 patients developed postoperative fever, and 1 patient had postoperative bleeding requiring a blood transfusion. One patient underwent emergency open surgery immediately after discharge due to bleeding through the drainage. The postoperative complication rate according to the Clavien-Dindo classification was 11% (8 patients).

**Table 3. Survival time after Surgery**

Index	Number	Percentage
Died from the disease	5	6.8%
Died from other causes	5	6.8%
Survived	63	86.4%
Mean Follow-up Time	-	46.7±26.5 months

Comment: Among the 73 cases meeting the criteria, we conducted follow-up communication with patients and their families. The results show that 63 patients are still alive, 5 patients have passed away due to the disease, and 5 patients have died from other causes such as traffic accidents, cardiovascular diseases, and cerebral vascular accidents. The average follow-up time is 46.7±26.5 months.

**Table 4. Analysis of survival Time after Surgery**

Survival Analysis	3 years	4 years	5 years	6 years	7 years
Cumulative Survival Rate (%)	100	97.6	94.8	90.9	83.3
Mean Additional Survival Time (months)	-	-	84.11 ± 1.80 months	-	-

Comment: The cumulative survival rates at 3, 4, 5, 6, and 7 years after radical nephrectomy for the treatment of renal cell carcinoma were 100%, 97.6%, 94.8%, 90.9%, and 83.3%, respectively. The average additional survival time after surgery was 84.11 ± 1.80 months.

IV. DISCUSSION:

In our study, the average age was 53.52 ± 12.17 years. The youngest patient was 20 years old, while the oldest was 84 years old. The most common age groups were 40-60 years and 60-80 years, accounting for 57.9% and 38.4%, respectively. We observed that for radical nephrectomy surgeries, similar results were reported by other authors. Cicco and colleagues in France (2001) conducted a study on 50 patients with a mean age of

61.31 for radical nephrectomy by laparoscopy. Hwang G Jeon<sup>2</sup> retrospectively identified 1371 patients who underwent RN between 1995 and 2010 with the age 54.7 ± 11.4. Nguyễn Minh Tuấn<sup>3</sup> nephronsparing surgery for renal cell cancer is selected almost routinely for cases of T1a renal cell carcinoma at the age of 54.9 ± 12.1 years old (29 - 76 years old). In our study, the male-to-female ratio was 1.43. Other authors, such as Pyo<sup>4</sup>, studied partial nephrectomy by

laparoscopy in 110 patients with a mean age of  $62 \pm 10.8$  years. According to Sobey<sup>5</sup>, the mean age was 61.1 years, including some patients aged 24 and 25. In the case of partial nephrectomy for 30 cases of renal cancer, the mean age was  $47.27 \pm 14.42$  years. We believe that radical nephrectomy at any stage is highly effective for treating renal cell carcinoma (RCC). Patients can be reassured that the surgery completely removes the cancer, leading to improved quality of life, especially in patients of working age. For patients over 60 years old, partial nephrectomy may be considered, as after the age of 50, the kidneys tend to become sclerotic, and removing one kidney may increase the risk of renal insufficiency. Furthermore, in our study, patients were in stages T1-T2 with early-phase tumors of moderate size. The size of the tumor is an important factor in making strategic decisions for the partial nephrectomy. According to Hwang G Jeon<sup>2</sup> small tumour size is associated with CKD after RN. Partial nephrectomy should be considered in patients with tumour size 7 cm or less. In the study by N.M Tuấn<sup>3</sup>, the average size of the tumor is  $25.7 \pm 0.7$  mm (12 - 44 mm). Lê Xuân Thanh's<sup>9</sup> research in 2019 shows that the average size of the tumor is  $34.3 \pm 10.3$  mm (10–60 mm). Preservation of the kidney during tumor biopsy is indicated in renal tissue tumors. Nowadays, many authors agree that partial nephrectomy can be performed in patients with a solitary malignant tumor, a small tumor (< 7 cm), and a normally functioning contralateral kidney. It can be said that in stage tumors < 4 cm, the decision to remove a portion or the entire kidney depends on the surgeon's experience, strategy, and habits. Hwang Gyun Jeon<sup>2</sup> found that the mean GFR decrease was lower

in patients with a tumour larger than 7 cm than in patients with tumour size between 4 and 7 cm, or 4 cm or less. Ohno<sup>6</sup> et al. divided patients who underwent radical nephrectomy into two groups based on tumour size (7 cm or less versus greater than 7 cm) and reported that a >30% GFR decrease at 1 year after radical nephrectomy occurred more frequently in patients with tumours  $\leq 7$  cm than those with tumours >7 cm (74.7% versus 32.8%, respectively,  $P < 0.001$ ). The value of 74.7% reported by Ohno was higher than our results for patients with tumour size of 7 cm or less (52.4% in tumours 4 cm or less and 41.5% in tumours between 4 and 7 cm) although we observed similar values for patients with tumours >7 cm (32.8% versus 33.7%). This difference is most likely explained by the younger mean age and higher GFR of our population, both of which are risk factors for a decreased GFR after radical nephrectomy. Preoperative diagnosis of renal cell carcinoma based on computed tomography (CT) scan results plays a crucial role in selecting the surgical approach. CT scans help in diagnosing and categorizing the stage of renal cell carcinoma, providing valuable information for preoperative planning in cases of localized renal masses. In our study, CT scans classified renal cell carcinoma stages preoperatively according to IUAC 2009: 53.4% were stage T1a, 42.4% were stage T1b, 2.8% were stage T2a, and 1.4% were stage T2b. None of the patients were in stage III. These figures reflect the preoperatively determined and surgically confirmed clinical stages of renal cell carcinoma. Several groups reported that loss of normal renal volume after nephrectomy induces adaptation in renal function in the remaining kidney<sup>7,8,11</sup>. Unlike previous reports, our

results revealed that the normal contralateral kidney requires a different amount of time for functional adaptation according to the size of the tumour after radical nephrectomy. As tumour size increases more renal parenchyma is destroyed, which eventually decreases the renal function of the affected kidney before surgery. As a result, hypertrophy and hyperfiltration are induced in the remaining kidney according to tumour size. Jeon et al. reported that the kidney volume of the normal side was 15.5% higher than that of the operated side (142.4 cc versus 123.2 cc) in RCC patients who underwent radical nephrectomy, whereas in the partial nephrectomy group the kidney volume of the normal side was not different from that of the operated side (127.2 cc versus 128.5 cc). Survival analysis after laparoscopic radical nephrectomy for T1-T2 renal cell carcinoma, using the Kaplan-Meier algorithm, showed a 5-year survival rate of 94.8%. The average additional survival time after surgery was  $84.11 \pm 1.80$  months. Our results are consistent with other authors. Eskicorapci<sup>9</sup> (2007) reported a 92%-94% overall 5-year survival rate, with 96% for T1/2 and 75% for T3, with an average follow-up of 75 months. Similar survival rates were reported by other authors over 5 and 10 years<sup>8</sup>, such as Ono (92%), Chan (95%), Gill (92%), and Saika<sup>7</sup> (91%). In a comparison between laparoscopic and open radical nephrectomy for T1-T2 renal cell carcinoma, Andrew<sup>12</sup> found a 5-year survival of 92% for laparoscopic and 91% for open surgery, with no significant difference ( $P=0.583$ ). The conclusion was that laparoscopic radical nephrectomy provides better postoperative survival results than open surgery.

#### V. CONCLUSION:

Laparoscopic radical nephrectomy for early-stage renal cell carcinoma (T1 and T2) demonstrates high surgical safety and absolute efficacy in oncology.

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