

Five years survival and quality of life after radical nephrectomy: a descriptive single-center study



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ABSTRACT

Introduction: Health-related quality of life (QoL) is an increasingly important factor in examining the benefits of different cancer treatments, such as radical nephrectomy for those with a renal mass presumed to be renal cell carcinoma (RCC). This study evaluates five years of survival rate, and quality of life of the patient after radical nephrectomy in our center.

Methods: This descriptive longitudinal study included thirty patients who were diagnosed as having renal mass in Urology division of H. Adam Malik General Hospital between January 2014 and December 2015. All patients were completely followed up for 5 years or until the patient died. We used a translated and validated Indonesian written European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Version 3.0 (EORTC QLQ-C30) to assess the patient's quality of life.

Results: Overall, 5-years survival of kidney tumor patients was 100%, 66.67%, 50%, 8.33%, respectively for stages 1 to 4. We found a sharp decrease in the cumulative survival rate of stage IV group in the first 24 months compared to the first 12 months, from 66.67% to 25%. This pattern of decrease was not found in the other group of stages. Overall, patients' quality of life had increased in the first three years postoperatively and decreased in the two years afterward. These fluctuations consistently occur in all groups. All of the groups had reached the maximum quality of life at the third year postoperatively.

Conclusion: Stage I renal cell carcinoma patients showed the best five-year survival rate and quality of life. The quality of life for all groups inclined for the first three years after surgery and decline consistently afterward.

Keywords: survival rate, quality of life, radical nephrectomy.

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BACKGROUND

The widespread use of routine imaging has resulted in the increased detection of incidental renal tumors, as the daily use of a computed tomography scan has been ordered for other reasons outside kidney problems.¹ Registry-based studies report that early-stage localized T1 renal tumors account for most of this increase in renal cancer incidence.² This cancer can spread throughout the body and causing problems like bleeding, pain, or even death.³ Renal cell carcinoma (RCC) originates from the renal parenchymal urinary epithelial system accounts for 80–90% of renal malignancies. The incidence of RCC is 2–3% in adult malignant tumors, the ratio of renal carcinoma in males and females is about 2:1,⁴ and it frequently

occurs in people in the age between 50 and 70 years old.⁵ One of the preferred ways to treat these conditions is through surgical resection (radical nephrectomy), and it remains the most commonly performed procedure for the excision of renal tumors. Radical nephrectomy performed with the excision of a tumor-free surgical margin or simple enucleation is considered the gold standard for the treatment of RCC.⁶

One of the significant objectives of radical nephrectomy is achieving a longer survival rate of the patient.^{7,8} Surgical resection for the clinically localized disease remains a reliable treatment for curative intervention. Recurrence rates of 20% reflect the aggressive and often insidious nature of RCC to 40% after nephrectomy for clinically localized disease.⁹ However,

anatomic staging systems based on the tumor, nodes, metastasis (TNM) system have been the mainstays in RCC prognosis. Using the 1997 TNM classification from the International Union Against Cancer and American Joint Committee on Cancer, 5-year cancer-specific survival rates of 91%, 74%, 67%, and 32% for stages I to IV, respectively, have been reported.¹⁰ At the time of diagnosis, 23% of the patients with RCC have metastatic disease. Untreated patients with metastatic cancer have a median survival of 6 to 12 months and a 5-year survival rate of less than 20 percent.^{11–13} Twenty-five percent of the patients will develop metastasis after nephrectomy, and the majority (78%) of recurrent RCC occurs within the first five years.¹⁴ Metastases can be seen both

synchronously, at the time of diagnosis, and metachronously during follow-up. Patients with synchronous metastasis have significantly shorter survival than patients with metachronous metastasis.¹⁵

The other important objective of radical nephrectomy is to improve the quality of life of the patient. Five-year survival for surgically treated pT1 RCC is over 90%.^{16,17} A downstream effect of these longer survival times has been a parallel increase in the desire to evaluate factors that affect the post-surgical quality of life (QoL). Survey-based instruments to measure specific metrics related to patient QoL (e.g., depression, cancer-specific anxiety) have been developed and validated. These same instruments have been shown to improve physician-patient communication and provide increased individualization of treatment and self-assessment of physician surgical outcomes.^{18–20} Health-related QOL (HRQOL) is generally accepted as a multidimensional assessment of how disease and treatment affect a patient's sense of overall function and wellbeing. HRQOL is among the accepted primary outcomes in cancer trials for the FDA owing to its recognized importance to patients.^{21,22} Health-related quality of life (QoL) is an increasingly important factor in examining the benefits of different cancer treatments. QoL plays an essential role in the decision-making process and the ultimate acceptability for particular treatments. This is especially true for patients for whom multiple surgical treatment options, such as with a renal mass presumed to be renal cell carcinoma (RCC).²³

This study evaluates five years of survival rate and the quality of life of the patient after undergoing radical nephrectomy in our center.

METHOD

This is a descriptive study. Patients with renal tumors that underwent radical nephrectomy in Urology division of H. Adam Malik General Hospital between January 2014 and December 2015 were included. Most of the patients were in stage IV, and the other patients were in stage II dan III renal tumors. We excluded patients that did not cooperate with the instruction regarding answering the questionnaire

Table 1. Characteristics of patients

Characteristic	Frequency	Percent (%)	Mean (\pm SD)
Age			48.375 \pm 20.97
< 40	8	33.33 %	
40 – 50	1	4.16 %	
50 – 60	3	12.5 %	
60 – 70	10	41.6 %	
> 70	2	8.33 %	
Gender			
Male	13	54.16 %	
Female	11	45.83 %	
Renal Cancer Carcinoma Staging			
Stage I	1	41.6 %	
Stage II	8	33.33 %	
Stage III	7	29.16 %	
Stage IV	8	33.33 %	

and patients that could not be contacted. We also excluded patients with comorbidities such as diabetes melitus, hypertension, cerebrovascular accident, and heart disease. We use descriptive statistics to obtain the characteristics of our patients. From 95 patients underwent radical nephrectomy, 30 among them were because of underlying renal tumor condition. These 30 patients were included in our study. We processed the collected data with a descriptive statistic test using Statistical Product and Service Solution (SPSS) version 25.

The European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaire (QLQ)-C30 is among the most used validated HRQOL questionnaires. EORTC QLQ-C30 questionnaire evaluates physical function, mental health/emotional function, social function, vitality/fatigue, and pain. Better quality of life is indicated by higher values in the first six scores and by lower scores in the following nine symptom scores. This study used this questionnaire to evaluate the patient's quality of life and evaluated survival data as Quinten and colleagues ever reviewed survival data from 30 randomized controlled trials.^{24,25} Even more, the EORTC QLQ-C30 questionnaire is available in the Indonesian version. Perwitasari has conducted and published a study on the Japanese Journal of Clinical Oncology that showed the acceptable psychometric properties of reliability and validity evaluation of EORTC QLQ-C30 in

the Indonesian version.²⁶

RESULT

Baseline characteristic

Thirty patients at H. Adam Malik's General Hospital were diagnosed with kidney tumor from January 2014 to December 2015. Subjects in this descriptive study were eighteen male patients and twelve female patients. Most patients were histologically diagnosed with stage 4 RCC (40%), and only one patient was diagnosed at stage 1. Baseline scores on the function scale showed a decrease in scores as the patient's cancer stage increased. On the symptom scale, the highest score was reported in the stage 4 group. In this study we found quality of life in stage 1 patients was better than in stage 4 patients.

Five-year survival rate

Our study found that the 5-years survival of kidney tumor patients was 100%, 66.67%, 50%, and 8.33%, respectively for stage I to IV. A sharp decrease in the cumulative survival rate of stage IV patient group occurred in the first 24 months after radical nephrectomy. This decrease caused a 2-years survival rate for stage IV patients to be only 25%, a decrease of more than 40% from a 1-year survival rate of 66.67%. We were only able to include one patient in the stage I group. Individuals with stage I kidney tumors in our study remained alive at the end of the 5th year; this made the stage I 5-year survival rate 100%. The stage III survival rate decreased linearly

in the first year to the fourth year. While in the stage II group, this decline only consistently occurred in the fourth to fifth years (Figure 1).

Quality of life, according to EORTC QLQ-30, is divided into several scales, such as the scale of function, scale of symptoms, and overall quality of life. An increase in the function scale was recorded in all groups compared to the baseline (preoperatively). The increasing score of function scale continues to occur consistently until the 4th year. In the 5th year, all groups showed decreased quality of life. The most extreme decrease occurred in the stage IV group.

Interpretation of the scale of symptoms is different from other scales. On this scale, the smaller the score, the fewer clinical symptoms experienced by the patient. A consistent decrease in the scale of symptoms occurred in stage I and IV groups. Stage II and III groups experienced an increase in symptom scores in the 3rd year and were followed by decreased symptom scores the following year. Although the stage IV symptom

scores consistently decreased, it was never lower than the other groups.

The quality of life of stage I patients was higher than that of stage IV group. This was observed until the end of the 5th year of observation. From the first to the third post-operative year, all patients' quality of life had consistently improved. However, the stage III group's increase was not as good as the stage IV group, so that at the end of the second and third years, the remaining stage IV patients had a better quality of life than the stage III group. Three years after surgery, all groups experienced a decrease in quality of life until the observation (Table 2).

DISCUSSION

In 2013, renal cell carcinoma (RCC) was estimated to account for more than 90% of 65,150 new kidney cancer cases and accounted for a cancer death rate of 13,680.²⁷ RCC is the most lethal urological malignancy, with an estimated more than 40% of RCC patients dying as a result of this disease.⁹ Kidney resection is the most common action performed on

kidney tumor patients. Since it was first described by Robson et al. in 1969, open radical nephrectomy (ORN) has become the gold-standard treatment for patients with malignant kidney tumors.²⁸ However, RCC's aggressive nature causes 20-40% of patients to experience recurrence after renal resection with localized tumors.⁹

With these facts, the survival rate of patients with kidney disease is estimated to be low. Improvement of quality of life that might occur in the first years after surgery will gradually decrease due to this recurrence. In this single-centered descriptive study, we found that 5-years survival of kidney tumor patients was 100%, 66.67%, 50%, and 8.33%, respectively for stage I to 4 patients. Annual changes in survival rate kidney tumor patients were noticeable in stage IV RCC patients. The 1-year survival rate for stage IV patients was only 66.67%. This number decreased at the end of the second year after radical nephrectomy, with a survival rate of only 25%. A consistent decrease also occurred in the stage III group. The survival rates in the first, second, third, and fourth stage III groups were 87.5%, 75%, 62.5%, and 50%. Although the stage III group also consistently showed decreasing survival rates until the 3rd year, the decrease in survival rates at stage III was not worse compared to stage IV survival rates. The 5-year survival results we found in this study were in line with the study of Tsui et al. cited in the European Association of Urology Guideline 2020.^{29,30} The 5-year survival rate in the study was 91%, 74%, 67% and 32% for TNM stages I, II, III and IV lesions, respectively.³⁰

This descriptive study also reported the quality of life after nephrectomy. According to the EORTC QLQ-30

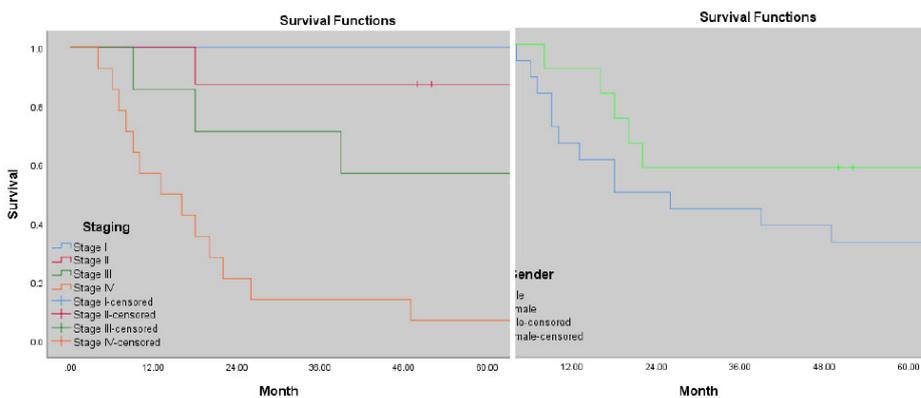


Figure 1. Kaplan Meier analysis based on RCC staging and gender quality of life

Table 2. Quality of life scale based on year after surgery

Quality of Life Scale (Symptom and Functional)	Baseline	Year I After surgery	Year II After surgery	Year III After surgery	Year IV After surgery	Year V After surgery	
Symptom	Stage I	25	17	14	14	14	
	Stage II	33	19.375	19.75	23.625	20.125	21.83
	Stage III	35	27.42	30.66	29	22.75	25.25
	Stage IV	52	42.25	44.66	36.5	25	31
Functional	Stage I	80	100	100	100	100	87
	Stage II	79	89	91	94	92	94
	Stage III	79	83	84	88	93	77
	Stage IV	59	70	78	93	73	40

assessment tool, quality of life includes aspects of function, symptoms, and overall quality of life within one week.²⁹ In the aspect of function, all groups experienced an increase in average function scores at the end of the first year. This increase consistently occurred until the end of the third year. Entering the fourth year postoperatively, only stage I patients continued to experience an increase, while the rest actually experienced decreased function scores. In the 5th year, a decrease in function scores occurred again and involved stage I patients. We recorded the most extreme decline occurred in stage IV patients.

In the aspect of symptoms, there is a pattern of change that is quite different between groups. Stage I patients consistently show a decrease in symptom scores until the fourth year postoperatively. In year 5, the symptoms of stage I patients had a slight increase. Stage II, III, and IV groups experienced a decrease in symptom scores at the end of the first year but increased at the end of the second year. The fluctuation was also found in the overall quality of life score. All groups experienced an increase in this score until the end of the 3rd year postoperatively. In the 4th year, all experienced a decrease in the quality-of-life score. The greatest decrease rates were recorded in stage I and stage IV patients.

A literature review explains that, although a case report has reported that recurrence can occur up to 30 years postoperatively, the greatest risk for recurrence of RCC is in the first five years (93%) after renal resection, with the most frequent occurrence in the third year post-operatively (80%).²⁸ This explains the findings we recorded in this descriptive study. All aspects of quality of life (EORTC QLQ-C30) decreased at the end of the fifth year after nephrectomy. Most of this decline began to occur since the third year after surgery. A prospective cohort study also reported the same thing we found. This study found an improvement in patients' physical functioning in the first twelve months of post-open and laparoscopic surgery.²⁹ A retrospective journal published in 2003 reported the opposite. However, this study does not

explain the patient baseline characteristics in detail. Confounder factors such as stage were not explored so that there was a big potential performance bias in this study. Some patients were also excluded due to death or recurrence.³⁰

Our study has several limitations. First, the stage I group consisted of only one patient and the high rate of advanced kidney tumor patients at our center is the paradox that is often encountered in Indonesia. This limitation made statistical analysis to look for the significance of differences between groups become impossible. Therefore, this study is more likely directed towards descriptive rather than analytic study. Second, the number of samples was quite limited. This study only involved 30 samples that were not evenly divided into groups, which was potentially causing allocation bias. Third, this study only involved one health institution (single-centered study). This caused the results of this study might not reflect the general population of Indonesia. 5-years survival of kidney tumor patients is 100%, 66.67%, 50%, and 8.33% respectively for stage 1 to 4 patients. With this survival rate, patients' quality of life has increased in the first three years postoperatively and decreased in the two years afterward. These fluctuations consistently occur in all groups.

CONCLUSION

Stage I renal cell carcinoma patients shown the best five-year survival rate and quality of life among others. The quality of life for all groups inclined for the first three years after surgery and decline consistently afterward.

CONFLICT OF INTEREST

None of the contributing authors have any conflict of interest, including specific interests or relationships and affiliations relevant to the subject matter or materials discussed in the manuscript.

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ETHICAL STATEMENT

This study is based on outpatient clinic registry, and ethical statement has been received from Ethical Committee Faculty of Medicine, Universitas Sumatera Utara with ethical clearance reference number 195/KEP/USU/2020.

AUTHOR CONTRIBUTION

All author had contributed equally in writing the original draft and project administration, and agree for the final version of the manuscript for publication.

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