

# Following radical nephrectomy for renal cancer, total renal volume and renal function

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## Abstract

The kidney on the opposing side may grow to make up for the lost renal mass following a Radical Nephrectomy (RN) for a renal malignancy. The capacity for compensating will determine how Renal Function (RF) develops. To assess the course of the RF, Total Renal Volume (TRV) measurements of the residual kidney taken before and after RN can be employed.

## Introduction

Kidney neoplasms are more common now than they were a few years ago. One of the most common adult malignancies, with a prevalence of just under 3%, is clear cell carcinoma. The nephrologist has a significant and vital role in the management, care, and monitoring of the development of kidney function since in clinical practice this constitutes a significant cause of acute renal failure and/or the onset of chronic kidney disease. According to reports, 33% of patients who have undergone radical nephrectomy get Acute Kidney Failure (AKF) and have a 4 times higher risk of developing Chronic Kidney Disease (CKD). Patients who have undergone partial nephrectomies experience a lesser risk. Different compensatory mechanisms are started on the remaining kidney right away after radical nephrectomy to lessen the decline in the glomerular filtration rate.

Total Renal Volume (TRV) measurement using the ellipsoid equation is a common tool in polycystic kidney disease since it is the primary indicator of the course and outlook for Renal Function (RF). Although it

hasn't been thoroughly studied, measuring the TRV of the remnant kidney in patients with renal neoplasms before and after radical nephrectomy (after one year of follow-up) could help assess the evolution of renal function and identify the factors that may affect the change in renal function. This study's goal was to compare the pre-and post-nephrectomy TRV in the kidney that remained and to see how that correlated with the eGFR at the one-year follow-up.

The findings of this study indicate a link between pre- and post-nephrectomy TRV and pre-nephrectomy eGFR that is positive. Surprisingly, there was a negative connection between the eGFR and TRV after one year of follow-up. This result is at odds with what is already known based on earlier research, which has demonstrated that the loss of 50% of the renal mass following radical nephrectomy triggers compensatory mechanisms early in an effort to reduce the reduction in glomerular filtration rate. Age, smoking, obesity, hypoalbuminemia, and the development of post-nephrectomy acute renal failure can alter these pathways, which will eventually decide the development of renal function and the risk of progression to CKD.

It is yet unclear whether the compensating mechanisms following nephrectomy in the setting of renal oncology differ from those seen in other clinical circumstances. Thus, renal function and tumour size have been observed in several studies to be negatively correlated, especially in cases when the tumour is larger than 5 cm. The median tumour diameter in our sample was 6 cm, which may have had an impact on the poor connection between post-nephrectomy renal function and function.

Depending on the etiology that led to the removal, the evolution of renal function following the loss of renal mass in the nephrectomized population exhibits distinct behaviours. The results of nephrectomies performed on people for purposes other than donation vary, although it appears that there is no discernible loss of kidney function in surviving kidney transplant recipient patients throughout follow-up. Patients who have undergone nephrectomy for non-cancerous reasons frequently retain renal function years after the procedure, especially if they are young and free of significant comorbidities. In contrast, some published series demonstrate worse outcomes, including a steady decline in renal function, the emergence of proteinuria, and the development of CKD.

## Conclusion

The conclusions drawn from this study may be constrained by its retrospective nature, but they serve to show that the evolution of the eGFR at one year of follow-up is strongly correlated with the measurement of pre and post-nephrectomy TRV in the remaining kidney using the ellipsoid equation in patients who had nephrectomies due to renal neoplasms. These variables may be helpful in determining renal function and the remaining kidney's potential for compensation.