Is simple nephrectomy the right nomenclature? - Comparing simple and radical nephrectomy to find the answer

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ABSTRACT

Introduction: The word “simple” means “easily done” or “presenting no difficulty.” Hence, the “Simple Nephrectomy” (SN) operation should be “easy to perform.” However, in clinical practice, we have noticed that SN can be equally or more challenging surgery than radical nephrectomy (RN). This study assesses the need to modify the terminology of simple nephrectomy and identify the level of difficulty between SN and RN by comparing various intraoperative and postoperative factors. Methods: Patients undergoing open SN for benign renal disease (Group A) and RN for T1/T2 renal tumors (Group B) were included in the study. Two groups were compared for operative time, estimated blood loss, postoperative complications, blood transfusion rate, and length of hospital stay. Results: A total of 114 patients were analyzed (82 in Group A and 32 in Group B). Mean age of the patients was higher in Group B (41.2 vs 53.6 years, \( P < 0.01 \)). Mean operative time (136.8 vs 125.5 min, \( P = 0.08 \)), incidence of postoperative complications (32.9% vs 25%, \( P = 0.50 \)), length of hospital stay (7.2 vs 6.5 days, \( P = 0.09 \)), estimated blood loss more than 500 ml (13.4% vs 9.3%, \( P = 0.75 \)), and requirement of blood transfusion (10.9% vs 6.2%, \( P = 0.72 \)) were higher in group A. Conclusion: The application of correct terminology is important to understand the subject and to convey the information. Simple nephrectomy is not an appropriate term as it is equally challenging to perform than its radical counterpart.

Keywords: Complications, radical nephrectomy, simple nephrectomy, terminology

Introduction

“Simple nephrectomy” (SN) is the removal of the kidney within Gerota fascia and performed for benign renal diseases, such as obstruction, infection or calculus disease, resulting in poorly- or non-functioning kidney. The term “radical nephrectomy” (RN) is complete removal of the kidney outside Gerota fascia along with the ipsilateral adrenal gland and complete regional lymphadenectomy and performed for malignant renal tumors.\[^{1}^\]

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postoperative factors in patients undergoing SN and RN to evaluate if “simple nephrectomy” is really “simple to perform.”

Methods

After Institutional Research Committee approval, patients undergoing open SN and RN (for T1/2 renal tumor with N0M0 status) by extraperitoneal approach during 2014 to 2016 were included in the study. Informed consent was obtained from all the patients. Patients with higher tumor stage were excluded as involvement of adjacent tissue may pose additional complexity to the procedure. Other exclusion criteria were laparoscopic procedures, transperitoneal approach, donor nephrectomy, partial nephrectomy, history of bleeding disorders, patients on anti-platelet drugs, procedure done by primary surgeon with less than 5 years of experience after obtaining degree, and history of previous ipsilateral surgery. Surgeries performed by primary surgeon with less than 5 years of experience have been excluded to remove bias associated with learning curve in getting expertise. Lymphadenectomy was not routinely done with radical procedures.

Demographic details of the patient, operative time (OT), estimated blood loss (EBL), postoperative complications, blood transfusion rate, and postoperative length of hospital stay (LOH) were recorded. OT was the duration between the start of skin incision till final skin closure. EBL was calculated with Gross formula\(^{[6]}\) - Blood Volume (BV) × \([Hct (i) - Hct (f)]/\) Hct (m); where BV is calculated by Body weight in kg × 70 and Hct denoted hematocrit \(i =\) initial, \(f =\) final and \(m =\) mean. Postoperative complications were recorded as per Clavien Dindo classification.\(^{[6,7]}\) Postoperative LOH was calculated by the total number of days in hospital after the day of surgery.

Statistical analysis was done with Statistical Package for Social Science (SPSS) v22.0 (IBM). Fisher exact test and Mann–Whitney U test were used to compare groups and \(P\) value less than 0.05 was considered statistically significant.

Results

A total 114 patients were available for analysis during the study period. Eighty-two patients underwent SN (Group A) and thirty-two underwent RN (Group B). Mean age of the patients was significantly higher in Group B (41.2 vs 53.6 years, \(P< 0.01\)). The number of male patients was higher in both groups. Left kidney was more affected in both the groups [Table 1].

Mean OT was higher in group A (136.8 vs 125.5 min, \(P= 0.08\)). EBL more than 500 ml was observed in 11 patients (13.4\%) in group A and 3 patients (9.3\%) in group B (\(P= 0.75\)). Blood transfusion was required in 9 patients (10.9\%) in group A and 2 patients (6.2\%) in group B (\(P= 0.72\)). Perioperative complications were seen in 27 (32.9\%) and 8 patients (25\%) in group A and B, respectively (\(P= 0.50\)). Mean LOH stay was 7.2 days in group A and 6.5 days in group B (\(P= 0.09\)). These values were higher in group A; however, this difference did not reach statistically significant level [Table 2].

Discussion

Simple nephrectomy is indicated for benign diseases of kidney, which include non-functioning or poorly functioning renal unit caused by stones, obstruction, and infection. Repeated or persistent infection and inflammation of renal unit may lead to scarring, fibrosis, and adhesions. These adverse factors pose surgical challenge during dissection, especially near hilum of kidney.\(^{[8]}\)

We have compared various intraoperative and postoperative variables of open SN and RN. Mean age of patients was significantly higher in RN group. Previous series also suggest that malignant tumors of kidney are more common with advancing age.\(^{[9]}\) Mean OT, LOH, EBL, blood transfusion rate, and postoperative complications in SN group were higher than RN group. However, on statistical analysis, all these variables were below statistically significance level.

Raman et al.\(^{[10]}\) published summary of physician responses regarding open/laparoscopic simple and radical nephrectomy. They reported that simple nephrectomy has comparable complication rate and hospital stay with radical nephrectomy. It has been suggested that simple nephrectomy is a misnomer and it should be replaced by the term “nonradical nephrectomy.” Hsiao and Pattaras\(^{[11]}\) reported that open conversion rate of laparoscopic SN was higher than conversion rate of laparoscopic RN (6.7\% vs 4.9\%), which signifies the difficulty associated with the procedure. Zelhof et al.\(^{[12]}\) presented data from British Association

| Table 1: Clinical parameters of patients |
|-----------------------------------------|
| **SN** | **RN** | **P** |
| Number of patients (n) | 82 | 32 |  |
| Age, years, mean±SD | 41.2±16.5 | 53.6±12.3 | <0.01 |
| Gender, Male/Female, n (%) | 46/36 | 19/13 | 0.83 |
| Kidney involved, n (%) | 33/49 | 12/20 | 0.76 |
| Right/Left, n (%) | 40.2%/59.8% | 37.5%/62.5% | |

| Table 2: Comparison of groups for intraoperative and postoperative factors |
|-----------------------------------------|
| **SN n=82** | **RN n=32** | **P** |
| Operative time, minutes, mean±SD | 136.8±55.6 | 125.5±46.8 | 0.08 |
| Perioperative blood loss >500 ml, n (%) | 11 (13.4\%) | 3 (9.3\%) | 0.75 |
| Postoperative complications, n (%) | 27 (32.9\%) | 8 (25.0\%) | 0.50 |
| Grade 1 | 12 | 5 | |
| Grade 2 | 10 | 2 | |
| Grade 3 | 1 | 0 | |
| Grade 4 | 2 | 1 | |
| Grade 5-mortality | 2 | 0 | |
| Blood transfusion rate, n (%) | 9 (10.9\%) | 2 (6.25\%) | 0.72 |
| Length of hospital stay, days, mean±SD | 7.2±2.5 | 6.5±1.8 | 0.09 |
of Urological Surgeons (BAUS) database. They have compared SN with RN for T1 tumors. Simple nephrectomy was associated with significantly higher Lap-open conversion rate (5.9% vs 3.3%, \( P = 0.003 \)) and blood transfusion rate (4.8% vs 2.8%, \( P = 0.01 \)). Simple nephrectomy was also associated with higher intraoperative (5.2% vs 3.7%, \( P = 0.09 \)) and postoperative (11.9% vs 10.0%, \( P = 0.17 \)) complications. They concluded that “simple” nephrectomy may be more difficult than radical nephrectomy and proposed the term “Benign” nephrectomy. These studies reiterate the fact that simple nephrectomy is equally or more difficult than radical nephrectomy.

However, few studies refute this fact. Conolly et al.\(^{[13]}\) reported that SN is simpler than RN as it is associated with shorter OT (2.1 vs 2.4, \( P = 0.002 \)), lower EBL (729 vs 859, \( P = 0.472 \)), and shorter LOH (6 vs 8, \( P < 0.001 \)) and the term is justifiable. Olcucuoglu\(^{[14]}\) also found that frequency of complications is higher in laparoscopic radical nephrectomy when compared with laparoscopic simple and donor nephrectomy. Although these studies have not mentioned tumor stage of patients undergoing radical nephrectomy, we assume that patients with all tumor stages have been included. In our opinion, we should avoid including patients with higher stage as involvement of renal vein, vena cava or adjacent organs, like bowel, may pose additional complexity to the procedure. We have compared SN and RN based on strict inclusion criteria to standardize operative conditions.

The above findings and our result clearly state that the nomenclature widely used “simple nephrectomy” is not appropriate in terms of surgical procedure and hence has implications for both patient and physician.\(^{[5,16]}\) The referring primary care physicians make first line of caregivers who explain about the disease, treatment options, hospital stay, and back to work scenarios to the patient. An inappropriate terminology may make this conversation challenging and may raise concerns from the patient side. Hence, we recommend that term SN is a misnomer and must be addressed globally to avoid misperception.

Our study had few limitations. Since our institution is a tertiary level referral center, the higher difficulty level of SN could have been biased due to complicated patients and thus, the sample size might not have been adequate. The proportion of patients undergoing SN was also higher.

**Conclusion**

Appropriate terminology is imperative for accurate communication. The term “Simple nephrectomy” is a misnomer. Simple nephrectomy carries comparable rate of perioperative difficulties along with surgical complications when compared to radical nephrectomy. Hence, the current used term “simple” nephrectomy needs revision. Consensus should be reached in identifying the most appropriate terminology for simple nephrectomy, from the suggestions like “nonradical nephrectomy,” “benign nephrectomy” or “nephrectomy for benign disease.” This should be performed based on multi-center studies with larger sample size, so that bias associated with assessment of complications is minimized.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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