

# Percutaneous Biopsy of Kidney, Comparison Between Prone and Sitting Position

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**Keywords.** biopsy, kidney, sitting position

**Introduction.** Percutaneous kidney biopsy has been established as a safe, reliable and minimally invasive method for diagnosing abnormalities. This study aims to describe the author's experience with biopsy of the kidney and to compare the results between sitting and prone position in terms of the safety and relevant complications.

**Methods.** Patients were divided into two groups: prone and sitting position based on the clinician's and patient's preferences for the biopsy. Followed by kidney biopsy, its relevant complications were analyzed in both groups. Then, data and the mean number of obtained glomeruli in each group were compared.

**Results.** Apart from sweating, presumably due to the prone position, no significant differences were found regarding the side effects including dizziness, seizure, nausea, and vomiting between the two groups. The number of obtained glomeruli was not significantly different between prone and sitting position.

**Conclusion.** In comparison with the prone position, kidney biopsy at sitting position is a good choice of procedure at least for patients who could not tolerate prone position. We recommend sitting position for kidney biopsy owing to the lower side effect and more comfortable experience for many patients. However, clinician may probably become a bit uncomfortable with this position.

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## INTRODUCTION

Percutaneous kidney biopsy has been established as a safe, reliable and minimally invasive method since its introduction into clinical practice at 1951.<sup>1,2</sup> Although the authors, in the first study, described placing the patient in sitting position,<sup>3</sup> kidney biopsy is usually performed with a patient placed in prone position, which has been used for diagnosis of several renal diseases for more than 60 years with a more than 90% success rate.<sup>4</sup> Yet, kidney biopsy in prone position is not recommended for all patients, including those suffering from ischemic heart diseases or respiratory disorders and those

who supposed not to tolerate prone position. Obese patients also may not be good candidates for renal biopsy in prone position.

We therefore introduced the technique of doing renal biopsies in sitting position in our hospital. The researchers, prospectively, audited the outcome of prone versus sitting position to compare side effects and the number of glomeruli obtained.

## MATERIALS AND METHODS

This study was performed in Shariati hospital, Tehran. Eligible patients were assigned to one of two groups: group1, biopsy performed in the sitting

position; group 2, biopsy performed in the prone position and the final decision on which position to choose was made based on both clinician's and patient's preferences. Any patient who had a problem with the prone position was entered into the alternative group, and rarely if anyone in the sitting group asked to have the procedure performed in the prone position, this was done, as well. A fixed team made up of attending doctors and nephrology fellows performed prone biopsy procedures, except for one nephrologist who performed the procedure in both positions. Prior to kidney biopsy, patients' basic and medical records and analysis of laboratory results including a complete blood count, partial thrombin and prothrombin times were collected. In addition, a detailed history is obtained to ascertain the absence of familial or drug-induced coagulopathy and any active infection. Moreover, we withdrew aspirin, dipyridamole, or warfarin for at least five days prior to biopsy and continued heparin or enoxaparin until the day before the biopsy and restarted them the night after the procedure. Kidney was localized and marked by nephrologists using the ultrasound techniques. The adequacy of the biopsy sample (the proportion of glomeruli) was extracted from the pathology report. After biopsy, patients were asked to complete the study-specific questionnaire to assess their biopsy-related side effects.

### Ethical Issues

Prior to the biopsy, written Informed consent for kidney needle biopsy was obtained from

all patients who participated in the study. This research was approved by the Ethics Committee of Tehran University of Medical Sciences (Ethical code # IRB00001641).

### Statistical Analysis

Statistical analysis was performed by SPSS version 18.0 for Windows (SPSS Inc., Chicago, IL). Chi-square test was used to compare categorical variables. Independent sample t-test was used to analyze age and the numbers of obtained glomeruli.  $P < 0.05$  was considered statistically significant.

### RESULTS

Patient characteristics and quality of obtained biopsy specimen are shown in Table 1. Number of obtained glomeruli was not statistically different in both groups; overall, the mean proportion of obtained glomeruli from renal specimen in prone and sitting positions were  $19.33 \pm 9.45$  and  $16.83 \pm 8.19$  ( $P > .05$ ), respectively. Table 2 presents the responses to the questionnaire collected after the biopsy. The questionnaires revealed that 31 of 35 patients biopsied in the sitting position and 27 of 34 examined in the prone position rated the procedure as easy to tolerate ( $P > .05$ ). Ten patients could not tolerate prone position, and were subsequently shifted to sitting position. No patient in both groups showed active bleeding or hemodynamic instability.

There were no significant differences in the incidence of adverse events between the two positions including dizziness, seizure, nausea and

**Table 1.** Patient Characteristics and Quality of Obtained Biopsy Specimen

Baseline Characteristics	Prone Position	Sitting Position	P
Age, mean $\pm$ SD	40.5 $\pm$ 18.2	46.7 $\pm$ 16.5	> .05*
Male, n (%)	19 (54.3)	24 (68.6)	> .05**
Cardiac Disease, n (%)			
No	32 (94.1)	32 (91.4)	> .05**
Yes	2 (5.9)	3 (8.6)	
Pulmonary disease, n (%)			
No	34 (97.1)	31 (88.6)	> .05**
Yes	1 (2.9)	4 (11.4)	
Glomeruli Obtained, mean $\pm$ SD	19.33 $\pm$ 9.45	16.83 $\pm$ 8.19	> .05*
Levels of Glomeruli Number, n (%)			
> 11	26 (74.3)	20 (57.1)	> .05**
7-11	5 (14.3)	6 (17.1)	
< 7	2 (5.7)	3 (8.6)	

\*Independent Samples T-test P Value

\*\*Chi-square Test P Value

Significant was taken as  $P < .05$ .

**Table 2.** Details and Results of Questionnaire Completed After Biopsy

	Pronen (%)	Sitting n (%)	P
Patients Satisfaction			
Good	27 (79.4)	31 (88.9)	> .05
Medium	5 (14.7)	4 (11.1)	
Poor	2 (5.9)	0 (0)	
Fellow Satisfaction			
Good	30 (93.8)	30 (88.2)	> .05
Medium	2 (6.2)	3 (11.8)	
Patients Stress			
High	11 (35.3)	1 (5.7)	> .05
Medium	9 (26.5)	12 (34.3)	
Poor	13 (38.2)	21 (60)	
Respiratory Distress			
No	31 (88.6)	34 (97.1)	> .05
Yes	4 (11.4)	1 (2.9)	
Un Satisfaction from Sitting Position			
No	8 (22.7)	33 (97.1)	< .05*
Yes	3 (27.3)	1 (2.9)	
Sweat			
No	16 (44.1)	29 (82.9)	< .05*
Yes	19 (54.3)	6 (17.1)	
Dizziness			
No	31 (88.6)	30 (85.7)	> .05
Yes	4 (11.4)	5 (14.3)	
Nausea and Vomiting			
No	31 (88.6)	33 (94.3)	> .05
Yes	4 (11.4)	2 (5.7)	
Seizure			
No	33 (97.1)	35 (100)	> .05
Yes	1 (2.9)	0 (0)	

Chi- square test P value.

\*Significant was taken as  $P < .05$ .

vomiting ( $P > .05$ ) except for sweating (occurred in 6 out of 35 patients in the sitting position versus 19 out of 35 in the prone position,  $P < .05$ ).

## DISCUSSION

To the best of our knowledge, this is the first study to compare the outcomes of kidney biopsy in prone versus sitting position. We believe that the preferred position for biopsy would be sitting position since it does not entail any potential adverse effect and its efficacy has been shown to be similar to prone position. No significant difference in overall proportion of obtained glomeruli was observed between prone and sitting positions. There is no difference in terms of procedure-related side effects regardless of the used technique, except for sweating. On the same basis, our results demonstrated that the rate of sweating were comparable in sitting versus

prone position, suggesting the importance of the biopsy technique. Therefore, we recommend the sitting position for the kidney biopsy, which is more clinically applicable than prone position for those patients who could not tolerate lying down. Gesualdo *et al.*<sup>5</sup> described another method of renal biopsy called supine antero-lateral position (SALP). This technique should be reserved for high risk patients suffering from respiratory difficulties or, obesity.

A limitation of the current study was the lack of a recorded number of needles passed to obtain adequate material in every case. However, evidence suggests that the number of needle passages does not increase the side effect rate.<sup>6</sup>

In conclusion, our study showed that sitting position results in similar number of obtained glomeruli with lower side effect and is more comfortable compared with prone position.

Therefore, it is possible to change one position for another upon patient's preference or when the position seems to be inappropriate for a specific case.

#### CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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