

# Percutaneous Renal Biopsy: Comparison Of Real-Time 4-Dimensional Ultrasound-Guided Technique With The 2-Dimensional Technique

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## Introduction

The use of 4-dimensional real-time ultrasound-guidance for various procedures is increasing, but its utility for percutaneous renal biopsy (4D biopsy) has not been described in literature.

The goal of the present study was to compare the diagnostic usefulness and complications of 4D biopsy with the conventional real time 2-dimensional ultrasound guided percutaneous renal biopsies (2D biopsy) at a single teaching institution.

## Methodology

All patients undergoing a native or transplant kidney percutaneous ultrasound guided renal biopsy between August 2015 to January 2016 were included in the study.

The patients were divided into two groups, those undergoing conventional (2D) renal biopsy and other group consisting of 4D renal biopsies.

The adequacy and complication rates of both the procedures were compared.

	2D	4D	Total
Number	45	35	80
Native biopsy	40	30	70
Transplant biopsy	5	5	10
No of Glomeruli	11 ( $\pm 9$ )	14 ( $\pm 9$ )	
Inadequacy	6.6%	0	
<b>Complications</b>			
Bleeding	14.2%	12.6%	
Transfusion	4%	0	
AV fistula	0	0	

Fig 1: Characteristics of 2D & 4D biopsies



Fig 2: 2D biopsy from a patient



Fig 3: 2D biopsy from another patient

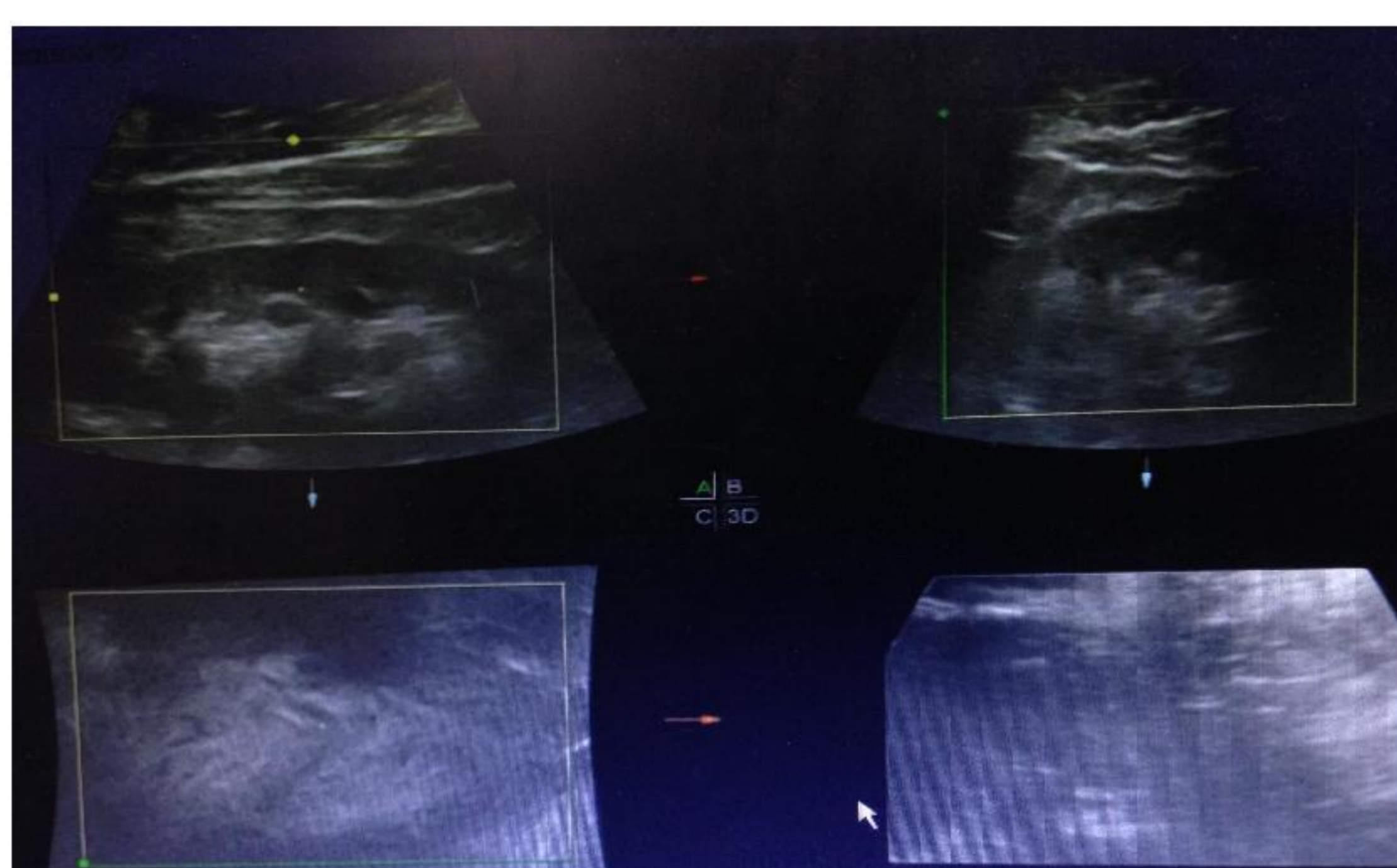


Fig 4: Real time 4D USG of kidney

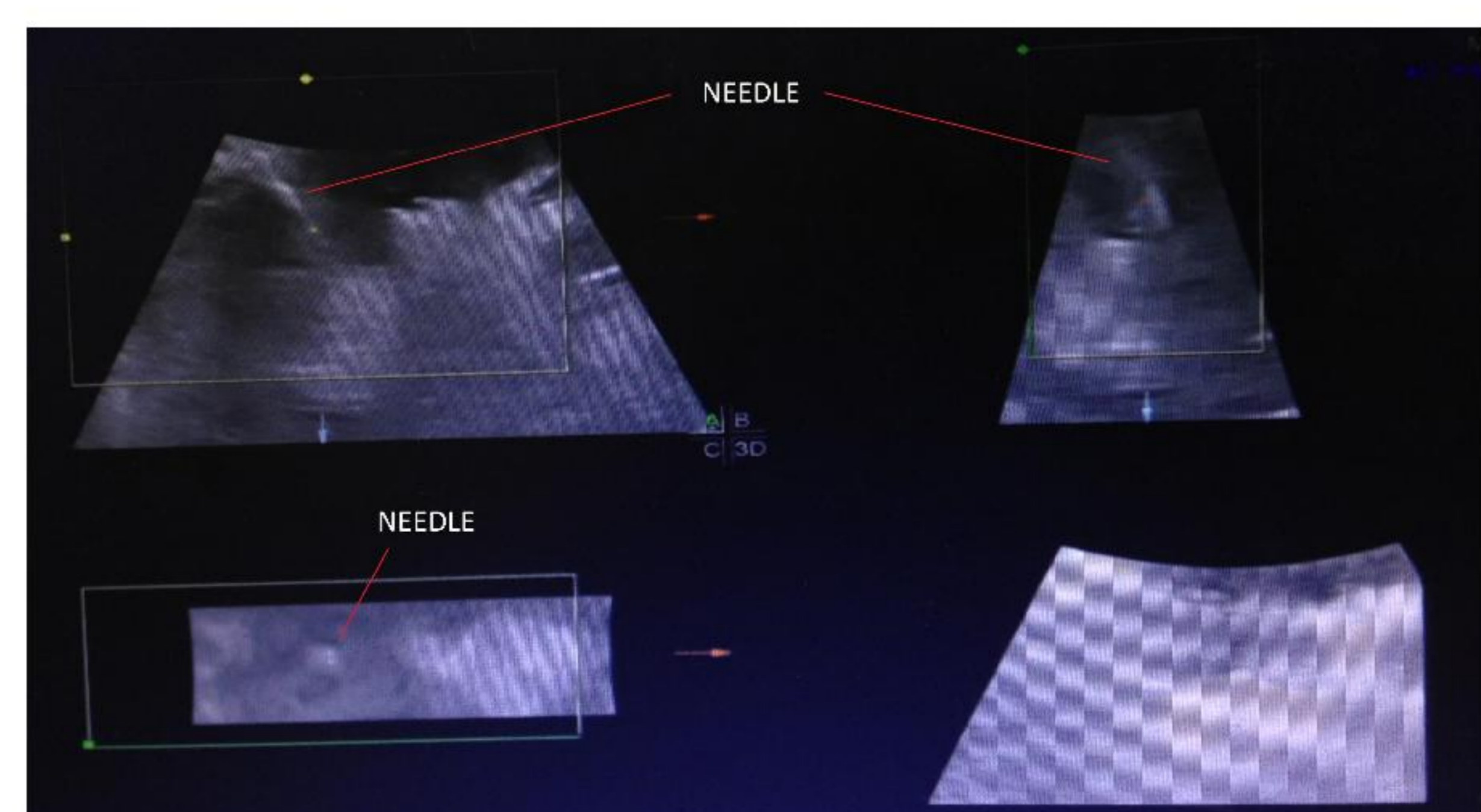


Fig 5: 4D Renal biopsy

## Results

Of the 80 renal biopsies, 35 were 4D biopsies and 45 were performed by the 2D biopsy technique. The proportion of native and allograft biopsies in each group was similar. All biopsies were performed by nephrology fellows under direct faculty supervision, along with an experienced radiologist.

The two groups were comparable in terms of age, sex, race, and underlying medical conditions. The mean number of glomeruli per biopsy was insignificantly higher in the 4D biopsy group than in the patients with 2D biopsy (14  $\pm$  9 versus 11  $\pm$  9).

An inadequate tissue sample requiring repeat biopsy occurred in 0% of the 4D biopsy group and in 6.6% of the blind biopsies. Bleeding complications requiring vascular intervention or transfusion were less frequent in the 4D biopsy group (0% versus 4%). Complications were less frequent with transplant kidney biopsies than with native kidneys (12.6% versus 14.2%). There were no cases of post biopsy arteriovenous fistula.

## Conclusion

In conclusion, When compared with 2D biopsy, real-time 4D ultrasound-guided percutaneous renal biopsy provides a better yield of kidney tissue and also is associated with fewer hemorrhagic complications.

