



Ultrasound versus CT guided Random Native Kidney Biopsies for Hospitalized Patients: Comparison of Clinical Outcomes and Complications

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Introduction

Percutaneous native kidney biopsies performed with ultrasound (US) or CT guidance are important in the workup of medical renal disease, with the modality often dependent upon the performing operator preference and patient characteristics as well as having various reported complication rates.

We compared the complication rates and types of complication of US versus CT-guided random native renal biopsy among hospitalized patients, an often underrepresented population among studies on complications from kidney biopsy.

Methods

105 consecutive inpatient US and CT guided native random renal biopsies performed by radiologists between 2006 to 2020 at a tertiary care academic center were retrospectively reviewed. Complication rates of US-guided and CT-guided random native kidney biopsies were calculated and compared.

Comparisons were made between US and CT guided biopsies with regards to types of complications using Society of Interventional Radiology grading scale, American Society of Anesthesiologists score, laboratory values, and other clinical data.

We included both incidental hematoma noted in the procedure dictation and repeat imaging as minor complications in the final analysis, even if asymptomatic, as they may require additional monitoring after biopsy.

Results

Complications			
	US Guided Biopsy (N = 42)	CT Guided Biopsy (N = 63)	P value
Overall	8	25	.03
Minor	5	18	.05
Incidentally noted during procedure	1	11	
Repeat imaging	4	7	
Major	3	7	.74
Requiring blood transfusion or embolization	3	6	
Death	0	1	

Patient/Study Demographics			
	US Guided Biopsy (N = 42)	CT Guided Biopsy (N = 63)	P value
Characteristic	(N = 42)	(N = 63)	P value
Age (mean ± SD)	52.9 ± 18.4	53.5 ± 19.4	.88
Biological sex (M/F)	23/19	24/39	.11
Indication for Biopsy			
Nephrotic Syndrome	11	14	.65
AKI	26	40	>.99
CKD	4	5	>.99
Other	1	4	.55
Past Medical History			
Hypertension	24	41	.42
Diabetes	15	20	.68
CKD	13	14	.37
Autoimmune Disease	8	19	.26

Conclusions

CT-guided random native kidney biopsy was associated with a higher overall complication rate compared to US-guided biopsy for hospitalized patients (40% vs 19%, p = .03).

The study provides additional evidence for US being the preferred modality for guiding random native renal biopsy in hospitalized patients due to overall lower complications. If CT is utilized for biopsy, inpatients may warrant closer monitoring after the biopsy for complications.

References

- Ramos Botelho Antunes P, Almeida Araújo S, Maria Carvalho Miranda S, et al. Post-Biopsy Complications Associated with Percutaneous Kidney Biopsy. *Ren Dis*. Published online 2020. doi:10.5772/intechopen.89226
- Moledina DG, Luciano RL, Kukova L, et al. Kidney biopsy-related complications in hospitalized patients with acute kidney disease. *Clin J Am Soc Nephrol*. 2018;13(11):1633-1640. doi:10.2215/CJN.04910418
- Maya ID, Maddela P, Barker J, Allon M. Percutaneous renal biopsy: Comparison of blind and real-time ultrasound-guided technique. *Semin Dial*. 2007;20(4):355–8
- Corapi KM, Chen JLT, Balk EM, Gordon CE. Bleeding complications of native kidney biopsy: A systematic review and meta-analysis. *Am J Kidney Dis*. 2012;60(1):62-73. doi:10.1053/j.ajkd.2012.02.330