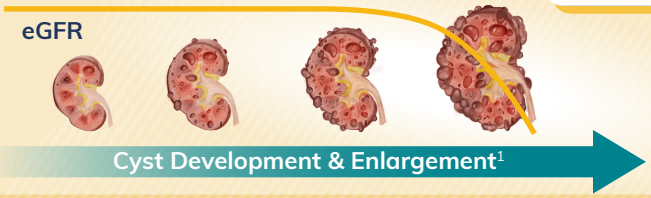
NephU™
Improving Awareness & Patient Outcomes

Total Kidney Volume (TKV) In Autosomal Dominant Polycystic Kidney Disease (ADPKD)

Learn More

Why TKV Is Important

The decline in estimated glomerular filtration rate (eGFR) is usually preceded by an increase in kidney volume.[3]

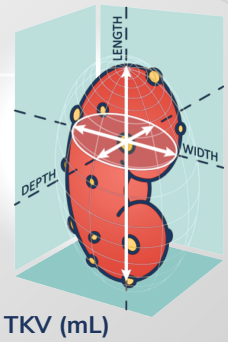


A Methods That Estimate TKV[2,3]

Ellipsoid Formula[2,3]

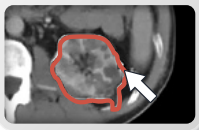
Length (L) = Average of maximal coronal and sagittal length
Width (W) = Maximal axial width
Depth (D) = Maximal axial depth

Measured in millimeters (mm)

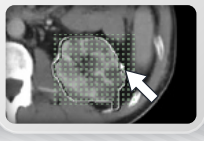


Left Kidney		Right Kidney	
$\frac{\pi}{6}$ x (L x W x D)	+	$\frac{\pi}{6}$ x (L x W x D)	= TKV (mL)

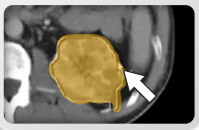
Manual Segmentation[3]



Stereology & Mid-Section Technique[3]



Semiautomated & Fully Automated[3]

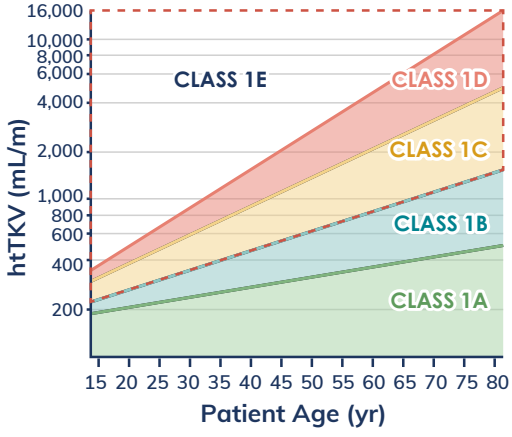


B Calculate Height-Adjusted TKV (htTKV)

$$\frac{\text{TKV (mL)}}{\text{height (m)}} = \text{htTKV (mL/m)}$$

C Determine ADPKD Imaging Classification

HtTKV can be used to determine a patient's risk of future kidney failure using the Mayo Clinic Imaging Classification (MCIC) system.



[2]

Class	Expected Annual Growth In htTKV	Estimated Slope Of Change In eGFR*	Rate Of Disease Progression
1E	>6.0%	~4.78	Rapid
1D	4.5%–6.0%	~3.48	Rapid
1C	3.0%–4.5%	~2.63	Rapid
1B	1.5%–3.0%	~1.33	Intermediate
1A	<1.5%	~0.23	Slow

[2,4]

*eGFR units =ml/min/1.73m²/yr

Patients with ADPKD and MCIC 1C, 1D, 1E are considered high risk for rapid progression to kidney failure.

How To Report[2,3]

1. **Exclude Mimics**
2. **Confirm Diagnosis**
3. **Classify**
   - Class I: Typical (can be classified based on Mayo classification)
   - Class II: Atypical
4. **Size Assessment**
   - A Kidney size or volume
   - B Calculate htTKV
   - C Determine Mayo Classification
5. **Report**
   - Complications
   - Extrarenal findings

When asked for a Total Kidney Volume or TKV:
Report either maximal bilateral kidney dimensions or a calculated volume.

References:
1. Grantham JJ et al. (2011). Nat Rev Nephrol. 7(10):556-566.
2. Odedra, D. et. al. Autosomal Dominant Polycystic Kidney Disease:Role of Imaging in Diagnosis and Management. Radiographics. 2023,43(1):e220126
3. Magistroni R, et al. (2018) Am J of Nephrology. 48:67-78.
4. Republished with permission of the American Society of Nephrology, Irazabal et al. (2015) J AM Soc Nephol. 26:160-172.