

A Guide to Estimating Kidney Volume in Patients with ADPKD

If a patient has confirmed ADPKD and does not have evidence of a significant declining eGFR, then their height adjusted total kidney volume (HtTKV) must be calculated if they are to be considered for Tolvaptan therapy. The one exception to this may possibly be if kidneys are both >16.5 cm each, as this itself is strongly associated with high risk. To calculate HtTKV an MRI or CT is required. Please refer to the protocol at bit.ly/pkdedren for more context.

The height of the patient is also required for the calculation.

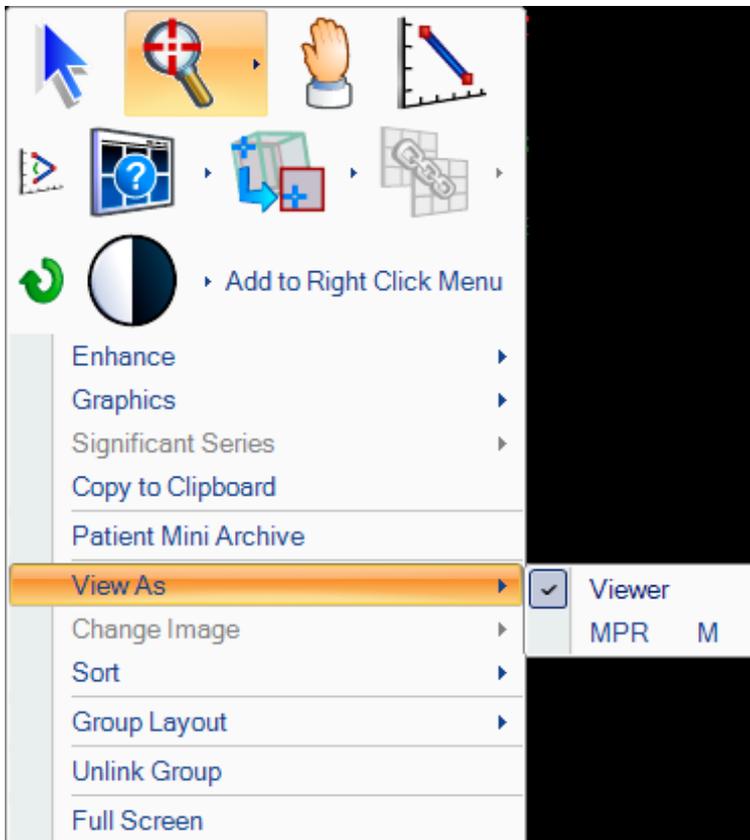
TKV is determined using an ellipsoid equation. This is validated for use in patients with 'typical' polycystic disease, being those with bilateral and diffuse small to medium sized cysts. If on interpretation you find the kidneys show atypical features such as unilateral cysts or cystic involvement of only specific segments of the kidney, then the risk of progression to ESRF cannot be estimated using this formula.

The ellipsoid equation requires three measurements from both kidneys:

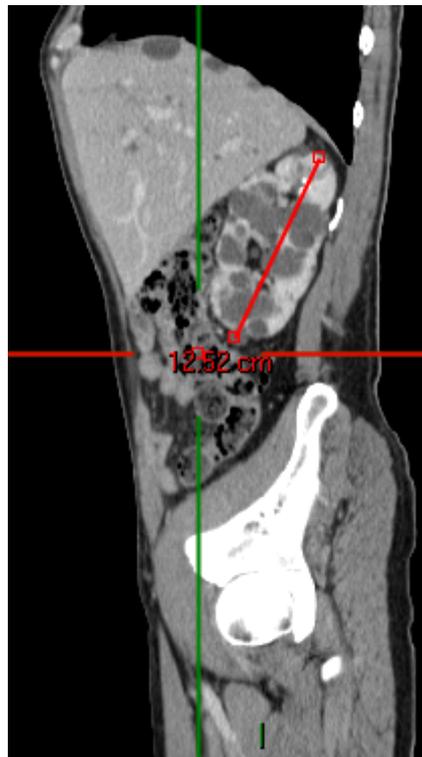
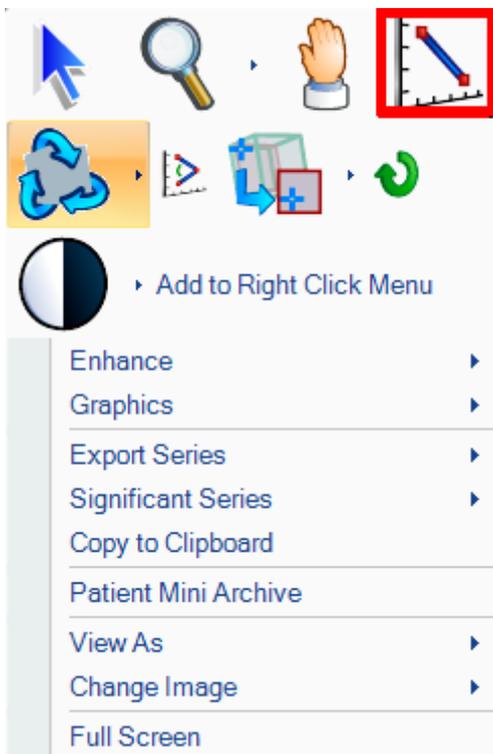
- Kidney Length
- Kidney Width
- Kidney Depth

Using NHS Scotland PACS

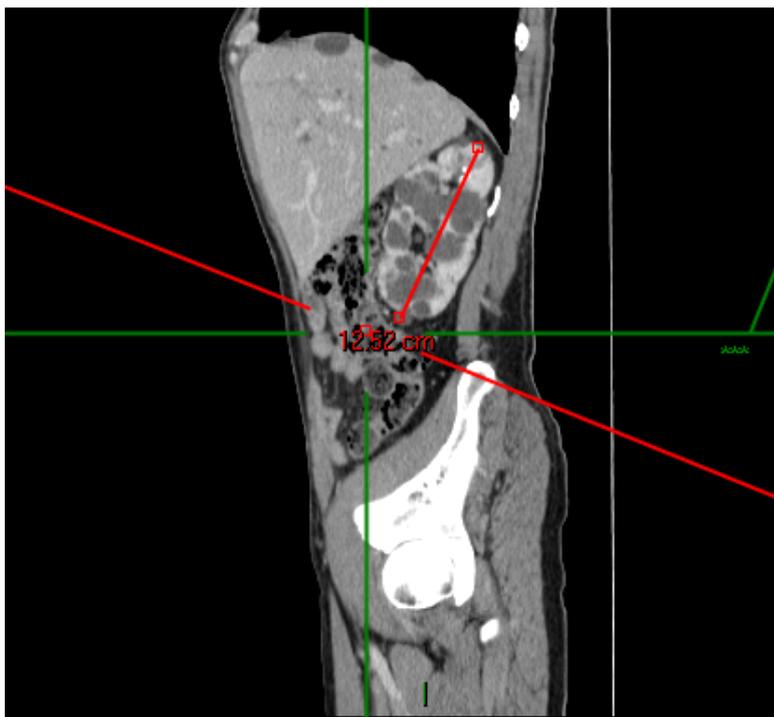
If you are viewing imaging on PACs it is easiest to calculate the HtTKV with all planes of the kidney visible at the same time. To do this, right click on the image, and select 'MPR' under the 'View As' drop-down menu as shown below.



From here you can view the kidney in the coronal, sagittal and transverse planes. The maximal length of the kidney should be measured in the **sagittal plane**. Scroll through the MRI or CT until you find the plane showing the greatest kidney length. Then right click, and select the line measurement tool in the top right corner. Using this measure the distance between the superior and inferior pole of the kidney.



The kidney width and depth should be measured in the plane perpendicular to the line in which the longitudinal length was measured. To do this click on the red horizontal line shown above and adjust it so it is perpendicular to the line measuring the length of the kidney (shown below)



Now scroll to the plane which shows the greatest kidney width and depth in the **transverse plane** and using the line measuring tool measure the width and depth.



Repeat this for the other kidney. Once you have all 6 measurements and the patient's height, insert them into the kidney volume calculator linked from bit.ly/pkdedren and this returns HtTKV.

bit.ly/pkdedren also links to a graph on which HtTKV can be plotted against age, showing which risk classification the patient falls into. Currently those in Classes C, D and E (those with the shortest predicted time to ESRF) are eligible for Tolvaptan. Refer to the protocol for guidance on how to progress with patients who fall into class A and B.

Cory Dunnigan
Madeleine Vernon
Neil Turner

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