

Radioisotope renal imaging

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^{99m}Tc The metastable radioisotope Tc emits gamma rays during ^{99m}Tc an isomeric transition to Tc. It has a 6-hour emission half-life and a 1-day biological half-life, so imaging with low exposure is ^{99m}Tc possible. For static imaging, Tc is linked to DMSA and given intravenously; an image is captured after 2–3 hours to assess renal morphology (e.g. agenesis and duplex systems), structure (e.g. renal scarring in reflux nephropathy) and function. For ^{99m}Tc dynamic imaging, Tc is linked to diethylenetriaminepenta - acetate (DTPA) or MAG-3 and given intravenously; a series of images is taken. If kidney function is compromised, the kidney is not imaged; if it is well perfused but partially obstructed, delayed transit is seen. Activity curves and comparison with the contralateral kidney are informative. MAG-3 is preferred to DTPA in neonates and children with impaired function and when an obstruction is suspected since it is more efficiently extracted from the blood by the proximal tubules and clearance correlates with blood flow. After extraction by the proximal tubules, MAG-3 is secreted into the tubular lumen, whereas DTPA is filtered by the glomerulus and ^{99m}Tc provides a measure of the glomerular filtration rate. Radioisotope renal imaging

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Revision #1

Created 2025-12-31 15:10:25 UTC by Omar Ayman

Updated 2025-12-31 15:10:25 UTC by Omar Ayman