

Comparison of Ultrasound versus CT-KUB for investigation of possible renal colic under POAC. For patients <15 years of age, all cases to be discussed with a paediatrician on a case by case basis

CT KUB is considered by Urologists to be the gold standard for renal colic diagnosis for a number of years. It is required for almost all patients needing surgical intervention for renal stones.

Pregnant patients should not be referred for CT unless this has been approved by a DHB obstetrician. Refer pregnant patients for renal ultrasound.

	USS	CT KUB	Comments
Time	Takes longer	Shorter - 5 mins in scanner	Extra time if need to re-present for 2 nd investigation if USS misses stone.
Obesity	Not suitable	Suitable	
Cost	Less \$217	More \$537	But may need to proceed to CT after USS due to poorer sensitivity
Support from Urologists and Radiologists	Some support in certain circumstances	All support	CTKUB is best practice
Wait times if "conversion to CTKUB" required in public system	May be long	N/A – already done under POAC	
Sensitivity	24 – 84%	97 – 99%	More stones missed with USS, necessitating FU CTKUB; USS may miss dilatation in the presence of obstructing stone
Specificity	53 – 94%	95%	
Radiation dose	0 mSv	1 – 5.5 mSv, mostly lower range (1-2). Proportional to patient build: obese get higher radiation dose	From typical annual background radiation = 3 mSv 15 flights from Melbourne to London (via Singapore) = 1 mSv

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Additional cancer risk due to irradiation	0%	0.015 – 0.05% (3-10 mSv)	From typical annual background radiation 0.012%
Identification of alternative diagnoses	Superior to unenhanced CTKUB for characterizing (not identifying) cysts in the kidney or pelvis	Superior for differentials outside of renal tract eg appendicitis, diverticulitis	
Stone presence, sizing and position	Inferior: stones may be missed due to being obscured by bowel gas	Superior, especially in the ureter	
Stone composition	Inferior: No information regarding stone composition	Superior: Provides stone composition information	Relevant to both management and follow-up for prevention of further stones. A low density on CT is likely to be a uric acid stone, where an option is to dissolve the stone with oral Ural sachets and manage uric acid excretion for prevention.

A widely used figure is a 5% excess risk of death from cancer with a 1000 mSv dose.^{15,16}

See <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2996147/> for table of comparison of radiation dosed from medical imaging tests and background radiation