American College of Radiology ACR Appropriateness Criteria[®]

Renal Transplant Dysfunction

Variant 1: Adult. Renal transplant dysfunction. Initial imaging.

Describert	Appropriateness	SOF		D. J. DDI	Detter	Malla]	Final	l Tal	oulati	ons		
Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US duplex Doppler kidney transplant	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	1	0	C	0 0	1	1	13
		References		Study	v Quality										
		33 (22595689)			2										
		25 (3548286)			3										
		23 (3541027)			2										
		22 (3303879)			3										
		24 (2644778)			2										
		26 (12853584)			3										
		27 (21324840)			2										
		29 (7554736)			3										
		30 (9176852)			3										
		32 (12594798)			2										
		35 (14571160)			4										
		36 (2004509)			4										
		37 (18287435)			3										
		28 (24195547)			2										
		31 (14521886)			3										
		34 (28858538)			2										
		18 (30033070)			4										

CT abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	େଡେଡ 1-10 mSv	✿֎֎֎ 3- 10 mSv [ped]	3	3	7	0	3	1	3	1	1	0	0
CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	3	3	6	0	5	0	3	1	1	0	0
CT abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଝେଝେ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	2	2	8	1	2	1	3	0	1	0	0
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟବ୍ୟକ 10-30 mSv	େବେବେବବ 10-30 mSv [ped]	2	2	8	1	2	2	3	0	0	0	0
CT pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	2	2	8	1	3	0	3	0	1	0	0
CTA abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ତତତତ 10-30 mSv		1	1	10	0	3	1	1	1	0	0	0
CT pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ତବ୍ତବ୍ତ 10-30 mSv	&&&& 3- 10 mSv [ped]	1	1	10	0	4	1	1	0	0	0	0
CTU without and with IV contrast	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv	୫୫୫୫୫ 10-30 mSv [ped]	1	1	12	1	1	1	1	0	0	0	0
Arteriography kidney	Usually not appropriate	Expert Consensus	ଡେଡେ 1-10 mSv		1	1	13	0	1	1	1	0	0	0	0
Image-guided biopsy kidney	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	9	1	4	0	1	0	1	0	0
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	3	2	0	0	0	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	2	1	1	0	0	0	0
MRA abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	1	1	1	0	0	0	0

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MRA abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	2	1	0	1	0	0	0
MRI pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	2	1	1	1	0	0	0
MRI pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	1	1	2	0	0	0	0
MRU without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	0	1	2	0	0	0	0
MRU without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	0	3	0	0	0	0	0
DTPA renal scan	Usually not appropriate	Limited	ତେତେ 1-10 mSv		1	1	9	0	4	2	1	0	0	0	0
		References		Study	y Quality										
		13 (10952501)			3										
		14 (24152633)			3										
		15 (16549144)			3										
		18 (30033070)			4										
		17 (18589113)			4										
		16 (3891349)			4		-								
MAG3 renal scan	Usually not appropriate	Strong	֎֎֎ 1-10 mSv	େଡେଡ 0.3- 3 mSv [ped]	1	1	9	0	2	4	1	0	0	0	0
		References		Study	y Quality										
		13 (10952501)			3										
		20 (24484750)			4										
		14 (24152633)			3										
		19 (30074536)			3										
		21 (11168310)			2										
		18 (30033070)			4										
		17 (18589113)			4										

US pelvis	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	0	0	0	0	1	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv		1	1	12	0	3	1	0	0	0	0	0
CTA pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଷଷଷଷ 10-30 mSv		1	1	10	0	3	1	2	0	0	0	0
MRA pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	1	1	2	0	0	0	0
US pelvis with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	1	1	0	1	0	0	0	0
CTV abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ତତତତ 10-30 mSv		1	1	11	1	3	0	1	0	0	0	0
CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	ବଟଟଟ 10-30 mSv		1	1	11	1	2	0	2	0	0	0	0
MRV abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	2	1	1	0	0	0	0
MRV pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	1	1	1	1	0	0	0
MRA pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	2	2	1	0	0	0	0

Variant 2: Adult. Renal transplant dysfunction. US suspicious for, but not conclusive for arterial etiology. Next imaging study.

		Appropri	iateness	COL			D (1				ŀ	final '	Tabu	latio	ns	_	
Procedure	e	Categ		SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CTA pelvis with IV con	ntrast	Usua approp		Strong	ବ୍ୟବ୍ୟକ 10-30 mSv		8	8	1	0	1	0	0	1	5	4	4
				References		Study	Quality										
				56 (21111553)			3										

		55 (17497443)			1										
		57 (24948209)			2										
		18 (30033070)			4										
MRA pelvis without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	1	1	2	10	2
		References		Study	v Quality										
		63 (21601400)			2										
		62 (10508297)			4										
		60 (10997461)			3										
		61 (12354824)			3										
		57 (24948209)			2										
		18 (30033070)			4				1						
CTA abdomen and pelvis with IV contrast	Usually appropriate	Limited	ଡେଡଡଡ 10-30 mSv		7	7	1	1	0	0	0	0	9	4	1
		References		Study	Quality										
		55 (17497443)			1										
		18 (30033070)			4			-		_					
MRA abdomen and pelvis without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	5	3	6	2	0
		References		Study	Quality										
		63 (21601400)			2										
		62 (10508297)			4										
		60 (10997461)			3										
		61 (12354824)			3										
		18 (30033070)			4					_					
MRA abdomen and pelvis without IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	1	0	0	1	4	9	1	0	0
		References		Study	Quality										
		62 (10508297)			4										
		64 (19261926)			2										
		65 (19635833)			2										
		· · · · · · · · · · · · · · · · · · ·													

		68 (29666993)			3										
		66 (24246390)			3										
		67 (24592960)			3				1						
MRA pelvis without IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	2	3	10	1	0	0
		References		Study	v Quality										
		62 (10508297)			4										
		64 (19261926)			2										
		65 (19635833)			2										
		68 (29666993)			3										
		18 (30033070)			4										
		66 (24246390)			3										
		67 (24592960)			3										
Arteriography kidney	May be appropriate (Disagreement)	Expert Opinion	֎֎֎ 1-10 mSv		5	5	1	1	1	1	6	4	1	0	1
		References		Study	Quality										
		46 (19473615)			2										
		45 (19235580)			2										
		41 (16433762)			2										
		42 (15590798)			2										
		43 (18435786)			2										
		44 (20601365)			2										
		47 (18589114)			2										
		48 (17629433)			2										
		49 (16504683)			4										
		50 (20682611)			4										
		51 (18670375)			3										
		52 (15943633)			2										
		39 (21839234)			2										
		40 (20824760)			2										
		38 (25220328)			4										

		53 (21331135)			4										
		54 (13679503)			4										
DTPA renal scan	May be appropriate	Limited	ତେତେ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	5	5	0	0	0	8	7	0	1	0	0
		References		Study	Quality										
		16 (3891349)			4										
US pelvis with IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	0	1	0	7	6	0	0	1
		References		Study	V Quality										
		69 (28583646)			3										
		70 (1688270)		1	4		_								
MAG3 renal scan	Usually not appropriate	Limited	ଡଡ େ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	3	3	6	0	7	1	0	0	1	1	0
		References		Study	V Quality										
		59 (28969763)			4										
		58 (7715893)			3										
US duplex Doppler kidney transplant	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	5	2	4	4	0	0	0	1	0
MRI pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	3	2	1	1	1	0	0	0
CT abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଡେଡେ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	10	0	3	0	1	1	0	0	1
CT abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	ଡେଡେ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	11	1	2	0	1	1	0	0	0
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	ଡେଡେଡ 10-30 mSv	େତେତେତେ 10-30 mSv [ped]	1	1	14	0	0	1	1	0	0	0	0
CT pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଡେଡେ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	10	4	1	1	0	0	0	0	0

CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	ତତତ 1-10 mSv	✿֎֎֎ 3- 10 mSv [ped]	1	1	12	0	2	1	1	0	0	0	0
CT pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	֎֎֎֎ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	11	3	1	1	0	0	0	0	0
CTU without and with IV contrast	Usually not appropriate	Expert Consensus	ଡେଡେଡ 10-30 mSv	ତ୍ତତ୍ତ୍ତ୍ତ୍ର 10-30 mSv [ped]	1	1	12	0	2	1	1	0	0	0	0
Image-guided biopsy kidney	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	10	0	4	0	1	0	1	0	0
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	2	2	2	0	1	0	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	2	0	0	1	0	1	0	0
MRI pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	5	0	0	0	0	2	0	0
MRU without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	3	0	1	0	0	0	0
MRU without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	3	0	1	0	0	0	0
US pelvis	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	1	2	1	0	1	1	0	0
CTV abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଝଝଝଝ 10-30 mSv		1	1	12	0	2	1	1	0	0	0	0
CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	ବେବେବ 10-30 mSv		1	1	12	0	2	1	1	0	0	0	0
MRV abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	2	0	2	0	0	0	0
MRV pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	2	1	1	1	0	0	0

	Appropriateness								F	'inal '	Гаbu	latio	ıs		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CTV abdomen and pelvis with IV contrast	Usually appropriate	Expert Consensus	ବ୍ୟବ୍ୟ 10-30 mSv		8	8	1	0	0	1	0	0	4	8	2
MRV abdomen and pelvis without and with IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	8	8	1	0	0	0	0	1	1	10	3
MRV pelvis without and with IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	8	8	1	0	0	1	0	2	2	4	6
CTV pelvis with IV contrast	Usually appropriate	Expert Consensus	ବେବେବ 10-30 mSv		7	7	0	1	0	1	3	3	1	5	2
US pelvis with IV contrast	May be appropriate (Disagreement)	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	6	2	2	2	1	2	0	1	0
MRI pelvis without and with IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	2	1	5	4	3	0	1	0	0
US duplex Doppler kidney transplant	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	6	0	2	2	5	0	1	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	1	5	2	1	0	0	0	0
CT abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଝେଝ 1-10 mSv	✿֎֎֎ 3- 10 mSv [ped]	2	2	7	5	2	2	0	0	0	0	0
CT abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	11	0	1	1	3	0	0	0	0
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟତ୍ତର 10-30 mSv	&&&& 10-30 mSv [ped]	1	1	14	1	0	1	0	0	0	0	0

Variant 3: Adult. Renal transplant dysfunction. US suspicious for, but not conclusive for venous etiology. Next imaging study.

CTA abdomen and pelvis with IV contrast	Usually appropr	Expert Consensus	ଚଚଚଚଚ 10-30 mSv		1	1	13	2	0	0	0	0	1	0	0
CT pelvis with IV contrast	Usually appropr	Expert Consensus	ତତତ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	9	2	4	1	0	0	0	0	0
CT pelvis without IV contrast	Usually appropr	Expert Consensus	ତତତ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	11	0	2	0	2	1	0	0	0
CT pelvis without and with IV contrast	Usually appropr	Expert Consensus	ବ୍ୟବ୍ୟବ୍ୟ 10-30 mSv	େବେବେ 3- 10 mSv [ped]	1	1	12	2	1	1	0	0	0	0	0
CTU without and with IV contrast	Usually appropri	Expert Consensus	ହ ନ୍ତ୍ରର 10-30 mSv	ଡଡଡଡଡ 10-30 mSv [ped]	1	1	12	0	2	0	1	0	1	0	0
Arteriography kidney	Usually appropr	Limited	ତତତ 1-10 mSv		1	1	15	0	0	1	0	0	0	0	0
		References		Study	y Quality					-				•	
		71 (16687747)			2			1	1		1				
Image-guided biopsy kidney	Usually appropr	Expert Consensus	Varies	Varies	1	1	15	0	0	0	0	0	1	0	0
MRI abdomen and pelvis without IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	1	2	0	2	2	0	0	0
MRA abdomen and pelvis without IV contrast	Usually appropr	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	3	0	1	1	1	0	0
MRA abdomen and pelvis without and with IV contrast	Usually appropr	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	0	0	0	0	0	1	0	0
MRI pelvis without IV contrast	Usually appropr	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	1	2	2	0	2	0	0	0
MRU without IV contrast	Usually appropr	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	3	1	1	0	0	0	0
MRU without and with IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	2	2	1	0	0	0	0

DTPA renal scan	Usuall approp	Limited	ତତତ 1-10 mSv	&& 0.3- 3 mSv [ped]	1	1	10	1	4	0	0	0	1	0	0
		References		Study	v Quality										
		59 (28969763)			4										
MAG3 renal scan	Usuall approp	Limited	ବ୍ୟତ୍ୟ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	1	1	14	1	0	0	0	0	1	0	0
		References		Study	V Quality										
		59 (28969763)			4										
US pelvis	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	1	0	1	0	1	0	0	0
CTA pelvis with IV contrast	Usuall approp	Expert Consensus	ତତତତ 10-3(mSv	0	1	1	14	1	0	0	0	0	1	0	0
MRA pelvis without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	4	0	1	0	0	1	0
MRA pelvis without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	4	0	1	0	1	0	0

Variant 4: Adult. Renal transplant dysfunction. US suspicious for, but not conclusive for extrinsic etiology. Next imaging study.

	Appropria	teness	COF			D. (F	'inal '	Fabu	latio	ns		
Procedure	Catego		SOE	Adults RRI	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT pelvis with IV contrast	May b appropri		Expert Consensus	ତତତ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	6	6	0	0	0	1	4	8	2	1	0
MRI pelvis without and with IV contrast	May b appropri	e iate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	5	7	1	2	0
MRU without and with IV contrast	May b appropri	e iate	te Limited O		O 0 mSv [ped]	6	6	0	0	0	2	5	8	0	1	0
			References		Study	y Quality										
			73 (12227682)			3										

CT abdomen and pelvis with IV contrast	May approp		Expert Consensus	ତତତ 1-1 mSv	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Sv	5	5	0	0	0	1	9	2	1	1	2
CT abdomen and pelvis without IV contrast	May approp				0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Sv	5	5	0	0	0	1	10	2	0	3	0
CT pelvis without IV contrast	May approp		Expert Consensus	ତତତ 1-1 mSv	0 🛛 🕸 🏵 🕫 10 m [pec	Sv	5	5	0	0	0	2	9	3	2	0	0
CT pelvis without and with IV contrast	May approp (Disagre	oriate	Expert Opinion	ଡେଡଡଡ 10- mSv	30 00000 10 m [pec	Sv	5	5	3	1	4	1	1	5	1	0	0
CTU without and with IV contrast	May approp		Limited	ଡ≎ତତ 10- mSv	30 30 30 mS [pe	30 v	5	5	0	0	1	3	7	4	0	1	0
			References			Study Qua	lity										
			72 (12207185)			3											
MRI abdomen and pelvis without IV contrast	May approp		Expert Consensus	O 0 mSv	, O 0 n [pe		5	5	0	0	0	2	10	3	0	1	0
MRI abdomen and pelvis without and with IV contrast	May approp		Expert Consensus	O 0 mS\	, O 0 n [pe	-	5	5	0	0	0	2	9	4	1	0	0
MRI pelvis without IV contrast	May approp		Expert Consensus	O 0 mSv	, O 0 n [pe		5	5	0	0	0	1	10	4	1	0	0
MRU without IV contrast	May approp		Limited	O 0 mSv	, O 0 n [pe		5	5	1	0	2	3	8	1	1	0	0
			References			Study Quality											
			74 (18055152)			3			-	-			-				
CT abdomen and pelvis without and with IV contrast	May approp		Expert Consensus	ଡଡଡଡ 10- mSv	30 00-30 mS	30 V	4	4	3	1	4	1	5	1	1	0	0
DTPA renal scan	Usuall approp		Expert Consensus	ତତତ 1-1 mSv	0 888 3 m [pe	Sv	3	3	7	0	2	3	2	2	0	0	0

MAG3 renal scan	Usually not appropriate	Expert Consensus	େହେତ 1-10 mSv	ଡେଡଡ 0.3- 3 mSv [ped]	2	2	8	0	2	2	3	0	1	0	0
US pelvis with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	6	3	3	0	2	1	1	0	0
		References		Study	Quality										
		75 (24118471)		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	3										
		11 (32412688)			4										
CTA abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	֎֎֎֎ 10-30 mSv		1	1	9	0	3	2	1	1	0	0	0
Arteriography kidney	Usually not appropriate	Expert Consensus	ଝେଝ 1-10 mSv		1	1	12	0	2	1	0	1	0	0	0
Image-guided biopsy kidney	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	12	0	3	0	1	0	0	0	0
MRA abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	3	0	1	1	0	0	0
MRA abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	3	0	1	1	0	0	0
US duplex Doppler kidney transplant	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	1	5	1	0	0	0	0	0
US pelvis	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	2	2	0	1	1	1	0	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv		1	1	10	0	2	1	2	0	1	0	0
CTA pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv		1	1	10	0	4	0	0	2	0	0	0
MRA pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	2	0	1	1	0	0	0
CTV abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv		1	1	10	0	3	0	2	1	0	0	0

CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟତ୍ୟ 10-30 mSv		1	1	13	1	0	1	0	1	0	0	0
MRV abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	3	0	1	1	1	0	0
MRV pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	1	1	1	0	0	0	0	0
MRA pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	2	1	0	1	0	0	0

Variant 5: Adult. Renal transplant dysfunction. US unremarkable or indeterminate. Next imaging study.

	Appropriateness	COF		Peds RRL		N. 11			F	'inal '	Tabu	latio	ıs		
Procedure	Category	SOE			Rating	Median	1	2	3	4	5	6	7	8	9
Image-guided biopsy kidney	Usually appropriate	Limited	Varies	Varies	7	7	1	0	0	0	2	0	6	3	4
		References		Study	/ Quality										
		79 (14508363)			4										
		18 (30033070)			4										
		76 (22231130)													
		77 (10096531)													
		78 (15996250)		-	3										
CT abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଷଷଷ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	3	3	7	0	7	0	0	2	0	0	0
CT pelvis with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟବହ 1-10 mSv	€€€€ 3- 10 mSv [ped]	3	3	7	0	2	5	0	2	0	0	0
CT pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟବ୍ୟବ୍ୟ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	3	3	7	0	2	5	0	2	0	0	0
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	1	2	4	2	0	0	0	0

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MRI abdomen and pelvis without and with IV contrast	Usuall ₂ approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	0	3	4	2	0	0	0	0
MRI pelvis without IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	1	2	0	6	0	0	0	0
MRI pelvis without and with IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	1	2	0	6	0	0	0	0
CT abdomen and pelvis without and with IV contrast	Usually approp	Expert Consensus	ବତତତ 10-30 mSv	***** 10-30 mSv [ped]	2	2	8	2	4	0	0	1	1	0	0
CTU without and with IV contrast	Usuall ₂ approp	Expert Consensus	ବବରବ 10-30 mSv	୫୫୫୫ 10-30 mSv [ped]	2	2	8	6	1	0	0	0	1	0	0
MRU without and with IV contrast	Usuall ₂ approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	1	5	1	1	0	0	0	0
MRA pelvis without and with IV contrast	Usuall ₂ approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	1	2	1	2	2	0	0	0
US pelvis with IV contrast	Usually approp	Limited	O 0 mSv	O 0 mSv [ped]	2	2	8	1	2	0	4	1	0	0	0
		References		Study	Quality										
		83 (21792579)			4										
		81 (33184930)			3										
		 84 (28885208)			4										
		12 (29632989)			4										
		82 (33941759)			4										
		80 (19460520)			2										
CT abdomen and pelvis without IV contrast	Usually approp	Expert Consensus	ଷଷଷ 1-10 mSv	֎֎֎֎ 3- 10 mSv [ped]	1	1	9	1	4	0	0	1	1	0	0
CTA abdomen and pelvis with IV contrast	Usuall ₂ approp	Expert Consensus	֎֎֎֎ 10-30 mSv		1	1	10	0	4	0	0	2	0	0	0

CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	ଡଡ ଡ 1-10 mSv	✿֎֎֎ 3- 10 mSv [ped]	1	1	9	0	6	0	0	1	0	0	0
Arteriography kidney	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv		1	1	13	0	0	0	1	1	1	0	0
MRA abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	3	0	0	2	0	0	0
MRA abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	2	1	1	2	0	0	0
MRU without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	0	1	0	0	0	0
DTPA renal scan	Usually not appropriate	Expert Consensus	ଡେଡେଡ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	1	1	9	1	2	0	2	1	1	0	0
MAG3 renal scan	Usually not appropriate	Expert Consensus	ଡେଡେଡ 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	13	0	1	0	0	1	1	0	0
US duplex Doppler kidney transplant	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	3	0	1	0	0	0	0
US pelvis	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	3	2	0	0	1	1	0	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv		1	1	11	0	2	1	0	1	1	0	0
CTA pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଷଷଷଷ 10-30 mSv		1	1	13	2	0	0	0	0	1	0	0
CTV abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	ଷଷଷଷ 10-30 mSv		1	1	10	0	3	0	1	1	0	1	0
CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ରବ୍ୟୁ 10-30 mSv		1	1	10	0	2	0	2	1	0	1	0
MRV abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	1	0	0	1	0	0	0	0

MRV pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	0	1	0	0	0	0
MRA pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	2	2	1	0	2	0	0	0

Appendix Key

A more complete discussion of the items presented below can be found by accessing the supporting documents at the designated hyperlinks.

Appropriateness Category: The panel's recommendation for a procedure based on the assessment of the risks and benefits of performing the procedure for the specified clinical scenario.

SOE: Strength of Evidence. The assessment of the amount and quality of evidence found in the peer reviewed medical literature for an appropriateness recommendation.

- **References:** The citation number and PMID for the reference(s) associated with the recommendation.
- Study Quality: The assessment of the quality of an individual reference based on the number of study quality elements described in the reference.

RRL: Relative Radiation Level. A population based assessment of the amount of radiation a typical patient may be exposed to during the specified procedure.

Rating: The final rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Median: The median rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Final tabulations: A histogram showing the number of panel members who rated the procedure as noted in the column heading (ie, 1, 2, 3, etc.).

Additional supporting documents about the AC methodology and processes can be found at www.acr.org/ac.