

**American College of Radiology  
ACR Appropriateness Criteria®**

**Renal Transplant Dysfunction**

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

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US duplex Doppler kidney transplant	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	9	9	0	0	1	0	0	0	1	1	13
			References	Study 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	☼☼☼ 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	☼☼☼ 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	☼☼☼ 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	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 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	☼☼☼ 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	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	10	0	3	1	1	1	0	0	0
CT pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 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	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	12	1	1	1	1	0	0	0	0
Arteriography kidney	Usually not appropriate	Expert Consensus	☼☼☼ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	11	2	1	1	1	0	0	0	0
MRA abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	10	2	2	1	0	1	0	0	0
MRI pelvis without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	11	1	1	1	2	0	0	0	0
MRU without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	11	2	0	3	0	0	0	0	0
DTPA renal scan	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹ 0.3-3 mSv [ped]	1	1	9	0	4	2	1	0	0	0	0

References	Study 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	☹☹☹ 0.3-3 mSv [ped]	1	1	9	0	2	4	1	0	0	0	0
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References	Study 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	○ 0 mSv	○ 0 mSv [ped]	1	1	14	0	1	0	0	0	0	1	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv		1	1	12	0	3	1	0	0	0	0	0
CTA pelvis with IV contrast	Usually not appropriate	Expert Consensus	⊗⊗⊗⊗ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	10	2	1	1	2	0	0	0	0
US pelvis with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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	⊗⊗⊗⊗ 10-30 mSv		1	1	11	1	3	0	1	0	0	0	0
CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	⊗⊗⊗⊗ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	11	1	1	1	1	1	0	0	0
MRA pelvis without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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.**

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CTA pelvis with IV contrast	Usually appropriate	Strong	⊗⊗⊗⊗ 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	0 0 mSv	0 0 mSv [ped]	8	8	0	0	0	0	1	1	2	10	2
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References	Study Quality
63 (21601400)	2
62 (10508297)	4
60 (10997461)	3
61 (12354824)	3
57 (24948209)	2
18 (30033070)	4

CTA abdomen and pelvis with IV contrast	Usually appropriate	Limited	⊕⊕⊕⊕ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	7	7	1	1	0	0	0	0	9	4	1
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References	Study Quality
55 (17497443)	1
18 (30033070)	4

MRA abdomen and pelvis without and with IV contrast	Usually appropriate	Limited	0 0 mSv	0 0 mSv [ped]	7	7	0	0	0	0	5	3	6	2	0
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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	0 0 mSv	0 0 mSv [ped]	6	6	1	0	0	1	4	9	1	0	0
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References	Study Quality
62 (10508297)	4

64 (19261926)	2
65 (19635833)	2
68 (29666993)	3
66 (24246390)	3
67 (24592960)	3

MRA pelvis without IV contrast	May be appropriate	Strong	0 0 mSv	0 0 mSv [ped]	6	6	0	0	0	2	3	10	1	0	0
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References	Study 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
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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	☹☹☹ 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	○ 0 mSv	○ 0 mSv [ped]	5	5	1	0	1	0	7	6	0	0	1				
			References		Study Quality														
			69 (28583646)		3														
			70 (1688270)		4														
MAG3 renal scan	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹ 0.3-3 mSv [ped]	3	3	6	0	7	1	0	0	1	1	0				
			References		Study Quality														
			59 (28969763)		4														
			58 (7715893)		3														
US duplex Doppler kidney transplant	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	5	2	4	4	0	0	0	1	0				
MRI pelvis without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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	☹☹☹ 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	☹☹☹ 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	☹☹☹☹ 10-30 mSv	☹☹☹☹☹ 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	☼☼☼ 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	☼☼☼ 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	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	9	5	0	0	0	0	2	0	0
MRU without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	12	0	3	0	1	0	0	0	0
US pelvis	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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	☼☼☼☼ 10-30 mSv		1	1	12	0	2	1	1	0	0	0	0
CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 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

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

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CTV abdomen and pelvis with IV contrast	Usually appropriate	Expert Consensus	☼☼☼☼ 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	☼☼☼☼ 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	☼☼☼ 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	☼☼☼ 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	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	14	1	0	1	0	0	0	0	0
CTA abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	13	2	0	0	0	0	1	0	0
CT pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	9	2	4	1	0	0	0	0	0
CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 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 not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	12	2	1	1	0	0	0	0	0
CTU without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	12	0	2	0	1	0	1	0	0
Arteriography kidney	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	15	0	0	1	0	0	0	0	0

References	Study Quality
71 (16687747)	2

Image-guided biopsy kidney	Usually not appropriate	Expert Consensus	Varies	Varies	1	1	15	0	0	0	0	0	1	0	0
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	9	1	2	0	2	2	0	0	0
MRA abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	1	1	10	0	3	0	1	1	1	0	0



Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT pelvis with IV contrast	May be appropriate	Expert Consensus	⊗⊗⊗ 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 be appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	6	6	0	0	0	1	5	7	1	2	0
MRU without and with IV contrast	May be appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	6	6	0	0	0	2	5	8	0	1	0
		References		Study Quality											
		73 (12227682)		3											
CT abdomen and pelvis with IV contrast	May be appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	5	5	0	0	0	1	9	2	1	1	2
CT abdomen and pelvis without IV contrast	May be appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	5	5	0	0	0	1	10	2	0	3	0
CT pelvis without IV contrast	May be appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	5	5	0	0	0	2	9	3	2	0	0
CT pelvis without and with IV contrast	May be appropriate (Disagreement)	Expert Opinion	⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	5	5	3	1	4	1	1	5	1	0	0
CTU without and with IV contrast	May be appropriate	Limited	⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	5	5	0	0	1	3	7	4	0	1	0
		References		Study Quality											
		72 (12207185)		3											
MRI abdomen and pelvis without IV contrast	May be appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	5	5	0	0	0	2	10	3	0	1	0
MRI abdomen and pelvis without and with IV contrast	May be appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	5	5	0	0	0	2	9	4	1	0	0

MRI pelvis without IV contrast	May be appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	5	5	0	0	0	1	10	4	1	0	0
MRU without IV contrast	May be appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	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 be appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕⊕⊕ 10-30 mSv [ped]	4	4	3	1	4	1	5	1	1	0	0
DTPA renal scan	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕ 0.3-3 mSv [ped]	3	3	7	0	2	3	2	2	0	0	0
MAG3 renal scan	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕ 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	○ 0 mSv	○ 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	⊕⊕⊕⊕⊕ 10-30 mSv [ped]	1	1	9	0	3	2	1	1	0	0	0
Arteriography kidney	Usually not appropriate	Expert Consensus	⊕⊕⊕ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	11	0	3	0	1	1	0	0	0

US duplex Doppler kidney transplant	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	9	1	5	1	0	0	0	0	0
US pelvis	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	9	2	2	0	1	1	1	0	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	10	0	2	1	2	0	1	0	0
CTA pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 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	○ 0 mSv	○ 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	☼☼☼☼ 10-30 mSv		1	1	10	0	3	0	2	1	0	0	0
CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	13	1	1	1	0	0	0	0	0
MRA pelvis without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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.**

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							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)	4
77 (10096531)	3
78 (15996250)	3

CT abdomen and pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 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	☼☼☼☼ 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	☼☼☼☼☼ 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	○ 0 mSv	○ 0 mSv [ped]	3	3	7	1	2	4	2	0	0	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	7	0	3	4	2	0	0	0	0
MRI pelvis without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	7	1	2	0	6	0	0	0	0
MRI pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	7	1	2	0	6	0	0	0	0
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼☼ 10-30 mSv	☼☼☼☼☼☼ 10-30 mSv [ped]	2	2	8	2	4	0	0	1	1	0	0
CTU without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼☼ 10-30 mSv	☼☼☼☼☼☼ 10-30 mSv [ped]	2	2	8	6	1	0	0	0	1	0	0
MRU without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	8	1	5	1	1	0	0	0	0
MRA pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	8	1	2	1	2	2	0	0	0

US pelvis with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 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 not appropriate	Expert Consensus	⊗⊗⊗ 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	Usually not appropriate	Expert Consensus	⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	10	0	4	0	0	2	0	0	0
CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	⊗⊗⊗ 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	⊗⊗⊗ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	10	0	2	1	1	2	0	0	0
MRU without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	14	0	1	0	1	0	0	0	0
DTPA renal scan	Usually not appropriate	Expert Consensus	⊗⊗⊗ 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	⊗⊗⊗ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	10	2	3	0	1	0	0	0	0
US pelvis	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	9	3	2	0	0	1	1	0	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv		1	1	11	0	2	1	0	1	1	0	0
CTA pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 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	☼☼☼☼ 10-30 mSv		1	1	10	0	3	0	1	1	0	1	0
CTV pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 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	○ 0 mSv	○ 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	○ 0 mSv	○ 0 mSv [ped]	1	1	14	0	1	0	1	0	0	0	0
MRA pelvis without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 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](http://www.acr.org/ac).