American College of Radiology
ACR Appropriateness Criteria®

Right Upper Quadrant Pain

Variant 1: Right upper quadrant pain. Unknown etiology. Initial Imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US abdomen	Usually appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	9	9	1	0	0	0	0	0	1	4	10

References	Study Quality
16 (15256633)	4
7 (26526429)	4
25 (22798223)	Good
28 (11420481)	3
26 (31493199)	3
27 (28586152)	4
29 (15208132)	4

CT abdomen with IV contrast	Usually appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	8	8	0	0	1	0	0	0	7	7	1

References	Study Quality
7 (26526429)	4
10 (25424561)	3
9 (29702020)	3

CT abdomen without IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	1	0	0	5	6	1	2	1	0

References	Study Quality
7 (26526429)	4

		10 (25424561)	3												
		9 (29702020)	3												
MRI abdomen without IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	0	1	2	10	1	0	1	0
		References	Study Quality												
		11 (-3194377)	4												
		12 (15922197)	3												
		13 (7942684)	Inadequate												
MRI abdomen without and with IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	0	1	4	6	3	1	0	0
		References	Study Quality												
		11 (-3194377)	4												
		12 (15922197)	3												
		13 (7942684)	Inadequate												
Radiography abdomen	May be appropriate (Disagreement)	Expert Opinion	☢☢ 0.1-1mSv	☢☢ 0.03-0.3 mSv [ped]	5	5	1	3	8	1	1	0	0	2	0
		References	Study Quality												
		18 (20825832)	3												
		19 (12355000)	3												
		23 (19561056)	3												
		24 (16183928)	1												
		22 (10749232)	2												
		21 (26757563)	4												
		20 (16234073)	3												
Nuclear medicine scan gallbladder	Usually not appropriate	Limited	☢☢ 0.1-1mSv		3	3	2	1	7	2	2	1	0	1	0
		References	Study Quality												
		16 (15256633)	4												
		17 (19098200)	4												
		14 (15290472)	2												

		15 (14661666)		4												
CT abdomen without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	2	2	4	9	2	0	0	1	0	0	0
		References		Study Quality												
		7 (26526429)		4												
		10 (25424561)		3												
		9 (29702020)		3												

Variant 2: Right upper quadrant pain. Suspected biliary disease. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US abdomen	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		40 (7255722)		3											
		16 (15256633)		4											
		43 (12467321)		3											
		17 (19098200)		4											
		41 (7730462)		3											
		15 (14661666)		4											
		42 (7979854)		4											
		22 (10749232)		2											
		7 (26526429)		4											
		30 (24224584)		4											
		44 (26070243)		4											
CT abdomen with IV contrast	May be appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	6	6	0	0	0	0	0	0	0	0	0
		References		Study Quality											

			16 (15256633)		4											
			31 (11804880)		3											
			17 (19098200)		4											
			15 (14661666)		4											
			33 (19559349)		2											
			34 (20489092)		4											
			32 (16671375)		3											
			35 (19497464)		3											
			7 (26526429)		4											
			30 (24224584)		4											
			10 (25424561)		3											
MRI abdomen without and with IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	0	0	0	0	0
			References		Study Quality											
			36 (19711404)		4											
			37 (17581902)		3											
			38 (14628868)		2											
			7 (26526429)		4											
MRI abdomen without IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	0	0	0	0	0	0
			References		Study Quality											
			36 (19711404)		4											
			37 (17581902)		3											
			38 (14628868)		2											
			7 (26526429)		4											
Nuclear medicine scan gallbladder	May be appropriate	Limited	☢☢ 0.1-1mSv		5	5	0	0	0	0	0	0	0	0	0
			References		Study Quality											
			40 (7255722)		3											
			16 (15256633)		4											
			17 (19098200)		4											

		15 (14661666)	4												
		39 (21339427)	3												
CT abdomen without IV contrast	May be appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	0	0	0	0	0	0	0
		References	Study Quality												
		16 (15256633)	4												
		31 (11804880)	3												
		17 (19098200)	4												
		15 (14661666)	4												
		33 (19559349)	2												
		34 (20489092)	4												
		32 (16671375)	3												
		35 (19497464)	3												
		7 (26526429)	4												
		30 (24224584)	4												
		10 (25424561)	3												
CT abdomen without and with IV contrast	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	3	3	0	0	0	0	0	0	0	0	0
		References	Study Quality												
		16 (15256633)	4												
		31 (11804880)	3												
		17 (19098200)	4												
		15 (14661666)	4												
		33 (19559349)	2												
		34 (20489092)	4												
		32 (16671375)	3												
		35 (19497464)	3												
		7 (26526429)	4												
		30 (24224584)	4												
		10 (25424561)	3												

Variant 3: Right upper quadrant pain. No fever and no high white blood cell (WBC) count. Suspected biliary disease. Negative or equivocal ultrasound. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI abdomen without and with IV contrast with MRCP	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	0	0	0
References	Study Quality														
38 (14628868)	2														
7 (26526429)	4														
CT abdomen with IV contrast	Usually appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	0	0	0	0	0	0	0	0	0
References	Study Quality														
7 (26526429)	4														
10 (25424561)	3														
MRI abdomen without IV contrast with MRCP	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	0	0	0	0
References	Study Quality														
38 (14628868)	2														
7 (26526429)	4														
Nuclear medicine scan gallbladder	May be appropriate	Limited	☢☢ 0.1-1mSv		5	5	0	0	0	0	0	0	0	0	0
References	Study Quality														
45 (23731969)	4														
CT abdomen without IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	0	0	0	0	0	0	0
References	Study Quality														
7 (26526429)	4														
10 (25424561)	3														

CT abdomen without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	3	3	0	0	0	0	0	0	0	0	0

References	Study Quality
7 (26526429)	4
10 (25424561)	3

Variant 4: Right upper quadrant pain. Fever, elevated WBC count. Suspected biliary disease. Negative or equivocal ultrasound. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI abdomen without and with IV contrast with MRCP	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	0	0	0

References	Study Quality
49 (26526902)	3
36 (19711404)	4
37 (17581902)	3
47 (10937751)	2
38 (14628868)	2
48 (9676460)	2
7 (26526429)	4
25 (22798223)	Good

CT abdomen with IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	0	0	0	0	0	0	0	0	0

References	Study Quality
16 (15256633)	4
31 (11804880)	3
17 (19098200)	4
15 (14661666)	4
33 (19559349)	2

		34 (20489092)		4												
		32 (16671375)		3												
		35 (19497464)		3												
		46 (22332066)		2												
		7 (26526429)		4												
		30 (24224584)		4												
		10 (25424561)		3												
Nuclear medicine scan gallbladder	Usually appropriate	Moderate	☢☢ 0.1-1mSv		7	7	0	0	0	0	0	0	0	0	0	
		References		Study Quality												
		42 (7979854)		4												
		25 (22798223)		Good												
MRI abdomen without IV contrast with MRCP	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	0	0	0	0	0	
		References		Study Quality												
		49 (26526902)		3												
		36 (19711404)		4												
		37 (17581902)		3												
		47 (10937751)		2												
		38 (14628868)		2												
		48 (9676460)		2												
		7 (26526429)		4												
		25 (22798223)		Good												
CT abdomen without IV contrast	May be appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	0	0	0	0	0	0	0	
		References		Study Quality												
		16 (15256633)		4												
		31 (11804880)		3												
		17 (19098200)		4												
		15 (14661666)		4												
		33 (19559349)		2												

CT abdomen without and with IV contrast	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	3	3	0	0	0	0	0	0	0	0	0

References	Study Quality
16 (15256633)	4
31 (11804880)	3
17 (19098200)	4
15 (14661666)	4
33 (19559349)	2
34 (20489092)	4
32 (16671375)	3
35 (19497464)	3
46 (22332066)	2
7 (26526429)	4
30 (24224584)	4
10 (25424561)	3

Variant 5: Right upper quadrant pain. Suspected acalculous cholecystitis. Negative or equivocal ultrasound. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Nuclear medicine scan gallbladder	Usually appropriate	Limited	☢☢ 0.1-1mSv		8	8	0	0	0	0	0	0	0	0	0

		References		Study Quality											
		51 (19879969)		4											
CT abdomen with IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	6	6	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		31 (11804880)		3											
		50 (20489669)		3											
		7 (26526429)		4											
		10 (25424561)		3											
Image-guided cholecystostomy	May be appropriate	Strong	Varies	Varies	6	6	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		57 (21318431)		2											
		52 (21814147)		2											
		55 (22192897)		2											
		56 (22133709)		2											
		53 (25539703)		4											
		54 (7579876)		4											
MRI abdomen without and with IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		36 (19711404)		4											
		37 (17581902)		3											
		38 (14628868)		2											
		7 (26526429)		4											
MRI abdomen without IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		36 (19711404)		4											
		37 (17581902)		3											

		38 (14628868)		2											
		7 (26526429)		4											
CT abdomen without IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		31 (11804880)		3											
		50 (20489669)		3											
		7 (26526429)		4											
		10 (25424561)		3											
CT abdomen without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	3	3	0	0	0	0	0	0	0	0	0
		References		Study Quality											
		31 (11804880)		3											
		50 (20489669)		3											
		7 (26526429)		4											
		10 (25424561)		3											

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.**