

American College of Radiology
ACR Appropriateness Criteria®

Abnormal Liver Function Tests

Variant 1: Abnormal liver function tests. Hepatocellular predominance with mild aminotransferase increase. 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	3	5	8
		References		Study Quality											
		6 (24849827)		4											
		7 (24381873)		4											
		9 (12198701)		3											
		8 (21618575)		Good											
		10 (20185194)		3											
		11 (20574093)		2											
		13 (19716568)		4											
		14 (19304694)		4											
		12 (26673807)		4											
US duplex Doppler abdomen	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	1	11	2	1
		References		Study Quality											
		16 (9694471)		3											
		17 (24829735)		4											
MRI abdomen without IV contrast with MRCP	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	1	0	1	0	3	5	5	0	1
		References		Study Quality											

[illegible]

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	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	5	2	9
		References		Study Quality											
		54 (31054739)		4											
		55 (3881796)		4											
		56 (25444098)		4											
		57 (7054838)		4											
		58 (7403553)		4											
		59 (15256619)		4											
CT abdomen and pelvis with IV contrast	Usually appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	0	0	0	0	0	3	10	2	0
		References		Study Quality											
		37 (23674857)		3											
		38 (8539386)		3											

		39 (21410060)		4											
		40 (15851049)		3											
US duplex Doppler abdomen	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	1	8	4	2
MRI abdomen without IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	1	3	2	7	3	0	0
		References		Study Quality											
		43 (24808418)		4											
		50 (28266528)		4											
		51 (25030459)		3											
		38 (8539386)		3											
		44 (9672968)		4											
		45 (15503331)		3											
		46 (2704798)		4											
		47 (10358327)		4											
		48 (20010061)		4											
		49 (8610556)		4											
		52 (33034671)		4											
		53 (33081713)		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	1	3	6	4	2	0
		References		Study Quality											
		43 (24808418)		4											
		50 (28266528)		4											
		51 (25030459)		3											
		38 (8539386)		3											
		44 (9672968)		4											
		45 (15503331)		3											
		46 (2704798)		4											
		47 (10358327)		4											
		48 (20010061)		4											

[illegible]

Variant 3: Abnormal liver function tests. Cholestatic predominance. Elevated alkaline phosphatase with or without elevated gamma-glutamyl transpeptidase. 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	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	3	3	10
		References		Study Quality											
		73 (25719223)		M											
		70 (22071641)		3											
		71 (24124333)		4											
		65 (18722735)		4											
		72 (26895915)		4											
CT abdomen and pelvis with IV contrast	Usually appropriate	Limited	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	7	7	0	0	1	1	2	2	6	4	0
		References		Study Quality											
		63 (28154908)		3											
MRI abdomen without and with IV contrast with MRCP	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	1	1	5	4	4	1
		References		Study Quality											
		66 (26205638)		3											
		64 (24780789)		3											
		51 (25030459)		3											
		65 (18722735)		4											
MRI abdomen without IV contrast with MRCP	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	4	5	5	0	1
		References		Study Quality											
		69 (21765298)		4											
		68 (22160649)		3											
		67 (25001391)		4											

CT abdomen and pelvis without IV contrast	May be appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	4	4	2	0	2	5	6	0	0	0	0
US duplex Doppler abdomen	May be appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	4	4	0	1	3	4	6	1	0	0	0

References	Study Quality
74 (30347616)	4

CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	⊕⊕⊕⊕ 10-30 mSv	⊕⊕⊕⊕⊕ 10-30 mSv [ped]	3	3	3	3	9	0	0	0	0	0	0
MR elastography abdomen	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	5	2	6	1	2	0	0	0	0
US shear wave elastography abdomen	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	5	3	5	1	2	0	0	0	0
US abdomen with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	6	2	5	2	0	0	1	0	0

Variant 4: Abnormal liver functions tests. Hyperbilirubinemia. Acute or subacute cholestasis. Conjugated or unconjugated. 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	Limited	○ 0 mSv	○ 0 mSv [ped]	9	9	0	0	0	0	0	0	1	4	11

References	Study Quality
81 (25305349)	4

CT abdomen and pelvis with IV contrast	Usually appropriate	Limited	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	7	7	0	0	1	1	1	4	4	5	0
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References	Study Quality
79 (20524442)	3

MRI abdomen without IV contrast with MRCP	Usually appropriate	Limited	0 0 mSv	0 0 mSv [ped]	7	7	0	0	0	0	4	3	8	0	1
		References	Study Quality												
		80 (29101993)	4												
		54 (31054739)	4												
MRI abdomen without and with IV contrast with MRCP	Usually appropriate	Limited	0 0 mSv	0 0 mSv [ped]	7	7	0	0	0	1	0	2	7	4	2
		References	Study Quality												
		80 (29101993)	4												
		54 (31054739)	4												
CT abdomen and pelvis without IV contrast	May be appropriate	Limited	☻☻☻ 1-10 mSv	☻☻☻☻ 3-10 mSv [ped]	4	4	1	1	3	5	3	3	0	0	0
		References	Study Quality												
		79 (20524442)	3												
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Limited	☻☻☻☻ 10-30 mSv	☻☻☻☻☻ 10-30 mSv [ped]	3	3	3	0	5	1	5	1	0	0	0
		References	Study Quality												
		79 (20524442)	3												
MR elastography abdomen	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	5	3	4	2	1	0	1	0	0
US shear wave elastography abdomen	Usually not appropriate	Moderate	0 0 mSv	0 0 mSv [ped]	3	3	4	2	9	0	0	0	0	0	0
		References	Study Quality												
		18 (24476011)	Good												
US duplex Doppler abdomen	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	1	2	12	0	0	0	0	0	0
US abdomen with IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	2	2	6	3	4	2	0	1	0	0	0
		References	Study Quality												

54 (31054739)	4
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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.