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.

	Appropriateness	207							F	inal	Tabul	atio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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										

			-												
		32 (21997548)			4										
		9 (12198701)			3										
		10 (20185194)			3										
		11 (20574093)			2										
		28 (23382293)			4										
		29 (22923718)			3										
		30 (22025886)			4										
		31 (25086936)			4										
		33 (20594607)			3	_									
US shear wave elastography abdomen	May be appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	1	8	5	1	0
		References		Study	Quality										
		18 (24476011)		C	Good										
MRI abdomen without and with IV contrast with MRCP	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	0	1	4	1	3	5	1	0	0
MR elastography abdomen	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	0	0	4	9	1	0	0	0
		References		Study	Quality								•		
		27 (21460032)		-	4										
CT abdomen and pelvis without IV contrast	May be appropriate	Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	4	4	1	3	2	2	7	0	0	0	0
		References		Study	Quality										
		19 (22733892)			3										
		20 (16484355)			2										
		21 (17449775)			3										
		22 (9252082)			3										
		23 (17185663)			4										
		24 (25914777)			4										
CT abdomen and pelvis with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	1	4	9	1	0	0	0	0	0

			References			Study	Quality										
			20 (16484355)				2										
			25 (9663278)				3										
			26 (30190781)				4										
CT abdomen and pelvis without and with IV contrast	Usuall approp	y not oriate	Expert Consensus	Expert		0-30 nSv ped]	3	3	6	0	9	0	0	0	0	0	0
US abdomen with IV contrast	Usuall approp	y not oriate	Limited	O 0 mSv		0 mSv ped]	3	3	4	1	7	2	2	0	0	0	0
			References			Study	Quality										
			15 (25068001)				3										

Variant 2: Abnormal liver function tests. Hepatocellular predominance with moderate or severe aminotransferase increase. Initial imaging.

D 1	Appropri	ateness	COE	4 1 14 DD	_	D I DDI	D 4	3.6 11			F	inal '	Tabu	latio	ns		
Procedure	Categ	ory	SOE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US abdomen	Usua approp		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	Usua approp		Limited	��� 1-10 mSv	0	���� 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)		1	3			1	1	1	1		I		
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										

	49 (8610556)			4										
	52 (33034671)			4										
	53 (33081713)			4										
May be appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	5	5	1	1	3	3	5	2	1	0	0
	References		Study	Quality		-								
	37 (23674857)			3										
	38 (8539386)			3										
	39 (21410060)			4										
	40 (15851049)			3										
Usually not appropriate	Limited	୫୫୫୫ 10-30 mSv	����� 10-30 mSv [ped]	3	3	3	0	5	1	5	1	0	0	0
	References		Study Quality											
	37 (23674857)		Study Quality 3											
	38 (8539386)			3										
	39 (21410060)			4										
	40 (15851049)			3										
Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	2	4	9	0	0	0	0	0	0
Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	3	2	6	2	1	2	0	0	0
	References		Study	Quality		-								
	60 (23137926)		Study Quality 4											
Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	5	4	3	1	1	1	1	0	0
	References		Study		_	_								
	41 (23837611)			3										
	42 (24166665)			3										
	Usually not appropriate Usually not appropriate Usually not appropriate Usually not appropriate Usually not appropriate	S3 (33081713) May be appropriate	May be appropriate	Signature Sign	Signature Sign	May be appropriate	S3 (33081713)	May be appropriate						

Variant 3: Abnormal liver function tests. Cholestatic predominance. Elevated alkaline phosphatase with or without elevated gamma-glutamyl transpeptidase. Initial imaging.

Durandana	Appropriateness	SOF	A Julta DDI	D. J. DDI	D - 45	M - 3!			F	inal	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	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 approp		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 approp	be briate	Limited	O 0 mSv	,	O 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 approp		Expert Consensus	���� 10- mSv		����� 10-30 mSv [ped]	3	3	3	3	9	0	0	0	0	0	0
MR elastography abdomen	Usually approp	y not oriate	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	3	3	5	2	6	1	2	0	0	0	0
US shear wave elastography abdomen	Usually approp		Expert Consensus	O 0 mSv	/	O 0 mSv [ped]	3	3	5	3	5	1	2	0	0	0	0
US abdomen with IV contrast	Usually approp		Expert Consensus	O 0 mSv	,	O 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.

D 1	Appropriat	teness	GOE.	4 1 14 DD	T D 1	DDI	D 41	3.6 11			F	inal '	Tabu	latio	ns		
Procedure	Categor		SOE	Adults RR	L Peas	s RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US abdomen	Usually appropria	-	Limited	O 0 mSv		mSv ped]	9	9	0	0	0	0	0	0	1	4	11
			References			Study	Quality										
			81 (25305349)			Inad	equate										
CT abdomen and pelvis with IV contrast	Usually appropria	-	Limited	��� 1-10 mSv	10	≎≎ 3- mSv ped]	7	7	0	0	1	1	1	4	4	5	0
			References			Study	Quality										
			79 (20524442)				3										

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

54 (21054720)	Л
54 (31054739)	4

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.