American College of Radiology ACR Appropriateness Criteria®

Staging and Follow-up of Primary Liver Cancer

Variant 1: Adult. Primary liver cancer. Screening.

Duran James	Appropri	ateness	SOF	A J14., DD1	_	D. J. DDY	D - 43	M - 12 -			F	inal '	Tabu	latio	ns		
Procedure	Categ	ory	SOE	Adults RRI	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US abdomen	Usua approp		Moderate	O 0 mSv		O 0 mSv [ped]	8	8	0	0	0	1	0	0	6	4	6
			References			Study	Quality										
			16 (27775821)				3										
			15 (29981779)				4										
			14 (15042359)				1										
			4 (29624699)				4										
			13 (11592607)				4										
MRI abdomen without and with IV contrast	May approp	be riate	Moderate	O 0 mSv		O 0 mSv [ped]	6	6	0	0	0	2	1	5	6	0	0
			References			Study	Quality										
			11 (31524775)				3										
			10 (25714281)				2										
			9 (27657493)				3										
			8 (29268722)				4										
CT abdomen with IV contrast multiphase	May approp	be riate	Limited	���� 10-3 mSv	30		5	5	0	0	1	1	6	4	2	0	0
			References			Study	Quality										
			4 (29624699)				4										

MRI abdomen without IV contrast	May approp	Limited	O 0 mSv	O 0 mSv [ped]	4	4	1	1	0	8	2	2	0	0	0
		References		Study	Quality										
		8 (29268722)			4										
		12 (27558976)			3										
CT abdomen with IV contrast	Usuall approp	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	2	2	5	3	4	1	0	0	0
		References		Study	Quality										
		4 (29624699)			4										
CT abdomen without and with IV contrast	Usuall approp	Limited	���� 10-3 mSv	30	3	3	2	2	9	1	0	0	0	0	0
	•	References		Study	Quality										
		4 (29624699)			4										
MRI abdomen without IV contrast with MRCP	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	6	2	3	6	0	0	0	0	0
MRI abdomen without and with IV contrast with MRCP	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	0	3	3	2	1	1	0	0
US abdomen with IV contrast	Usuall approp	Limited	O 0 mSv	O 0 mSv [ped]	3	3	5	2	7	0	0	0	0	0	0
CT abdomen without IV contrast	Usuall approp	Expert Consensus	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	11	4	2	0	0	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usuall approp	Expert Consensus	≎≎≎≎ 10-3 mSv	30	1	1	10	5	2	0	0	0	0	0	0

Variant 2: Adult. Primary liver cancer. Staging.

	Appropriateness	COE	A L L DDI	n i nni	·	3.5.31]	inal	Tabı	ılatio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9

	Appropriateness	207							F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT abdomen with IV contrast multiphase	Usually appropriate	Limited	���� 10-30 mSv		9	9	0	0	0	0	2	1	3	1	7
		References		Study	y Quality										
		4 (29624699)			4								_		
MRI abdomen without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	0	7	1	5
		References		Study	y Quality										
		23 (28859233)			4										
		4 (29624699)			4										
CT abdomen and pelvis with IV contrast	May be appropriate (Disagreement)	Expert Opinion	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	5	5	1	1	6	1	3	2	1	0	0
CT chest with IV contrast	May be appropriate (Disagreement)	Expert Opinion	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	5	5	1	1	1	1	1	0	6	3	1
CT chest without IV contrast	May be appropriate (Disagreement)	Expert Opinion	��� 1-10 mSv	���� 3- 10 mSv [ped]	5	5	0	2	0	1	1	1	10	0	0
CT pelvis with IV contrast	May be appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	4	4	0	2	1	7	2	2	1	0	0
MRI abdomen without and with IV contrast with MRCP	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	1	1	5	3	2	2	0	0	0
Bone scan whole body	May be appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	4	4	0	2	2	5	3	2	0	0	0
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Limited	ଡଡ଼ଡ଼ଡ଼ 10-30 mSv	\$\$\$\$\$ 10-30 mSv [ped]	3	3	3	2	3	4	0	1	1	0	0
FDG-PET/MRI skull base to mid-thigh	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	2	2	7	0	2	0	0	1	0

References	Study Quality
21 (10845666)	3
20 (29518452)	3

		20 (27310132)													
CT abdomen and pelvis without IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	6	5	2	0	1	0	0	0	0
CT chest without and with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	5	4	2	1	1	1	0	0	0
CT pelvis without IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	3	5	5	0	1	0	0	0	0
CT pelvis without and with IV contrast	Usually not appropriate	Limited	���� 10-30 mSv	���� 3- 10 mSv [ped]	2	2	4	4	4	1	1	0	0	0	0
MRI abdomen without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	5	3	5	1	0	0	0	0	0
MRI abdomen without IV contrast with MRCP	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	5	3	5	0	0	0	0	1	0
US abdomen with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	9	2	1	0	1	1	0	0	0
US abdomen transabdominal	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	2	3	0	0	0	0	0	0

Variant 3: Adult. Primary liver cancer. Liver observations under active surveillance.

D 1	Appropriateness	COF	A L L DDI	D I DDI	D 41	N. 6 11			F	inal '	Гаbu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI abdomen without and with IV contrast	Usually appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	1	2	11
CT abdomen with IV contrast multiphase	Usually appropriate	Moderate	���� 10-30 mSv		9	9	0	0	0	0	0	0	1	4	9

CT abdomen without and with IV contrast	May approp	Expert Consensus	୫୫୫୫ 10-30 mSv	&&&&& 10-30 mSv [ped]	4	4	0	3	4	2	4	0	1	0	0
MRI abdomen without and with IV contrast with MRCP	May approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	1	0	4	3	3	3	0	0	0
CT abdomen with IV contrast	Usually approp	Moderate	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	3	3	1	3	5	4	1	0	0	0	0
US abdomen with IV contrast	Usually approp	Limited	O 0 mSv	O 0 mSv [ped]	3	3	1	6	4	1	2	0	0	0	0
MRI abdomen without IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	4	5	4	1	0	0	0	0	0
MRI abdomen without IV contrast with MRCP	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	3	5	5	0	1	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually approp	Expert Consensus	��� 10-30 mSv	���� 3- 10 mSv [ped]	2	2	6	4	2	1	1	0	0	0	0
US abdomen transabdominal	Usually approp	Limited	O 0 mSv	O 0 mSv [ped]	2	2	3	6	2	2	1	0	0	0	0
		References		Study	Quality										
		6 (27158749)			4										
CT abdomen without IV contrast	Usually approp	Expert Consensus	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	11	1	2	0	0	0	0	0	0

Variant 4: Adult. Primary liver cancer. Posttreatment evaluation after liver directed therapy or neoadjuvant chemotherapy.

December 1	Appropriateness	SOE	A Julia DDI	D. J. DDI	D - 41	М. 11			F	inal T	Гаbu	lation	ıs		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI abdomen without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	0	3	11

		References		Study	Quality										
		4 (29624699)			4										
		24 (33596330)			3										
		25 (-3197194)			4		_								
CT abdomen with IV contrast multiphase	Usually appropriate	Limited	���� 10-30 mSv)	8	8	0	0	0	0	0	0	1	7	6
		References		Study	Quality										
		4 (29624699)			4										
		24 (33596330)			3										
CT abdomen without and with IV contrast	Usually appropriate	Expert Consensus	���� 10-30 mSv		7	7	1	0	0	0	1	0	8	4	0
MRI abdomen without and with IV contrast with MRCP	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	2	1	2	5	3	1	0	0	0
CT abdomen with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	3	1	9	0	1	0	0	0	0
FDG-PET/CT skull base to mid- thigh	Usually not appropriate	Expert Consensus	���⊕ 10-30 mSv	9999 3- 10 mSv [ped]	3	3	5	2	6	0	1	0	0	0	0
US abdomen with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	3	2	4	2	3	0	0	0	0
MRI abdomen without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	7	3	4	0	0	0	0	0	0
MRI abdomen without IV contrast with MRCP	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	6	4	3	0	1	0	0	0	0
CT abdomen without IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	9	2	3	0	0	0	0	0	0
US abdomen transabdominal	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	2	3	0	0	0	0	0	0

Variant 5: Adult. Primary liver cancer. Treated. Routine surveillance.

	Appropriateness	GOT	4.1.1. DDT		- ·				F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI abdomen without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	0	4	10
		References		Study	Quality										
		24 (33596330)			3										
CT abdomen with IV contrast multiphase	Usually appropriate	Limited	���� 10-30 mSv	0	9	9	0	0	0	0	0	0	1	3	10
		References		Study	Quality										
		24 (33596330)			3										
CT abdomen without and with IV contrast	May be appropriate	Expert Consensus	ଡେଡେଡ 10-30 mSv	⊕⊕⊕⊕⊕ 10-30 mSv [ped]	5	5	2	0	1	4	5	1	1	0	0
MRI abdomen without and with IV contrast with MRCP	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	2	0	1	3	6	2	0	0	0
CT abdomen with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	5	1	3	3	1	1	0	0	0
MRI abdomen without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	5	6	3	0	0	0	0	0	0
MRI abdomen without IV contrast with MRCP	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	7	4	3	0	0	0	0	0	0
FDG-PET/CT skull base to mid-thigh	Usually not appropriate	Expert Consensus	���� 10-30 mSv	0	2	2	4	4	5	0	1	0	0	0	0
US abdomen with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	7	5	2	0	0	0	0	0	0

CT abdomen without IV contrast	Usually not appropriate	Expert Consensus	୫୫୫ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	9	1	4	0	0	0	0	0	0
US abdomen transabdominal	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	2	0	0	0	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.