American College of Radiology
ACR Appropriateness Criteria®

Management of Liver Cancer

Variant 1: Hepatocellular cancer: Solitary tumor less than 3 cm, cirrhotic.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Liver transplantation	Usually appropriate	Strong	N/A	N/A	9	9	0	0	0	2	1	0	2	3	7

References	Study Quality
1 (8594428)	2
10 (22424438)	4
7 (25921669)	4
11 (24606007)	2
12 (24347475)	3
2 (10518312)	4
9 (27416729)	4

Surgical liver resection	Usually appropriate	Strong	N/A	N/A	8	8	0	0	1	0	0	3	4	5	2

References	Study Quality
1 (8594428)	2
5 (17617328)	2
7 (25921669)	4
2 (10518312)	4
3 (20385428)	4
4 (16332475)	3
6 (28053342)	4

		8 (17981188)		3												
Percutaneous ablation liver	Usually appropriate	Strong	N/A	N/A	8	8	0	0	0	0	0	0	4	8	3
		References		Study Quality												
		15 (16495695)		1												
		19 (18008357)		2												
		17 (23428356)		2												
		20 (22357902)		2												
		21 (23374361)		2												
		16 (22634125)		1												
		18 (21107100)		1												
		14 (19174803)		M												
		9 (27416729)		4												
		13 (28351116)		Not Assessed												
Transarterial chemoembolization	May be appropriate	Limited	N/A	N/A	5	5	0	0	1	2	9	2	0	1	0
		References		Study Quality												
		36 (29354763)		4												
		37 (15633215)		2												
		38 (16978986)		4												
Combination locoregional therapy	May be appropriate	Strong	N/A	N/A	5	5	0	0	1	2	6	4	0	2	0
		References		Study Quality												
		51 (23134976)		M												
		49 (26342009)		2												
		50 (25577299)		1												
		9 (27416729)		4												
		38 (16978986)		4												
		52 (22157201)		1												
		53 (27362551)		1												
		54 (18688876)		2												

		55 (25409554)		2												
Transarterial radioembolization	May be appropriate	Strong	N/A	N/A	5	5	0	1	0	2	5	5	0	2	0	
		References		Study Quality												
		39 (19766639)		2												
		46 (17048240)		3												
		32 (19552767)		2												
		45 (28668402)		2												
		3 (20385428)		4												
		35 (28799575)		2												
		36 (29354763)		4												
		40 (22911442)		2												
		41 (30954184)		4												
		42 (29688155)		2												
		43 (24691943)		2												
		44 (20421150)		3												
		47 (29194711)		2												
		48 (25981135)		4												
External beam radiation therapy	May be appropriate	Strong	N/A	N/A	5	5	0	0	0	3	8	2	1	1	0	
		References		Study Quality												
		23 (21645977)		2												
		34 (22467602)		3												
		24 (23547075)		1												
		32 (19552767)		2												
		22 (30068240)		4												
		25 (16982547)		2												
		26 (20231127)		2												
		33 (22172906)		3												
		35 (28799575)		2												

Bland transarterial embolization	May be appropriate	Limited	N/A	N/A	4	4	2	1	3	5	2	1	0	1	0
	References	Study Quality													
	36 (29354763)	4													
Systemic therapies	Usually not appropriate	Expert Consensus	N/A	N/A	2	2	6	4	5	0	0	0	0	0	0

Variant 2: Hepatocellular cancer: Solitary tumor 3 to 5 cm, cirrhotic.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Liver transplantation	Usually appropriate	Strong	N/A	N/A	9	9	0	0	0	2	0	0	3	3	7
	References	Study Quality													
	1 (8594428)	2													
	10 (22424438)	4													
	11 (24606007)	2													
	12 (24347475)	3													
	57 (21695773)	4													
Surgical liver resection	Usually appropriate	Limited	N/A	N/A	7	7	0	0	1	0	1	2	5	5	1
	References	Study Quality													
	1 (8594428)	2													
	56 (28130846)	4													
	7 (25921669)	4													
	2 (10518312)	4													
	8 (17981188)	3													
Transarterial chemoembolization	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	0	3	10	1	1
	References	Study Quality													

		69 (11981766)	1												
		68 (12049862)	1												
		62 (18503900)	2												
		61 (24493271)	2												
		63 (17103105)	4												
		75 (18936575)	2												
		76 (19912531)	4												
		78 (18696158)	2												
		79 (16939518)	4												
		74 (23041304)	4												
		77 (20373461)	2												
		80 (15004776)	4												
		64 (20213741)	2												
		66 (19908093)	1												
		73 (20740319)	2												
		65 (24224722)	M												
		60 (26834067)	1												
		71 (9696501)	1												
		72 (7708069)	1												
		70 (18242076)	1												
Combination locoregional therapy	Usually appropriate	Strong	N/A	N/A	7	7	1	0	0	0	1	2	8	2	1
		References	Study Quality												
		51 (23134976)	M												
		49 (26342009)	2												
		50 (25577299)	1												
		9 (27416729)	4												
		52 (22157201)	1												
		53 (27362551)	1												
		54 (18688876)	2												
		55 (25409554)	2												

		83 (23216261)	2												
		84 (21966941)	2												
Transarterial radioembolization	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	1	4	5	3	2
		References	Study Quality												
		46 (17048240)	3												
		32 (19552767)	2												
		45 (28668402)	2												
		81 (25921670)	4												
		3 (20385428)	4												
		41 (30954184)	4												
		42 (29688155)	2												
		43 (24691943)	2												
		44 (20421150)	3												
		47 (29194711)	2												
		48 (25981135)	4												
		82 (31233480)	2												
Bland transarterial embolization	May be appropriate	Strong	N/A	N/A	6	6	1	0	0	4	1	5	3	0	1
		References	Study Quality												
		62 (18503900)	2												
		61 (24493271)	2												
		63 (17103105)	4												
		64 (20213741)	2												
		66 (19908093)	1												
		67 (22251546)	4												
		65 (24224722)	M												
		60 (26834067)	1												
Percutaneous ablation liver	May be appropriate	Strong	N/A	N/A	5	5	0	0	0	1	10	2	0	2	0
		References	Study Quality												

51 (23134976)	M
49 (26342009)	2
50 (25577299)	1
52 (22157201)	1
53 (27362551)	1
54 (18688876)	2
55 (25409554)	2
58 (26220125)	2
59 (25958973)	2

External beam radiation therapy	May be appropriate	Strong	N/A	N/A	5	5	0	0	1	3	8	1	2	0	0

References	Study Quality
23 (21645977)	2
34 (22467602)	3
24 (23547075)	1
32 (19552767)	2
22 (30068240)	4
25 (16982547)	2
26 (20231127)	2
33 (22172906)	3
35 (28799575)	2

Systemic therapies	Usually not appropriate	Expert Consensus	N/A	N/A	3	3	2	5	7	1	0	0	0	0	0

Variant 3: Hepatocellular cancer: Multifocal, bilobar disease, at least 1 tumor greater than 5 cm, cirrhotic.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Transarterial chemoembolization	Usually appropriate	Strong	N/A	N/A	8	8	0	0	0	0	0	0	7	6	2

References	Study Quality
69 (11981766)	1
68 (12049862)	1
62 (18503900)	2
61 (24493271)	2
63 (17103105)	4
64 (20213741)	2
66 (19908093)	1
67 (22251546)	4
65 (24224722)	M
60 (26834067)	1
100 (24549881)	2
101 (17377182)	2
71 (9696501)	1
72 (7708069)	1
70 (18242076)	1

Transarterial radioembolization	Usually appropriate	Strong	N/A	N/A	8	8	0	0	0	0	0	0	3	10	2

References	Study Quality
102 (20066715)	2
103 (20022765)	2
104 (21983055)	2
106 (23093355)	2
107 (21044630)	2
46 (17048240)	3
32 (19552767)	2
45 (28668402)	2
105 (27586657)	4
109 (27315059)	3
3 (20385428)	4
35 (28799575)	2

		36 (29354763)	4												
		41 (30954184)	4												
		42 (29688155)	2												
		43 (24691943)	2												
		44 (20421150)	3												
		47 (29194711)	2												
		108 (21618574)	2												
		110 (24332243)	3												
Bland transarterial embolization	Usually appropriate	Strong	N/A	N/A	7	7	0	0	1	1	1	4	7	0	1
		References	Study Quality												
		62 (18503900)	2												
		61 (24493271)	2												
		63 (17103105)	4												
		64 (20213741)	2												
		66 (19908093)	1												
		67 (22251546)	4												
		65 (24224722)	M												
		60 (26834067)	1												
		100 (24549881)	2												
		101 (17377182)	2												
Systemic therapies	Usually appropriate	Strong	N/A	N/A	7	7	0	1	0	0	0	6	7	1	0
		References	Study Quality												
		85 (18650514)	1												
		86 (19095497)	1												
		90 (29875066)	2												
		91 (28434648)	2												
		89 (32847838)	1												
		88 (27932229)	1												
		87 (32402160)	1												

Combination locoregional therapy	May be appropriate	Strong	N/A	N/A	5	5	0	0	1	3	5	2	3	1	0

References	Study Quality
83 (23216261)	2
84 (21966941)	2

External beam radiation therapy	May be appropriate	Strong	N/A	N/A	4	4	0	1	1	8	3	2	0	0	0

References	Study Quality
34 (22467602)	3
24 (23547075)	1
32 (19552767)	2
22 (30068240)	4
25 (16982547)	2
26 (20231127)	2
33 (22172906)	3
35 (28799575)	2

Surgical liver resection	Usually not appropriate	Strong	N/A	N/A	3	3	4	2	5	1	1	2	0	0	0

References	Study Quality
95 (19106671)	4
93 (21159100)	2
75 (18936575)	2
46 (17048240)	3
32 (19552767)	2
45 (28668402)	2
81 (25921670)	4
3 (20385428)	4
33 (22172906)	3
35 (28799575)	2
36 (29354763)	4
47 (29194711)	2

		54 (18688876)	2												
		92 (22864644)	2												
		94 (12783395)	2												
		96 (19032223)	2												
		97 (15561225)	4												
Percutaneous ablation liver	Usually not appropriate	Expert Consensus	N/A	N/A	3	3	0	6	7	2	0	0	0	0	0
Liver transplantation	Usually not appropriate	Strong	N/A	N/A	2	2	6	4	5	0	0	0	0	0	0
		References	Study Quality												
		95 (19106671)	4												
		93 (21159100)	2												
		75 (18936575)	2												
		46 (17048240)	3												
		32 (19552767)	2												
		45 (28668402)	2												
		81 (25921670)	4												
		3 (20385428)	4												
		33 (22172906)	3												
		35 (28799575)	2												
		36 (29354763)	4												
		47 (29194711)	2												
		54 (18688876)	2												
		92 (22864644)	2												
		94 (12783395)	2												
		96 (19032223)	2												
		97 (15561225)	4												

Variant 4: Hepatocellular cancer: Solitary or multifocal disease with vascular invasion, cirrhotic.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Systemic therapies	Usually appropriate	Strong	N/A	N/A	8	8	0	0	0	0	0	1	7	4	3

References	Study Quality
85 (18650514)	1
86 (19095497)	1
90 (29875066)	2
91 (28434648)	2
89 (32847838)	1
88 (27932229)	1
87 (32402160)	1

Transarterial radioembolization	Usually appropriate	Strong	N/A	N/A	8	8	0	0	0	0	1	2	2	8	2

References	Study Quality
102 (20066715)	2
103 (20022765)	2
104 (21983055)	2
106 (23093355)	2
46 (17048240)	3
105 (27586657)	4
109 (27315059)	3
81 (25921670)	4
108 (21618574)	2
110 (24332243)	3

Transarterial chemoembolization	May be appropriate	Strong	N/A	N/A	6	6	0	1	0	0	6	6	2	0	0

References	Study Quality
114 (23566041)	Good
115 (22200992)	2
116 (20839057)	1

Bland transarterial embolization	May be appropriate	Strong	N/A	N/A	5	5	1	1	0	3	7	2	1	0	0

References	Study Quality
114 (23566041)	Good
115 (22200992)	2
116 (20839057)	1

Combination locoregional therapy	May be appropriate	Limited	N/A	N/A	5	5	0	1	0	2	10	2	0	0	0

References	Study Quality
117 (29543938)	1

External beam radiation therapy	May be appropriate	Strong	N/A	N/A	4	4	0	0	1	8	3	2	0	1	0

References	Study Quality
24 (23547075)	1
25 (16982547)	2
26 (20231127)	2

Surgical liver resection	Usually not appropriate	Moderate	N/A	N/A	2	2	6	5	4	0	0	0	0	0	0

References	Study Quality
111 (24096763)	2

Percutaneous ablation liver	Usually not appropriate	Expert Consensus	N/A	N/A	2	2	5	7	1	2	0	0	0	0	0
Liver transplantation	Usually not appropriate	Strong	N/A	N/A	1	1	9	3	2	0	1	0	0	0	0

References	Study Quality
112 (27107252)	2
113 (26386273)	2

Variant 5: Intrahepatic cholangiocarcinoma: Peripheral hepatic lobar cholangiocarcinoma, less than 3 cm; no biliary ductal dilatation, macroscopic vascular invasion, regional lymphadenopathy, or distant metastases.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Surgical liver resection	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	0	0	5	4	6
	References	Study Quality													
	121 (29911912)	2													
	120 (28577720)	4													
Percutaneous ablation liver	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	1	1	11	2	0
	References	Study Quality													
	123 (21257864)	2													
	125 (22374282)	1													
	124 (28343412)	4													
Liver transplantation	May be appropriate	Limited	N/A	N/A	5	5	2	1	3	1	6	2	0	0	0
	References	Study Quality													
	122 (10836374)	4													
	121 (29911912)	2													
Systemic therapies	May be appropriate	Limited	N/A	N/A	5	5	0	0	1	1	9	1	2	1	0
	References	Study Quality													
	119 (20375404)	1													
Transarterial radioembolization	May be appropriate	Limited	N/A	N/A	5	5	0	0	0	4	5	4	1	1	0
	References	Study Quality													
	127 (19876691)	2													
Transarterial chemoembolization	May be appropriate	Expert Consensus	N/A	N/A	4	4	0	1	6	3	5	0	0	0	0

External beam radiation therapy	May be appropriate	Expert Consensus	N/A	N/A	4	4	0	5	3	2	4	1	0	0	0
Bland transarterial embolization	Usually not appropriate	Expert Consensus	N/A	N/A	3	3	2	2	6	2	3	0	0	0	0

Variant 6: Ductal cholangiocarcinoma: Hilar cholangiocarcinoma, greater than 3 cm with poorly defined margins, vascular invasion, and periportal lymphadenopathy.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Systemic therapies	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	1	0	2	7	5
References			Study Quality												
119 (20375404)			1												
Transarterial radioembolization	May be appropriate	Limited	N/A	N/A	5	5	0	2	4	1	3	5	0	0	0
References			Study Quality												
132 (31079715)			4												
131 (27826686)			2												
External beam radiation therapy	May be appropriate	Limited	N/A	N/A	4	4	0	0	2	7	4	1	1	0	0
References			Study Quality												
128 (26172136)			4												
Transarterial chemoembolization	Usually not appropriate	Moderate	N/A	N/A	3	3	1	2	5	1	5	1	0	0	0
References			Study Quality												
130 (23725793)			Good												
Bland transarterial embolization	Usually not appropriate	Limited	N/A	N/A	3	3	3	2	4	3	1	2	0	0	0
References			Study Quality												
129 (23846786)			3												

Surgical liver resection	Usually not appropriate	Expert Consensus	N/A	N/A	2	2	7	5	3	0	0	0	0	0	0
Percutaneous ablation liver	Usually not appropriate	Expert Consensus	N/A	N/A	2	2	6	7	0	1	1	0	0	0	0
Liver transplantation	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	10	3	1	0	1	0	0	0	0

Variant 7: Metastatic liver disease: Multifocal metastatic neuroendocrine tumor (includes carcinoid tumors as well as islet cell tumors of the pancreas).

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Long-acting somatostatin analogs	Usually appropriate	Strong	N/A	N/A	8	8	0	0	0	0	0	1	4	4	6

References	Study Quality
133 (28132407)	2
134 (26731483)	1

Transarterial chemoembolization	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	3	2	8	2	0

References	Study Quality
149 (16134179)	2
150 (17609443)	2
152 (22722717)	2
157 (22027582)	2
132 (31079715)	4
133 (28132407)	2
156 (27520932)	2
154 (25012459)	Inadequate
151 (21107755)	2
153 (24385266)	2
155 (26663886)	2

Bland transarterial embolization	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	3	3	7	2	0

References	Study Quality
149 (16134179)	2
150 (17609443)	2
152 (22722717)	2
132 (31079715)	4
133 (28132407)	2
156 (27520932)	2
154 (25012459)	Inadequate
151 (21107755)	2
153 (24385266)	2
155 (26663886)	2

Peptide receptor radionuclide therapy	Usually appropriate	Strong	N/A	N/A	7	7	0	0	1	0	1	2	7	3	1

References	Study Quality
161 (18445841)	2
160 (22934111)	2
162 (28076709)	1

Transarterial radioembolization	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	3	2	7	3	0

References	Study Quality
149 (16134179)	2
150 (17609443)	2
152 (22722717)	2
132 (31079715)	4
133 (28132407)	2
156 (27520932)	2
158 (27738818)	2
154 (25012459)	Inadequate
151 (21107755)	2

		153 (24385266)	2												
		155 (26663886)	2												
		159 (29724520)	2												
Systemic therapies	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	0	2	8	4	1	0
		References	Study Quality												
		135 (16041556)	4												
Surgical liver resection	May be appropriate	Limited	N/A	N/A	4	4	0	3	2	4	4	1	1	0	0
		References	Study Quality												
		141 (12831921)	2												
		140 (7817996)	3												
		142 (22658833)	4												
		143 (24655881)	3												
		144 (1701060)	4												
Percutaneous ablation liver	May be appropriate	Limited	N/A	N/A	4	4	0	1	2	5	6	1	0	0	0
		References	Study Quality												
		135 (16041556)	4												
External beam radiation therapy	May be appropriate	Limited	N/A	N/A	4	4	0	1	2	6	5	1	0	0	0
		References	Study Quality												
		148 (26434846)	3												
		147 (20404793)	4												
		146 (26628466)	2												
Liver transplantation	Usually not appropriate	Limited	N/A	N/A	3	3	3	3	2	4	1	2	0	0	0
		References	Study Quality												
		145 (28624178)	4												

Combination locoregional therapy	Usually not appropriate	Limited	N/A	N/A	3	3	1	2	10	2	0	0	0	0	0

References	Study Quality
159 (29724520)	2

Variant 8: Metastatic liver disease: Solitary colorectal liver metastasis.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Systemic therapies	Usually appropriate	Strong	N/A	N/A	9	9	1	0	0	0	1	0	2	2	9

References	Study Quality
163 (29589315)	4
164 (29910669)	4
165 (23352604)	1
166 (17947725)	1
167 (14665611)	1
168 (26338525)	1

Surgical liver resection	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	0	0	3	6	6

References	Study Quality
170 (17981429)	4
169 (27003990)	4
171 (22441614)	4

Percutaneous ablation liver	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	1	0	3	6	4	1

References	Study Quality
174 (22288086)	4
175 (27269232)	2
173 (15599547)	2

		176 (26267832)		2												
Combination locoregional therapy	May be appropriate	Moderate	N/A	N/A	6	6	0	0	0	1	4	8	2	0	0
		References		Study Quality												
		179 (27999917)		2												
External beam radiation therapy	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	1	4	9	1	0	0
		References		Study Quality												
		177 (29934790)		2												
Transarterial chemoembolization	May be appropriate	Limited	N/A	N/A	5	5	0	0	2	5	2	5	1	0	0
		References		Study Quality												
		178 (8629387)		1												
Transarterial radioembolization	May be appropriate	Expert Consensus	N/A	N/A	4	4	1	1	3	3	5	1	1	0	0
Hepatic arterial chemotherapy infusion	Usually not appropriate	Expert Consensus	N/A	N/A	3	3	1	2	8	2	2	0	0	0	0
Bland transarterial embolization	Usually not appropriate	Expert Consensus	N/A	N/A	3	3	1	3	4	5	2	0	0	0	0
Liver transplantation	Usually not appropriate	Limited	N/A	N/A	2	2	7	4	3	1	0	0	0	0	0
		References		Study Quality												
		172 (28544246)		2												

Variant 9: Metastatic liver disease: Multifocal bilobar colorectal carcinoma (liver dominant or isolated).

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Systemic therapies	Usually appropriate	Strong	N/A	N/A	9	9	0	0	0	0	0	0	0	3	12

References	Study Quality
164 (29910669)	4
169 (27003990)	4
180 (24585720)	2
165 (23352604)	1
166 (17947725)	1
167 (14665611)	1
168 (26338525)	1

Hepatic arterial chemotherapy infusion	May be appropriate	Strong	N/A	N/A	6	6	0	0	0	3	3	4	4	1	0

References	Study Quality
186 (26133575)	4
183 (28433600)	2
184 (28293087)	2
185 (24646562)	2
187 (22922040)	2

Transarterial chemoembolization	May be appropriate	Strong	N/A	N/A	6	6	0	0	0	1	4	10	0	0	0

References	Study Quality
69 (11981766)	1
68 (12049862)	1
189 (20830766)	2
188 (23885916)	4

Transarterial radioembolization	May be appropriate	Strong	N/A	N/A	6	6	0	0	1	0	2	8	2	2	0

References	Study Quality
192 (30033117)	2
190 (28781171)	1
191 (26903575)	1
193 (21800231)	2
194 (20628388)	2

Surgical liver resection	May be appropriate	Moderate	N/A	N/A	5	5	0	0	1	0	10	4	0	0	0
	References		Study Quality												
	180 (24585720)		2												
Bland transarterial embolization	May be appropriate (Disagreement)	Expert Opinion	N/A	N/A	5	5	1	2	4	3	2	3	0	0	0
Percutaneous ablation liver	May be appropriate	Moderate	N/A	N/A	5	5	0	0	1	3	8	3	0	0	0
	References		Study Quality												
	181 (28376151)		1												
Combination locoregional therapy	May be appropriate	Moderate	N/A	N/A	5	5	0	0	0	2	9	4	0	0	0
	References		Study Quality												
	179 (27999917)		2												
External beam radiation therapy	Usually not appropriate	Moderate	N/A	N/A	3	3	1	5	3	2	4	0	0	0	0
	References		Study Quality												
	182 (21432842)		2												
Liver transplantation	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	8	3	3	0	0	1	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.**