American College of Radiology ACR Appropriateness Criteria®

Assessment of Cardiac Function and Baseline Cardiac Risk Stratification in Oncology Patients

Variant 1: Adult. Cardiac risk stratification prior to initiation of oncologic therapy. No cardiac symptoms. Initial imaging.

D 1	Appropriateness	COF	A L L DDI	D I DDI	D 41	3.6 11			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US echocardiography transthoracic resting	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	4	4	11
		References		Study	Quality										
		26 (27068546)			2										
		1 (32809231)			4										
		2 (32463967)			4										
		25 (16012124)		0 0 mSv 7 7											
MRI heart function and morphology without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	5	8	3	2
		References													
		16 (27918725)			4										
MRI heart function and morphology without and with IV contrast	Usually appropriate	Limited	O 0 mSv	Study Quality 4			0	0	0	0	0	3	10	3	3
		References		Study	Quality										
		15 (20513610)			4										
		16 (27918725)			4										
Nuclear medicine ventriculography	Usually appropriate	Strong	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	7	7	0	0	0	1	2	3	10	2	1
		References		Study Quality											
		22 (22154116)			3										

		23 (28335788)			3										
		21 (32748278)			3										
		20 (3605130)			2										
CT coronary calcium	May be appropriate	Limited	��� 1-10 mSv		5	5	0	0	1	8	4	4	1	0	1
		References		Study	Quality										
		14 (28342038)			2										
		12 (35441347)			4										
		10 (30894318)			4										
		11 (31784032)			4										
		13 (31272536)			4										
MRI heart function with stress without and with IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	1	6	4	7	1	0	0
		References Study Quality													
		16 (27918725)			4										
US echocardiography transthoracic stress	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	1	8	4	4	2	0	0
		References		Study	Quality										
		1 (32809231)			4										
		2 (32463967)			4										
CTA coronary arteries with IV contrast	May be appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	4	4	0	1	3	6	4	4	1	0	0
CT heart function and morphology with IV contrast	May be appropriate	Expert Consensus	���� 10-30 mSv	���� 3- 10 mSv [ped]	4	4	0	0	1	10	3	3	2	0	0
MRI heart function with stress without IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	0	0	5	9	3	2	0	0	0
US echocardiography transesophageal	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	4	4	1	1	5	9	2	1	0	0	0
		References Study Quality													
		1 (32809231)			4										

		2 (32463967)			4										
Rb-82 PET/CT MPI rest and stress	May approp	Limited	���� 10-3 mSv	0	4	4	0	0	1	11	3	4	0	0	0
		References		Study	y Quality		•		•			•			
		19 (34820770)			3										
SPECT or SPECT/CT heart	May approp	Limited	���� 10-3 mSv	0	4	4	0	0	1	12	3	3	0	0	0
		References		Study	y Quality										
		24 (26072421)			2										
N-13 ammonia PET/CT MPI rest and stress	May approp	Limited	��� 1-10 mSv		4	4	0	1	3	10	2	3	0	0	0
		References		Study	y Quality				•	•					
		18 (31741325)			3										
		17 (32919154)			3										
		19 (34820770)			3										
Radiography chest	Usually approp	Expert Consensus	� <0.1 mSv		3	3	5	3	4	2	3	0	1	0	0
PYP scan heart	Usually approp	Limited	��� 1-10 mSv		3	3	6	1	8	1	1	0	0	1	0
		References		Study	y Quality										
		2 (32463967)			4										
PYP scan with SPECT or SPECT/CT heart	Usually approp	Limited	��� 1-10 mSv		3	3	6	2	7	1	1	0	0	1	0
		References		Study	y Quality										
		2 (32463967)			4										
CTA chest with IV contrast	Usually approp	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	8	5	3	1	1	0	0	0	0
CT chest with IV contrast	Usually approp	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	7	5	3	0	2	1	0	0	0

		References		Study	y Quality										
		9 (36216699)			4		_								
CT chest without IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	8	3	3	2	1	0	1	0	0
		References		Study	y Quality										
		9 (36216699)			4										
CT chest without and with IV contrast	Usually not appropriate	Limited	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	2	2	7	4	3	1	2	0	1	0	0
		References		Study	y Quality										
		9 (36216699)			4										
CTA pulmonary arteries with IV contrast	Usually not appropriate	Expert Consensus	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	2	2	9	3	5	1	0	0	0	0	0
CTA chest without and with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv		2	2	8	5	4	0	1	0	0	0	0
Arteriography coronary	Usually not appropriate	Expert Consensus	��� 1-10 mSv		1	1	12	3	2	0	1	0	0	0	0
Arteriography coronary with ventriculography	Usually not appropriate	Expert Consensus	⊕⊕⊕ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	11	2	5	0	0	0	0	0	0
US duplex Doppler lower extremity	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	0	3	2	0	0	0	0	0

Variant 2: Adult. Assessment of cardiac function during oncologic therapy. Cardiac symptoms. Ischemia not excluded. Initial imaging.

n 1	Appropriateness	COF	4 1 14 DD	, D 1 DD1	D 43	34.11			F	inal '	Гаbи	latio	ns		
Procedure	Category	SOE	Adults RR	L Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
US echocardiography transthoracic resting	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	1	2	3	13
		References		Study	Quality										

		43 (27296561)			3										
		44 (29984789)			2										
		41 (30092972)			4										
		38 (26530752)			2										
		45 (30414755)			2										
		42 (22744937)			2										
		39 (23847385)			4										
		1 (32809231)			4										
		40 (12534739)			3										
CTA coronary arteries with IV contrast	Usually appropriate	Limited	≎≎≎ 1-10 mSv	���� 3- 10 mSv [ped]	8	8	0	0	1	0	0	0	6	7	5
		References		Study	Quality				•						
		29 (33555007)			4										
		9 (36216699)		4											
MRI heart function and morphology without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	1	3	6	9
		References		Study	Quality										
		30 (27183525)			4										
		32 (33404058)			4										
		37 (28395671)			2										
		33 (33606757)			3										
		31 (33029698)			4										
		34 (34536111)			2										
		35 (35718419)			4										
		36 (35730658)		4											
MRI heart function and morphology without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	4	9	4	2
		References		Study	Quality										
		30 (27183525)			4										
		32 (33404058)		4											

Limited O 0 mSv O mSv																
31 (33029698) 4 34 (34536111) 2 36 (35730658) 4			37 (28395671)			2										
34 (34536111) 2 35 (35718419) 4 4 4 5 5 6 (35730658) 4 4 5 6 (35730658) 4 5 6 (35730658) 4 6 6 6 6 6 6 6 6 6			33 (33606757)			3										
35 (35718419) 4			31 (33029698)			4										
MRI heart function with stress without and with IV contrast Usually appropriate Limited O 0 mSv [ped] 7 7 0 0 0 0 0 0 2 9 5 3			34 (34536111)			2										
MRI heart function with stress without and with IV contrast Limited O 0 mSv [ped] 7 7 0 0 0 0 0 0 0 0			35 (35718419)			4										
Limited O 0 mSv O mSv			36 (35730658)			4										
30 (27183525)	MRI heart function with stress without and with IV contrast		Limited	O 0 mSv		7	7	0	0	0	0	0	2	9	5	3
32 (33404058)			References		Study	/ Quality										
33 (33606757) 3 31 (33029698) 4 34 (34536111) 2 35 (35718419) 4 36 (35730658) 4 37 7 0 0 1 0 0 0 0 0 0 0			30 (27183525)			4										
31 (33029698)			32 (33404058)			4										
34 (34536111) 2 35 (35718419) 4 36 (35730658) 4			33 (33606757)			3										
Strong O 0 mSv O 0 m			31 (33029698)			4										
Strong O 0 mSv O 0 mSv Fiped O 0 mSv O 0 mSv			34 (34536111)			2										
Strong O 0 mSv O 0 mSv Feed Proportiate Strong O 0 mSv Proportiate O 0 mSv O 0 mSv			35 (35718419)		4											
References Study Quality 41 (30092972) 4 38 (26530752) 2 42 (22744937) 2 39 (23847385) 4 40 (12534739) 3			36 (35730658)			4										
41 (30092972)	US echocardiography transthoracic stress		Strong	O 0 mSv		7	7	0	1	1	0	1	1	7	2	5
38 (26530752) 2			References		Study	Quality										
42 (22744937) 2 39 (23847385) 4 1 (32809231) 4 40 (12534739) 3 SPECT or SPECT/CT heart Usually appropriate Limited SPECT or SPECT/CT heart Usually appropriate Limited Study Quality Study Quality Consensus Study Quality Study Quality Study Quality Study Quality Consensus Consens			41 (30092972)			4										
39 (23847385) 4 1 (32809231) 4 40 (12534739) 3			38 (26530752)			2										
1 (32809231) 4 40 (12534739) 3			42 (22744937)			2										
A0 (12534739) 3			39 (23847385)			4										
Rb-82 PET/CT MPI rest and stress Usually appropriate Expert Consensus MSV T T T D D D D D D D D D D			1 (32809231)			4										
Consensus			40 (12534739)			3										
Limited MSv 7 7 0 0 1 1 3 2 6 5 1 References Study Quality	Rb-82 PET/CT MPI rest and stress	Usually appropriate	Expert Consensus			7	7	0	0	1	0	2	2	8	5	1
	SPECT or SPECT/CT heart	Usually appropriate	Limited			7	7	0	0	1	1	3	2	6	5	1
24 (26072421)			References		Study	Quality										
			24 (26072421)			2										

Nuclear medicine ventriculography	May approp		Moderate	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	6	6	0	0	1	2	4	6	6	0	0
			References			Study	Quality										
			23 (28335788)				3										
			20 (3605130)				2									_	
CT heart function and morphology with IV contrast	May approp		Limited	���� 10- mSv	30	���� 3- 10 mSv [ped]	5	5	0	0	1	5	4	5	4	0	0
			References			Study	Quality										
			29 (33555007)				4										
			9 (36216699)				4										
Arteriography coronary	May approp		Limited	��� 1-1 mSv	0		5	5	0	0	0	5	7	6	1	0	0
			References			Study	Quality		•								
			27 (30611123)				3										
			28 (32236322)				3										
Arteriography coronary with ventriculography	May approp		Expert Consensus	��� 1-1 mSv	0	���� 3- 10 mSv [ped]	5	5	0	0	0	7	5	6	1	0	0
MRI heart function with stress without IV contrast	May appror (Disagre	oriate	Expert Opinion	O 0 mSv	1	O 0 mSv [ped]	5	5	0	0	1	2	1	1	10	4	0
			References			Study	Quality							•			
			30 (27183525)				4										
			32 (33404058)				4										
			33 (33606757)				3										
			31 (33029698)				4										
			34 (34536111)				2										
			35 (35718419)				4										
			36 (35730658)			T	4			1			ı		1		
US echocardiography transesophageal	May approp		Strong	O 0 mSv	′	O 0 mSv [ped]	5	5	0	0	1	6	7	4	1	0	0

References	Study Quality
43 (27296561)	3
44 (29984789)	2
41 (30092972)	4
38 (26530752)	2
45 (30414755)	2
42 (22744937)	2
39 (23847385)	4
1 (32809231)	4
40 (12534739)	3

Radiography chest	May be appropriate (Disagreement)	Expert Opinion	ᢒ <0.1 mSv		5	5	2	1	0	1	0	3	8	3	1
CTA pulmonary arteries with IV contrast	May be appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	5	5	0	2	0	6	4	6	0	1	0
N-13 ammonia PET/CT MPI rest and stress	May be appropriate (Disagreement)	Expert Opinion	��� 1-10 mSv		5	5	0	1	0	2	1	3	6	5	1
CTA chest with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	3	5	9	2	0	0	0	0	0
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	6	3	1	4	2	0	2	0	0
CT coronary calcium	Usually not appropriate	Expert Consensus	��� 1-10 mSv		2	2	7	7	5	0	0	0	0	0	0
CT chest with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	5	5	8	1	0	0	0	0	0
CT chest without IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	7	6	6	0	0	0	0	0	0
US duplex Doppler lower extremity	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	9	4	4	1	1	0	0	0	0

CTA chest without and with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	2	2	4	8	7	0	0	0	0	0	0
PYP scan heart	Usually not appropriate	Expert Consensus	��� 1-10 mSv	2	2	8	3	5	0	2	0	0	0	0
PYP scan with SPECT or SPECT/CT heart	Usually not appropriate	Expert Consensus	��� 1-10 mSv	2	2	7	3	5	0	2	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.