

**American College of Radiology**  
**ACR Appropriateness Criteria®**

## Blunt Chest Trauma-Suspected Cardiac Injury

**Variant 1: Suspected cardiac injury following blunt trauma, hemodynamically stable patient.**

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography chest	Usually appropriate	Strong	⊕ <0.1 mSv	⊕ <0.03 mSv [ped]	9	9	0	0	0	0	0	1	3	2	16
		References	Study Quality												
		72 (23925583)	2												
		23 (19820586)	4												
		60 (17099521)	3												
		68 (18492911)	3												
		67 (8505524)	4												
		71 (11450784)	3												
		70 (2258953)	3												
		73 (17045268)	3												
		66 (16374282)	3												
		69 (16494179)	3												
		61 (29079373)	4												
		62 (26395222)	4												
		63 (24530038)	4												
		26 (24218497)	4												
		64 (21997988)	4												
		65 (-3149759)	4												



58 (24043608)	4
42 (24843237)	4
56 (29691906)	4
57 (29226380)	4
55 (28703435)	4
7 (29173678)	4
32 (22582351)	4
52 (7617506)	4
54 (2989545)	4
59 (10421603)	3

CT chest without and with IV contrast	Usually appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	7	7	0	0	0	0	0	0	15	5	1
---------------------------------------	---------------------	---------	--------------	---------------------	---	---	---	---	---	---	---	---	----	---	---

References	Study Quality
21 (26882960)	4
24 (24522690)	3
23 (19820586)	4
22 (18936021)	4
68 (18492911)	3
43 (11740271)	3
28 (28390914)	4
61 (29079373)	4
20 (28499862)	4
62 (26395222)	4
26 (24218497)	4
29 (23861498)	4
7 (29173678)	4
27 (28255632)	4
32 (22582351)	4
30 (18025505)	4
33 (11419177)	4
31 (16096553)	4

		34 (20971301)	4												
CTA chest without and with IV contrast	Usually appropriate	Expert Consensus	☼☼☼ 1-10 mSv		7	7	0	0	0	0	1	7	5	6	2
CT chest without IV contrast	May be appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	6	6	1	0	0	0	8	8	4	1	0

CT heart function and morphology with IV contrast	May be appropriate	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 3-10 mSv [ped]	4	4	1	0	3	8	8	1	1	0	0
CTA coronary arteries with IV contrast	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv	☢☢☢☢☢ 3-10 mSv [ped]	3	3	2	2	8	5	4	0	0	1	0
MRI heart function and morphology without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	5	3	9	2	2	0	0	0	1
MRI heart function and morphology without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	4	11	4	1	1	0	1	0	0
US echocardiography transthoracic stress	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	9	7	5	0	1	0	0	0	0
MRI heart with function and vasodilator stress perfusion without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	21	0	1	0	0	0	0	0	0
MRI heart with function and inotropic stress without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	21	0	1	0	0	0	0	0	0
MRI heart with function and inotropic stress without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	20	1	1	0	0	0	0	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	☢☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 3-10 mSv [ped]	1	1	18	2	2	0	0	0	0	0	0
SPECT or SPECT/CT MPI rest and stress	Usually not appropriate	Expert Consensus	☢☢☢☢☢ 10-30 mSv	☢☢☢☢☢☢ 10-30 mSv [ped]	1	1	19	1	2	0	0	0	0	0	0
SPECT or SPECT/CT MPI rest only	Usually not appropriate	Expert Consensus	☢☢☢☢ 1-10 mSv		1	1	20	1	0	1	0	0	0	0	0

**Variant 2: Suspected cardiac injury following blunt trauma, hemodynamically unstable patient.**

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US echocardiography transthoracic resting	Usually appropriate	Limited	0 0 mSv	0 0 mSv [ped]	9	9	0	0	0	0	0	0	1	5	16
		References	Study Quality												
		50 (8295249)	2												
		7 (29173678)	4												
Radiography chest	Usually appropriate	Expert Consensus	☼ <0.1 mSv	☼ <0.03 mSv [ped]	9	9	1	0	1	0	0	1	2	0	17
CTA chest with IV contrast	Usually appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	8	8	0	0	0	0	1	0	8	10	2
CT chest with IV contrast	Usually appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	0	0	0	0	1	0	12	4	4
CT chest without and with IV contrast	Usually appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	0	0	0	0	1	1	15	2	2
CT heart function and morphology with IV contrast	Usually appropriate	Limited	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	1	1	0	1	4	0	12	1	1
		References	Study Quality												
		21 (26882960)	4												
		40 (21234635)	4												
		37 (8639191)	Inadequate												
		41 (28761404)	4												
		6 (26374420)	4												
		35 (29350374)	4												
		39 (24585276)	4												
		38 (24444069)	4												
		36 (23622508)	4												
CTA chest without and with IV contrast	Usually appropriate	Expert Consensus	☼☼☼ 1-10 mSv		7	7	0	0	0	0	1	2	8	8	2

US echocardiography transesophageal	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	1	2	5	9	3	1	0
		References		Study Quality											
		50 (8295249)		2											
		7 (29173678)		4											
CTA coronary arteries with IV contrast	May be appropriate	Limited	⊗⊗⊗ 1-10 mSv	⊗⊗⊗⊗ 3- 10 mSv [ped]	5	5	2	0	0	1	9	8	0	1	0
		References		Study Quality											
		21 (26882960)		4											
		40 (21234635)		4											
		43 (11740271)		3											
		46 (16041562)		4											
		42 (24843237)		4											
		39 (24585276)		4											
		45 (23809387)		4											
		36 (23622508)		4											
		44 (23599204)		4											
		7 (29173678)		4											
		CT chest without IV contrast	May be appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv										
MRI heart function and morphology without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	7	2	7	1	5	0	0	0	0
		References		Study Quality											
		46 (16041562)		4											
		48 (15845942)		4											
		41 (28761404)		4											
MRI heart function and morphology without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	6	4	4	2	6	0	0	0	0
		References		Study Quality											
		46 (16041562)		4											

		48 (15845942)		4												
		41 (28761404)		4												
US echocardiography transthoracic stress	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	11	2	8	0	0	1	0	0	0	0
		References		Study Quality												
		41 (28761404)		4												
MRI heart with function and vasodilator stress perfusion without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	4	5	0	0	0	0	0	0	0
MRI heart with function and inotropic stress without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	4	4	0	0	0	0	0	0	0
MRI heart with function and inotropic stress without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	4	4	0	0	0	0	0	0	0
FDG-PET/CT heart	Usually not appropriate	Limited	⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	1	1	15	2	5	0	0	0	0	0	0	0
		References		Study Quality												
		47 (16498043)		4												
		37 (8639191)		Inadequate												
SPECT or SPECT/CT MPI rest and stress	Usually not appropriate	Limited	⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	17	1	4	0	0	0	0	0	0	0
		References		Study Quality												
		37 (8639191)		Inadequate												
		49 (2293955)		4												
SPECT or SPECT/CT MPI rest only	Usually not appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv		1	1	13	4	3	0	0	0	2	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](http://www.acr.org/ac).