American College of Radiology
ACR Appropriateness Criteria®

Penetrating Torso Trauma

Variant 1: Adult. Penetrating torso trauma, hypotensive. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography trauma series	Usually appropriate	Expert Consensus	☢☢☢ 1-10 mSv		9	9	1	0	0	0	1	0	3	2	7
CTA chest abdomen pelvis with IV contrast	Usually appropriate	Limited	☢☢☢☢☢ 30-100 mSv	☢☢☢☢☢ 10-30 mSv [ped]	7	7	0	1	0	0	2	2	2	4	2
References			Study Quality												
28 (26802856)			4												
27 (22824572)			4												
29 (31903225)			4												
CT chest abdomen pelvis with IV contrast	Usually appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	0	1	0	0	3	0	3	3	3
References			Study Quality												
24 (29369452)			4												
25 (-3196632)			2												
CT chest abdomen pelvis without IV contrast	Usually not appropriate	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	3	2	6	0	3	0	0	0	0
CT chest abdomen pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	9	3	1	0	0	0	0	0	0

MRI chest abdomen pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	0	0	0	0	0	0
MRI chest abdomen pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	0	1	0	0	0	0	0	0

Variant 2: Adult. Ballistic penetrating torso trauma, unknown trajectory, normotensive. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT chest abdomen pelvis with IV contrast	Usually appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	9	9	0	0	1	0	0	1	1	2	9

References	Study Quality
2 (26492022)	4
30 (30343384)	4
3 (34019436)	4
15 (31666333)	2

Radiography trauma series	Usually appropriate	Expert Consensus	☢☢☢ 1-10 mSv		9	9	1	0	0	0	0	0	3	3	7
CTA chest abdomen pelvis with IV contrast	Usually appropriate	Limited	☢☢☢☢☢ 30-100 mSv	☢☢☢☢☢ 10-30 mSv [ped]	8	8	0	0	0	0	0	0	6	2	5

References	Study Quality
29 (31903225)	4
33 (31283454)	4

CT chest abdomen pelvis without and with IV contrast	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	4	4	4	2	1	1	4	1	1	0	0

References	Study Quality
31 (23480864)	4

CT chest abdomen pelvis without IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	3	2	4	2	3	0	0	0	0
References				Study Quality											
32 (26945375)				2											
MRI chest abdomen pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	9	3	2	0	0	0	0	0	0
MRI chest abdomen pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	3	1	0	0	0	0	0	0

Variant 3: Adult. Ballistic penetrating torso trauma, limited to chest, normotensive. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CTA chest with IV contrast	Usually appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	9	9	0	0	0	0	0	0	3	3	7
References				Study Quality											
38 (25384283)				4											
CT chest with IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	9	9	0	0	1	0	0	1	1	3	8
References				Study Quality											
28 (26802856)				4											
38 (25384283)				4											
40 (23471527)				2											
37 (27324324)				3											
39 (32467475)				2											
Radiography trauma series	Usually appropriate	Strong	☢☢☢ 1-10 mSv		9	9	1	0	0	0	0	0	2	3	8
References				Study Quality											
43 (23536101)				4											

		41 (33441251)		2												
		42 (34607700)		2												
CT abdomen and pelvis with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	1	0	1	0	7	2	1	1	0
CTA abdomen and pelvis with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢☢ 10-30 mSv		5	5	1	0	0	3	2	1	2	3	1
		References		Study Quality												
		29 (31903225)		4												
CT chest without IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	3	2	2	2	4	1	0	0	0
		References		Study Quality												
		36 (35945464)		4												
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	6	1	1	3	1	1	1	0	0
CT abdomen and pelvis without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	6	2	3	2	1	0	0	0	0
		References		Study Quality												
		36 (35945464)		4												
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	8	2	0	1	2	0	0	1	0
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	1	0	0	0	0	0	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	1	0	0	0	0	0	0	0
MRI chest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	0	0	1	0	0	0	0

MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	0	0	0	1	0	0	0

Variant 4: Adult. Ballistic penetrating torso trauma, limited to abdomen and pelvis, normotensive. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen and pelvis with IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	9	9	0	0	0	0	0	0	2	3	9

References	Study Quality
9 (35322323)	2
10 (26984429)	2
44 (32889613)	2
45 (25023337)	4
46 (29412018)	2
47 (15128986)	2

CTA abdomen and pelvis with IV contrast	Usually appropriate	Limited	☢☢☢☢ 10-30 mSv		9	9	0	0	0	1	4	0	1	1	7

References	Study Quality
29 (31903225)	4
33 (31283454)	4

Radiography trauma series	Usually appropriate	Expert Consensus	☢☢☢ 1-10 mSv		8	8	1	0	0	1	0	0	3	3	6
CTA chest with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	2	0	0	0	4	0	4	2	1

References	Study Quality
29 (31903225)	4
48 (17257952)	2

CT chest with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	1	0	1	0	5	4	1	1	0
	References		Study Quality												
	2 (26492022)		4												
CT abdomen and pelvis without and with IV contrast	May be appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	4	4	2	2	2	4	3	0	0	0	0
	References		Study Quality												
	31 (23480864)		4												
CT abdomen and pelvis without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	2	3	4	2	2	1	0	0	0
	References		Study Quality												
	36 (35945464)		4												
CT chest without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	6	2	3	3	0	0	0	0	0
	References		Study Quality												
	36 (35945464)		4												
CT chest without and with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	8	1	1	1	2	1	0	0	0
	References		Study Quality												
	31 (23480864)		4												
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	0	0	0	1	0	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	0	0	0	1	0	0	0
MRI chest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	0	0	0	0	0	0
MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	0	0	0	0	0	0

Variant 5: Adult. Nonballistic penetrating torso trauma, unknown trajectory, normotensive. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT chest abdomen pelvis with IV contrast	Usually appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	9	9	0	0	0	0	0	1	3	2	8
References				Study Quality											
2 (26492022)				4											
30 (30343384)				4											
29 (31903225)				4											
49 (31140225)				2											
15 (31666333)				2											
Radiography trauma series	Usually appropriate	Limited	☢☢☢ 1-10 mSv		9	9	1	0	0	0	1	0	2	2	8
References				Study Quality											
50 (26463290)				4											
CTA chest abdomen pelvis with IV contrast	Usually appropriate	Limited	☢☢☢☢☢ 30-100 mSv	☢☢☢☢☢ 10-30 mSv [ped]	7	7	0	0	0	1	0	1	5	2	4
References				Study Quality											
29 (31903225)				4											
33 (31283454)				4											
CT chest abdomen pelvis without IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	4	1	4	2	2	1	0	0	0
References				Study Quality											
36 (35945464)				4											

CT chest abdomen pelvis without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	2	2	6	5	1	0	1	0	0	0	0
References				Study Quality											
31 (23480864)				4											
MRI chest abdomen pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	0	0	2	0	0	0	0
MRI chest abdomen pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	0	0	1	0	0	0	0

Variant 6: Adult. Nonballistic penetrating torso trauma, limited to chest, normotensive. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
Radiography trauma series	Usually appropriate	Limited	☢☢☢ 1-10 mSv		9	9	1	0	0	0	1	0	1	2	9
References				Study Quality											
50 (26463290)				4											
51 (31407022)				2											
CT chest with IV contrast	Usually appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	8	8	0	0	0	0	0	0	3	5	5
References				Study Quality											
37 (27324324)				3											
51 (31407022)				2											
CTA chest with IV contrast	Usually appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	0	0	0	1	3	2	1	1	5
References				Study Quality											
29 (31903225)				4											
33 (31283454)				4											

CT abdomen and pelvis with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	3	0	0	1	6	2	1	0	0
CT chest without IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	2	0	0	4	5	2	0	0	0
		References		Study Quality											
		36 (35945464)		4											
CTA abdomen and pelvis with IV contrast	May be appropriate	Limited	☢☢☢☢ 10-30 mSv		4	4	0	1	5	1	6	0	0	0	0
		References		Study Quality											
		29 (31903225)		4											
		33 (31283454)		4											
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	3	3	6	1	4	1	2	0	0	0	0
		References		Study Quality											
		31 (23480864)		4											
CT abdomen and pelvis without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	6	4	1	0	3	0	0	0	0
		References		Study Quality											
		36 (35945464)		4											
CT chest without and with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	7	4	2	0	0	0	0	0	0
		References		Study Quality											
		31 (23480864)		4											
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	0	0	0	0	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	1	0	0	0	0	0	0

MRI chest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	0	0	1	0	0	0	0
MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	0	1	1	0	0	0	0

Variant 7: Adult. Nonballistic penetrating torso trauma, limited to abdomen and pelvis, normotensive. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen and pelvis with IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	9	9	0	0	0	0	0	0	3	2	9

References	Study Quality
24 (29369452)	4
9 (35322323)	2
10 (26984429)	2
49 (31140225)	2
46 (29412018)	2

Radiography trauma series	Usually appropriate	Expert Consensus	☢☢☢ 1-10 mSv		9	9	1	0	0	1	1	0	2	2	7
CTA abdomen and pelvis with IV contrast	May be appropriate	Limited	☢☢☢☢ 10-30 mSv		6	6	0	0	0	0	6	2	1	1	3

References	Study Quality
29 (31903225)	4
33 (31283454)	4

CTA chest with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	1	0	2	2	6	0	0	2	0

References	Study Quality
29 (31903225)	4
33 (31283454)	4

CT abdomen and pelvis without IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	4	2	1	2	4	1	0	0	0
	References		Study Quality												
	36 (35945464)		4												
CT chest with IV contrast	May be appropriate	Expert Consensus	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	1	0	3	3	4	2	0	0	0
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	2	2	5	5	3	0	0	0	0	0	0
	References		Study Quality												
	31 (23480864)		4												
CT chest without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	7	2	3	1	1	0	0	0	0
	References		Study Quality												
	31 (23480864)		4												
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	7	1	3	2	1	0	0	0	0
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	0	0	0	0	1	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	0	0	1	1	0	0	0
MRI chest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	0	0	0	0	0	0
MRI chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	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.**