American College of Radiology ACR Appropriateness Criteria®

Head Trauma-Child

Variant 1: Child. Minor acute blunt head trauma. Very low risk for clinically important brain injury per PECARN criteria. Excluding suspected abusive head trauma. Initial imaging.

D 1	Appropri	Category Figure 1 200 1 10 200 3-				3.6.11			F	inal '	Tabu	latio	ns				
Procedure	Categ	ory	SOE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CTA head with IV contrast	Usually		Expert Consensus	��� 1-10 mSv)	���� 3- 10 mSv [ped]	1	1	18	0	0	0	0	0	0	1	0
CT head with IV contrast	Usually		Strong	��� 1-10 mSv	0	��� 0.3- 3 mSv [ped]	1	1	18	0	0	0	0	0	0	1	0
		References				Study	Quality										
			15 (27488722)				3										
			31 (26584662)				3										
			12 (24927811)				4										
		31 (26584662) 12 (24927811) 16 (24431418)					3										
			5 (19758692)				2										
	_		14 (24635987)				1										
CT head without IV contrast	Usually	y not riate	Strong	��� 1-10 mSv	0	��� 0.3- 3 mSv [ped]	1	1	12	2	2	0	2	0	0	0	1
			References			Study	Quality										
			15 (27488722)				3										
		15 (27488722) 31 (26584662)					3										
		31 (26584662) 12 (24927811)					4										
		16 (24431418)					3										
		5 (19758692)					2										

		14 (24635987)			1										
CT head without and with IV contrast	Usually	Strong	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	18	0	0	0	0	0	0	0	1
		References		Study	Quality										
		15 (27488722)			3										
		31 (26584662)			3										
		12 (24927811)			4										
		16 (24431418)			3										
		5 (19758692)			2										
		14 (24635987)			1										
Arteriography cerebral	Usually approp	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	18	0	0	0	0	0	0	0	1
MRA head without IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	17	1	0	0	0	0	0	1	0
MRA head without and with IV contrast	Usually	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	17	1	0	0	0	0	0	1	0
MRI head without IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	1	1	1	3	0	0	0	0
MRI head without and with IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	1	1	0	0	0	0	1	0
Radiography skull	Usually approp	Limited	� <0.1 mSv	�� 0.03- 0.3 mSv [ped]	1	1	16	0	1	0	1	0	0	1	0
		References		Study	Quality										
		2 (22273264)			4										
		33 (20495486)			4										
		9 (17056862)			3										

Variant 2: Child. Minor acute blunt head trauma. Intermediate risk for clinically important brain injury per PECARN criteria. Excluding suspected abusive head trauma. Initial imaging.

December 1	Appropriatene	SS COE	A J14- DDI	D. J. DDI	D - 42	M - 32			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT head without IV contrast	May be appropriate	Limited	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	6	6	1	1	0	1	6	9	1	1	1
		References		Study	Quality										
		5 (19758692)			2										
MRI head without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	10	7	2	2	0	0	0	0	0
CTA head with IV contrast	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	12	2	2	1	1	0	0	0	1
CT head with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	16	2	0	0	0	0	0	1	0
		References		Study	Quality										
		5 (19758692)			2										
CT head without and with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	2	0	0	0	0	0	1	0
		References		Study	Quality										
		5 (19758692)			2		_		_	_	_				
Arteriography cerebral	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	18	0	0	0	0	0	0	0	1
MRA head without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	1	0	2	1	0	0	0	1
MRA head without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	2	0	0	0	1
MRI head without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	1	2	1	0	0	0

Radiography skull	Usuall approp	Limited	≎ <0.1 mS	Sv	�� 0.03- 0.3 mSv [ped]	1	1	19	2	0	0	0	0	0	0	0
		References			Study	Quality										
		2 (22273264)				4										
		33 (20495486)				4										
		9 (17056862)				3										

Variant 3: Child. Minor acute blunt head trauma. High risk for clinically important brain injury per PECARN criteria. Excluding suspected abusive head trauma. Initial imaging.

.	Appropriateness	COF	4 1 14 DDY	D I DDI	D (1	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
CT head without IV contrast	Usually appropriate	Limited	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	9	9	0	0	0	0	0	0	0	2	19
		References		Study	Quality										
		5 (19758692)			2										
MRI head without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	10	2	4	3	2	0	0	0	0
CTA head with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	15	3	1	2	0	0	0	0	0
	,	References		Study	Quality										
		34 (22172317)			4										
		35 (21908994)			4										
		19 (21318614)			4										
CT head with IV contrast	Usually not appropriate	Limited	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	19	1	1	0	0	0	0	0	0
		References		Study	Quality										
		5 (19758692)			2										

CT head without and with IV contrast	Usuall approp	Limited	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	20	1	0	0	0	0	0	0	0
	•	References		Study	Quality				•	•					
		5 (19758692)			2										
Arteriography cerebral	Usuall approp	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	20	1	0	0	0	0	0	0	0
MRA head without IV contrast	Usuall approp	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	3	2	1	0	0	0	0	0
		References 34 (22172317)			Quality										
		` ′			4										
		35 (21908994) 19 (21318614)			4										
		19 (21318614)			4										
MRA head without and with IV contrast	Usuall approp	Limited	O 0 mSv	O 0 mSv [ped]	1	1	19	2	0	0	0	0	0	0	0
		References		Study	Quality										
		34 (22172317)			4										
		35 (21908994)			4										
		19 (21318614)			4										
MRI head without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	19	2	0	0	0	0	0	0	0
Radiography skull	Usuall approp	Limited	≎ <0.1 mSv		1	1	18	3	0	0	0	0	0	0	0
		References		Study	Quality										
		2 (22273264)			4										
		33 (20495486)			4										
		9 (17056862)		3											

Variant 4: Child. Moderate or severe acute blunt head trauma (GCS less than or equal to 13). Excluding suspected abusive head trauma. Initial imaging.

D	Appropri	ateness	COF	A J14 - DDI	D. J. DI		D - 43	M - 3!			F	inal	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RRI	Peds RI		Rating	Median	1	2	3	4	5	6	7	8	9
CT head without IV contrast	Usua approp	lly riate	Limited	��� 1-10 mSv	��� 0. 3 mSv [ped]		9	9	1	0	0	0	0	0	0	0	18
			References		S	tudy Q	Quality										
			36 (18022444)			4											
MRI head without IV contrast	Usually approp		Strong	O 0 mSv	O 0 ms [ped]	Sv	3	3	7	3	6	3	1	1	0	0	0
			References			tudy Q	Quality										
			25 (19852541)			2											
			39 (17437903)			2											
CTA head with IV contrast	Usually approp		Limited	≎≎≎ 1-10 mSv	≎≎≎≎ 10 mS [ped]		1	1	14	2	3	2	0	0	0	0	0
			References		S	tudy Q	Quality										
			37 (19760434)			4											
			19 (21318614)			4											
			38 (28916852)			4						_					
CT head with IV contrast	Usually approp		Limited	��� 1-10 mSv	��� 0. 3 mSv [ped]		1	1	15	1	2	0	0	1	0	0	0
			References		S	tudy Q	Quality										
			36 (18022444)			4											
CT head without and with IV contrast	Usually approp		Limited	��� 1-10 mSv	���� 10 mS [ped]		1	1	15	1	1	0	1	0	1	0	0
			References		S	tudy Q	Quality										
			36 (18022444)			4											
Arteriography cerebral	Usually approp		Expert Consensus	��� 1-10 mSv	≎≎≎≎ 10 mS [ped]		1	1	15	0	3	0	0	0	0	0	1
MRA head without IV contrast	Usually approp		Expert Consensus	O 0 mSv	O 0 ms [ped]	Sv	1	1	14	1	5	1	0	0	0	0	0

MRA head without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	1	1	18	0	3	0	0	0	0	0	0
MRI head without and with IV contrast	Usuall approp	Strong	O 0 mSv	,	O 0 mSv [ped]	1	1	18	1	1	1	0	0	0	0	0
		References			Study	Quality										
		25 (19852541)			2											
		39 (17437903)			2											
Radiography skull	Usuall approp	Limited	≎ <0.1 mS	Sv	�� 0.03- 0.3 mSv [ped]	1	1	19	0	0	1	1	0	0	0	0
		References		Study	Quality											
		2 (22273264)				4										
		33 (20495486)			4											
		9 (17056862)			3											

Variant 5: Child. Subacute blunt head trauma with cognitive or neurologic signs.

	Appropriatenes	S GOT				3.5 31			I	Final	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRI	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT head without IV contrast	Usually appropriate	Limited	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	8	8	0	1	0	0	0	1	3	7	9
		References Study Quality													
		43 (24064865)	ı												
		44 (29784284)			3										
MRI head without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	1	0	0	0	0	0	2	9	9
		References		Study	Quality										
		28 (26381555)			2										
		31 (26584662)		3											
		29 (25700122)	l .		2										

nally not ropriate	30 (27072355) 38 (28916852) Limited	⊕⊕⊕ 1-10	\$\$\$\$ 3-	4										
			00000											
		mSv	10 mSv [ped]	3	3	7	1	3	0	6	1	1	0	0
	References		Study	Quality		-								
	37 (19760434)			4										
	19 (21318614)			4										
	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	6	3	2	6	4	0	0	0	0
	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	9	0	2	1	5	1	1	0	0
	Strong	O 0 mSv	O 0 mSv [ped]	2	2	9	2	2	3	3	0	1	0	1
	References		Study	Quality		<u>.</u>								
	28 (26381555)			2										
	31 (26584662)			3										
	29 (25700122)			2										
	30 (27072355)			2										
	38 (28916852)			4										
	Limited	��� 1-10 mSv	��� 0.3- 3 mSv [ped]	1	1	12	1	1	1	2	0	2	0	0
	References		Study	Quality										
	43 (24064865)			3										
	44 (29784284)			3						1				
	Limited	��� 1-10 mSv	ଡେଡେଡେ 3- 10 mSv [ped]	1	1	19	0	1	0	1	0	0	0	0
	References		Study	Quality										
	43 (24064865)			3										
	44 (29784284)			3										
supp supp	sually not propriate sually not propriate	Expert Expert Consensus	Consensus Consensus	December Consensus Course Cours	Consensus Cons	Documents Docu	Consensus Cons	Consensus Cons	Consensus	Consensus	Consensus Commsv [ped] 3 3 6 3 2 6 4	Consensus Cons	Consensus Cons	Consensus

Arteriography cerebral	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	16	0	1	1	0	0	1	0	0
Radiography skull	Usually not appropriate	Expert Consensus	⊕ <0.1 mSv	�� 0.03- 0.3 mSv [ped]	1	1	17	0	0	0	0	1	0	0	1

Variant 6: Child. Chronic blunt head trauma with new or progressive cognitive or neurologic deficits. Excluding suspected abusive head trauma and post-traumatic seizure.

D 1	Appropriateness	COL	A L L DDI	D I DDI	D (1	3.7.11			F	inal	Tabu	lation	ıs		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI head without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	1	4	16
		References		Study	Quality										
		47 (28095029)			3										
		49 (27482782)			4										
		45 (28490224)			4										
		41 (29157852)			4										
		46 (26419243)			4										
CT head without IV contrast	May be appropriate (Disagreement)	Expert Opinion	≎≎≎ 1-10 mSv	��� 0.3- 3 mSv [ped]	5	5	7	2	7	2	0	1	0	0	2
		References		Study	Quality										
		47 (28095029)			3										
		46 (26419243)			4										
MRA head without IV contrast	May be appropriate (Disagreement)	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	6	1	0	8	3	3	0	0	0
MRI head without and with IV contrast	May be appropriate (Disagreement)	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	10	1	5	2	0	2	0	0	1
		References		Study	Quality										
		47 (28095029)			3										

		49 (27482782)		4											
		45 (28490224)		4											
		41 (29157852)		4											
		46 (26419243)		4											
MRI head without IV contrast with DTI	May be appropriate (Disagreeme	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	8	1	8	1	0	1	0	1	1
CTA head with IV contrast	Usually no appropriate		≎≎≎ 1-10 mSv	0	2	2	9	2	2	2	3	1	0	0	0
MRA head without and with IV contrast	Usually no appropriate		O 0 mSv	O 0 mSv [ped]	2	2	8	2	1	3	3	1	0	1	0
CT head with IV contrast	Usually no appropriate		��� 1-10 mSv	9	1	1	14	1	1	1	0	0	1	1	0
		References		Study Quality											
		47 (28095029)		3											
		46 (2641924)	3)		4										
CT head without and with IV contrast	Usually no appropriate		≎≎≎ 1-10 mSv	9	1	1	20	0	0	1	0	0	0	0	0
		References		Study	Quality										
47 (28095029)		9)													
		46 (2641924)	3)		4										
Arteriography cerebral	Usually no appropriate		⊕⊕⊕ 1-10 mSv	0	1	1	14	3	1	0	0	0	0	1	0
MRI functional (fMRI) head without IV contrast	Usually no appropriate		O 0 mSv	O 0 mSv [ped]	1	1	10	3	1	0	4	1	0	0	0
	References		Study Quality												
		51 (29560308	8)	4											
		52 (2808556	5)		4										
MR spectroscopy head without IV contrast	Usually no appropriate		O 0 mSv	O 0 mSv [ped]	1	1	10	2	0	3	2	2	0	0	0

References	Study Quality							
50 (24735414)	3							

FDG-PET/CT brain	Usually not appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	1	1	10	2	1	3	1	1	0	1	0
Radiography skull	Usually not appropriate	Limited	⊕ <0.1 mSv	�� 0.03- 0.3 mSv [ped]	1	1	17	0	0	0	1	0	0	0	1

References	Study Quality
48 (-3149364)	4

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.