American College of Radiology ACR Appropriateness Criteria[®]

Imaging of Suspected Intracranial Hypotension

Variant 1: Adult. Orthostatic headache from suspected intracranial hypotension, without recent spinal intervention that could cause CSF leakage. Initial imaging.

	Appropriate	ness	205		-	D 1 DD1					F	'inal '	Tabu	latio	ıs		
Procedure	Category	7	SOE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI head without and with IV contrast	Usually appropriate	te	Strong	O 0 mSv	,	O 0 mSv [ped]	9	9	0	0	0	0	0	0	1	4	11
			References			Study	/ Quality										
			25 (18768717)				2										
			16 (30776059)				2										
			26 (34579563)				2		-							•	
MRI complete spine without IV contrast	Usually appropriate		Strong	O 0 mSv	,	O 0 mSv [ped]	8	8	0	0	1	1	2	1	3	3	5
			References			Study	/ Quality										
			36 (24107860)				3										
			25 (18768717)				2										
			35 (32402615)				2										
			34 (19949036)				2		_								
MRI head without IV contrast	Usually appropriate		Strong	O 0 mSv	,	O 0 mSv [ped]	7	7	0	1	0	0	3	4	5	3	0
			References			Study	/ Quality										
			25 (18768717)				2										
			26 (34579563)				2										
			16 (30776059)				2										

MRI complete spine without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	1	11	2	2
		References		Study	y Quality									1	
		36 (24107860)		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	3										
		25 (18768717)			2										
		35 (32402615)			2										
		34 (19949036)			2										
		52 (32554417)			2										
CT myelography complete spine	May be appropriate	Strong	✿֎֎֎ 30- 100 mSv	ହତତତ 3- 10 mSv [ped]	4	4	1	1	1	7	4	2	0	0	0
		References		Study	y Quality										
		36 (24107860)		-	3										
		35 (32402615)			2										
		34 (19949036)			2										
DTPA cisternography	Usually not appropriate	Limited	֎֎֎ 1-10 mSv		2	2	8	1	3	2	1	1	0	0	0
		References		Study	y Quality					•	•				
		46 (22990687)			2										
		45 (26823556)			4										
MRI head with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	2	3	2	0	0	1	0	0
CT myelography dynamic complete spine	Usually not appropriate	Strong	✿֎֎֎ 30- 100 mSv		2	2	7	4	4	0	1	0	0	0	0
		References		Study	y Quality										
		24 (35261281)			4										
		39 (35614322)			2										
		38 (30226459)			2										
		37 (33602750)			2										
		44 (35332017)			4										
		43 (37128777)			4										

		42 (31518974)			2										
		41 (31857327)			4										
		40 (33122215)			4										
Radiographic myelography digital subtraction complete spine	Usually not appropriate	Strong	ଷଷଷଷ 10-30 mSv		2	2	8	3	2	2	0	0	0	1	0
		References		Study	V Quality										
		25 (18768717)			2										
		44 (35332017)			4										
		43 (37128777)			4										
		42 (31518974)			2										
		41 (31857327)			4										
		40 (33122215)			4										
		54 (26849709)			4										
		53 (33484155)		1	2	,	_		1	1	1	1	1		
MR myelography complete spine	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	8	7	1	0	0	0	0	0	0
		References		Study	Quality										
		48 (22173753)			4										
		49 (24852289)			2										
		47 (34292360)			4										
		50 (32354709)			4										
		51 (32720867)			4		_								
CT head with IV contrast	Usually not appropriate	Expert Consensus	ଡଡଡ 1-10 mSv	֎֎֎ 0.3- 3 mSv [ped]	1	1	13	2	0	1	0	0	0	0	0
CT head without IV contrast	Usually not appropriate	Expert Consensus	ଡଡଡ 1-10 mSv		1	1	11	2	2	1	0	0	0	0	0
CT head without and with IV contrast	Usually not appropriate	Expert Consensus	ଷଟତ 1-10 mSv	€€€€ 3- 10 mSv [ped]	1	1	13	1	0	1	1	0	0	0	0
CT head cisternography	Usually not appropriate	Limited	ତେତେ 1-10 mSv		1	1	13	3	0	0	0	0	0	0	0

		References 22 (22264184)		Stud	ly Quality 2										
MRI complete spine with IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	3	0	1	0	1	0	0
CT complete spine without and with IV contrast	Usuall ₂ approp	Expert Consensus	ଷତ୍ତର 10-3 mSv	60	1	1	14	1	0	1	0	0	0	0	0
CT complete spine without IV contrast	Usuall ₂ approp	Expert Consensus	ଡଡଡଡ 10-3 mSv	60 00000000000000000000000000000000000	1	1	15	0	0	0	1	0	0	0	0
CT complete spine with IV contrast	Usuall ₂ approp	Expert Consensus	ଝଝଝଝ 10-3 mSv	00002	1	1	14	2	0	0	0	0	0	0	0

Variant 2: Adult. Orthostatic headache from suspected intracranial hypotension within 72 hours of dural puncture or other spinal intervention that could cause CSF leakage. Initial imaging.

	Appropriateness	COF				N7 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 with IV contrast	Usually not appropriate	Expert Consensus	ତେତେ 1-10 mSv	ତତତ 0.3- 3 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT head without IV contrast	Usually not appropriate	Expert Consensus	ଝେଝେ 1-10 mSv	ତ୍ତଙ୍କ 0.3- 3 mSv [ped]	1	1	11	0	2	0	1	1	1	0	0
CT head without and with IV contrast	Usually not appropriate	Expert Consensus	ତେତେ 1-10 mSv	&&&& 3- 10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
MRI head without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	0	2	0	1	0	0	0	0
MRI head without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	0	2	0	0	0	1	0	0
MRI complete spine without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	0	1	0	0	0	0

MRI complete spine without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	0	1	0	0	0	0
CT head cisternography	Usually not appropriate	Expert Consensus	ଝେଝଝ 1-10 mSv		1	1	15	1	0	0	0	0	0	0	0
DTPA cisternography	Usually not appropriate	Expert Consensus	ଝେଝଝ 1-10 mSv		1	1	14	0	1	1	0	0	0	0	0
MRI complete spine with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT myelography complete spine	Usually not appropriate	Expert Consensus	ହହହହହ 30- 100 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	13	0	1	1	1	0	0	0	0
CT complete spine without and with IV contrast	Usually not appropriate	Expert Consensus	ବେବେବ 10-30 mSv	✿✿֎֎ 3- 10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT complete spine without IV contrast	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	15	0	0	0	1	0	0	0	0
CT complete spine with IV contrast	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
MRI head with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT myelography dynamic complete spine	Usually not appropriate	Expert Consensus	ଷ୍ଟ୍ରଷ୍ଟ୍ର 30- 100 mSv		1	1	15	0	0	0	1	0	0	0	0
Radiographic myelography digital subtraction complete spine	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv		1	1	15	1	0	0	0	0	0	0	0
MR myelography complete spine	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	0	1	1	1	0	0	0	0

Variant 3: Adult. Orthostatic headache from suspected intracranial hypotension without improvement post 72 hours of dural puncture or other spinal intervention that could cause CSF leakage. Initial imaging.

	Appropriateness	COL			D (1				I	Final	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT head with IV contrast	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT head without IV contrast	Usually not appropriate	Expert Consensus	ଝେଝ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	1	1	10	0	1	1	2	1	0	1	0
CT head without and with IV contrast	Usually not appropriate	Expert Consensus	ଡେଡେ 1-10 mSv	ତତତତ 3- 10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
MRI head without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	1	2	1	0	1	0	0
MRI head without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	0	1	2	1	0	1	0	0
MRI complete spine without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	2	0	0	1	1	0	0
MRI complete spine 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	2	0	0
CT head cisternography	Usually not appropriate	Expert Consensus	ଝିଝିଝି 1-10 mSv		1	1	15	1	0	0	0	0	0	0	0
DTPA cisternography	Usually not appropriate	Expert Consensus	ଝିଝିଝି 1-10 mSv		1	1	13	0	2	0	1	0	0	0	0
MRI complete spine with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT myelography complete spine	Usually not appropriate	Expert Consensus	ଡଡଡଡଡ 30- 100 mSv	���� 3- 10 mSv [ped]	1	1	12	0	2	0	1	0	1	0	0
CT complete spine without and with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟବ୍ୟକ 10-30 mSv	∞∞∞∞ 3- 10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT complete spine without IV contrast	Usually not appropriate	Expert Consensus	ହହହହ 10-30 mSv	∞∞∞∞ 3- 10 mSv [ped]	1	1	15	0	0	0	1	0	0	0	0

CT complete spine with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟବ୍ୟ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
MRI head with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	0	0
CT myelography dynamic complete spine	Usually not appropriate	Expert Consensus	֎֎֎֎֎ 30- 100 mSv		1	1	15	0	0	0	1	0	0	0	0
Radiographic myelography digital subtraction complete spine	Usually not appropriate	Expert Consensus	ତତତତ 10-30 mSv		1	1	15	1	0	0	0	0	0	0	0
MR myelography complete spine	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	0	1	0	0	0	1	0	0

Variant 4: Adult. Obtundation with initial brain imaging features of suspected intracranial hypotension. Next imaging study.

	Appropri	ateness	COL			D. (N7 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
MRI complete spine without IV contrast	Usua approp		Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	3	8	5
			References		Study	Quality										
			36 (24107860)			3										
			25 (18768717)			2										
			35 (32402615)			2										
			34 (19949036)			2				_	_				_	
MRI complete spine without and with IV contrast	Usua approp		Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	0	8	4	3
			References		Study	Quality										
			36 (24107860)			3										
			28 (20651205)			4										
			25 (18768717)			2										
			35 (32402615)			2										

		34 (19949036)			2										
CT myelography complete spine	May be appropriate	Strong	ଡଡଡଡଡ 30- 100 mSv	֎֎֎֎ 3- 10 mSv [ped]	5	5	0	0	(0 3	12	0	1	0	0
		References		Study	Quality										
		34 (19949036)			2										
		35 (32402615)			2										
DTPA cisternography	Usually not appropriate	Limited	ଡଙ≎ 1-10 mSv		3	3	6	2		1 4	2	1	0	0	0
		References		Study	Quality			-							
		46 (22990687)			2										
		45 (26823556)		-	4						_				
MR myelography complete spine	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	6	2	-	7 0	0	0	0	1	0
		References		Study	Quality										
		48 (22173753)			4										
		49 (24852289)			2										
		47 (34292360)			4										
		50 (32354709)			4										
		51 (32720867)			4										
CT myelography dynamic complete spine	Usually not appropriate	Strong	≎≎≎≎≎≎ 30- 100 mSv		2	2	6	4	0	5 0	0	0	0	0	0
		References		Study	Quality										
		24 (35261281)			4										
		39 (35614322)			2										
		38 (30226459)			2										
		37 (33602750)			2										
		44 (35332017)			4										
		43 (37128777)			4										
		42 (31518974)			2										
		41 (31857327)			4										

		40 (33122215)			4										
Radiographic myelography digital subtraction complete spine	Usuall ₂ approp	Strong	ହତତତ 10-30 mSv		2	2	6	3	6	0	0	0	1	0	0
		References		Study	Quality										
		24 (35261281)			4										
		44 (35332017)			4										
		43 (37128777)			4										
		42 (31518974)			2										
		41 (31857327)			4										
		40 (33122215)			4										
		54 (26849709)			4										
		53 (33484155)			2										
MRI complete spine with IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	3	1	0	1	0	0	0	0
CT complete spine without and with IV contrast	Usuall ₂ approp	Expert Consensus	ଡଡଡଡ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	14	1	0	0	0	1	0	0	0
CT complete spine without IV contrast	Usuall ₂ approp	Expert Consensus	ଡଡଡଡ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	14	0	0	1	1	0	0	0	0
CT complete spine with IV contrast	Usually approp	Expert Consensus	ଡଡଡଡ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	14	2	0	0	0	0	0	0	0

Variant 5: Adult. Chronic daily headache from suspected intracranial hypotension with negative initial brain and spine imaging, but with history and clinical examination suggesting CSF leakage. Next imaging study.

	Appropria	teness	005			D	20.11			F	'inal '	Tabu	latio	ns		
Procedure	Catego		SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT myelography dynamic complete spine	Usuall appropri		Strong	֎֎֎֎֎ 30- 100 mSv		8	8	0	0	0	0	0	1	2	6	7
			References		Study	/ Quality										

		24 (35261281)			4										
		39 (35614322)			2										
		38 (30226459) 37 (33602750) 44 (35332017) 43 (37128777) 42 (31518974) 41 (31857327)			2										
					2										
					4										
					4										
					2										
					4										
		40 (33122215)		1	4							,			
Radiographic myelography digital subtraction complete spine	Usually appropriate	Strong	ଝଝଝଝ 10-30 mSv		8	8	0	1	0	1	1	0	3	4	6
		References		Study	v Quality										
	24 (35261281)														
		54 (26849709)													
				2											
		44 (35332017)													
		43 (37128777)													
		42 (31518974)													
		41 (31857327)		4											
		40 (33122215)		1	4					1		,			
DTPA cisternography	May be appropriate	Limited	ଝେଝ 1-10 mSv		5	5	0	0	0	1	14	1	0	0	0
		References		Study											
		46 (22990687)			2										
		45 (26823556)		4							-				
MR myelography complete spine	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	0	12	4	0	0	0
		References		Study Quality											
		48 (22173753)													
		47 (34292360)		4 4											
		49 (24852289)			2										

		50 (32354709)		4													
			51 (32720867)			4								-		_	
CT head cisternography	Usuall ₂ approp		Limited	ତେତେ 1-1(mSv	D 1		1	14	1	0	0	1	0	0	0	0	
			References		Study Quality												
			22 (22264184)		2												

Variant 6: Adult. Rebound headache following epidural blood patch or fibrin glue patch treatment for suspected intracranial hypotension. Initial imaging.

Procedure	Appropriateness Category	SOF	Adults RRL	Peds RRL	Rating		Final Tabulations											
		SOE				Median	1	2	3	4	5	6	7	8	9			
CT head with IV contrast	Usually not appropriate	Expert Consensus	ଝେଝ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	1	1	14	2	0	0	0	0	0	0	0			
CT head without IV contrast	Usually not appropriate	Expert Consensus	ଝେଝେ 1-10 mSv	≎≎≎ 0.3- 3 mSv [ped]	1	1	14	1	0	0	0	0	1	0	0			
CT head without and with IV contrast	Usually not appropriate	Expert Consensus	ଝେଝେ 1-10 mSv	���� 3- 10 mSv [ped]	1	1	14	1	0	0	1	0	0	0	0			
MRI head without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	1	1	1	0	0	0	1	0			
MRI head without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	0	1	3	0	0	1	0	1			
MRI complete spine without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	1	2	1	0	0	0	0			
MRI complete spine without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	0	1	0	1	0	1	0	0			
CT head cisternography	Usually not appropriate	Expert Consensus	ଡଡ ଡ 1-10 mSv		1	1	15	1	0	0	0	0	0	0	0			

DTPA cisternography	Usually not appropriate	Expert Consensus	ଡେଡେ 1-10 mSv		1	1	15	1	0	0	0	0	0	0	0
MRI complete spine with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	2	1	0	0	0	0	0	0
CT myelography complete spine	Usually not appropriate	Expert Consensus	ଷତ୍ତରତ 30- 100 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	14	1	0	0	0	0	1	0	0
CT complete spine without and with IV contrast	Usually not appropriate	Expert Consensus	֎֎֎֎ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	14	1	0	1	0	0	0	0	0
CT complete spine without IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟବ୍ୟ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	14	2	0	0	0	0	0	0	0
CT complete spine with IV contrast	Usually not appropriate	Expert Consensus	ଷଷଷଷ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	14	2	0	0	0	0	0	0	0
MRI head with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	2	0	0	0	0	0	0	0
CT myelography dynamic complete spine	Usually not appropriate	Expert Consensus	ଡଡଡଡଡ 30- 100 mSv		1	1	14	1	0	0	0	1	0	0	0
Radiographic myelography digital subtraction complete spine	Usually not appropriate	Expert Consensus	ତତତତ 10-30 mSv		1	1	14	1	0	1	0	0	0	0	0
MR myelography complete spine	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	1	0	1	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.