American College of Radiology ACR Appropriateness Criteria[®]

Acute Shoulder Pain

Variant 1: Adult. Acute shoulder pain. Any etiology. Initial imaging.

	Appropri	ateness	005							F	'inal '	Tabu	latio	ns		
Procedure	Categ	gory	SOE	Adults RR	L Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Radiography shoulder	Usua approp		Strong	≎ <0.1 mS	v	9	9	0	0	0	0	0	0	1	1	12
			References		Stud	ly Quality							-			
			9 (17692769)			3										
			11 (24124199)			3										
			10 (19166638)			3										
			12 (35813132)			2										
			7 (20206348)			4		_								
CT shoulder without IV contrast	Usually approp		Limited	ଝେଝ 1-10 mSv)	2	2	5	3	2	3	0	1	0	0	0
			References		Stud	ly Quality										
			6 (18029890)			2										
			7 (20206348)			4										
			8 (25231817)			3										
			9 (17692769)			3		_								
CT arthrography shoulder	Usually approp		Expert Consensus	ଡଡଡ ଡ 10-3 mSv	30	1	1	12	0	0	1	1	0	0	0	0
CT shoulder with IV contrast	Usually approp		Expert Consensus	ଝେଝ 1-10 mSv)	1	1	11	1	1	0	0	0	1	0	0

CT shoulder without and with IV contrast	Usuall approp		Expert Consensus	ତତତ 1-10 mSv		1	1	11	2	0	0	0	0	1	0	0
MR arthrography shoulder	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	0	0	0	1	0	0	0
MRI shoulder without IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	0	0	1	0	0	1	0
MRI shoulder without and with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	2	0	0	0	1	0	0	0
Bone scan shoulder	Usuall approp		Expert Consensus	ତତତ 1-10 mSv		1	1	13	0	1	0	0	0	0	0	0
FDG-PET/CT skull base to mid- thigh	Usuall approp	•	Expert Consensus	ଡଡଡଡ 10-3 mSv	0	1	1	13	1	0	0	0	0	0	0	0
US shoulder	Usuall approp		Limited O		O 0 mSv [ped]	1	1	9	0	1	0	2	1	1	0	0
			References 13 (20848574)		Study	Quality 2										

Variant 2: Adult. Acute shoulder pain. Suspect occult fracture. Radiographs negative or indeterminate. Next imaging study.

	Appropriateness	COF			D (1				F	inal	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT shoulder without IV contrast	Usually appropriate	Strong	ବ୍ୟବ୍ୟ 1-10 mSv		9	9	0	0	0	0	0	1	4	0	9
		References		Study	v Quality										
		16 (17325929)			2										
		15 (26295635)			4										
		14 (32656034)			2				_						
MRI shoulder without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	2	1	5	3	3

			References		Study	v Quality										
			21 (24172671)			4										
			20 (19305272)			2										
			19 (21940587)			3										
			18 (24560469)			4										
			17 (34033918)			2			1				1		1	
CT arthrography shoulder	Usually approp		Expert Consensus	ଝଝଝଝ 10-30 mSv)	1	1	13	0	0	0	0	0	1	0	0
CT shoulder with IV contrast	Usually approp		Expert Consensus	ଝେଝେ 1-10 mSv		1	1	11	1	1	0	0	0	1	0	0
CT shoulder without and with IV contrast	Usually approp		Expert Consensus	≎≎≎≎ 1-10 mSv		1	1	11	2	0	0	0	0	1	0	0
MR arthrography shoulder					O 0 mSv [ped]	1	1	12	0	0	1	0	1	0	0	0
MRI shoulder without and with IV contrast	Usually approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	10	2	0	1	0	0	1	0	0
Bone scan shoulder	Usually approp		Expert Consensus	≎≎≎≎ 1-10 mSv		1	1	12	1	0	0	0	1	0	0	0
FDG-PET/CT skull base to mid- thigh	Usually approp		Expert Consensus	ଷଷଷଷ 10-30 mSv) 😌 😌 🥸 3- 10 mSv [ped]	1	1	13	0	1	0	0	0	0	0	0
US shoulder	Usually approp		Limited	O 0 mSv	O 0 mSv [ped]	1	1	9	0	2	1	0	1	1	0	0
			References			v Quality										
		17 (34033918)				2										

Variant 3: Adult. Acute shoulder pain. Radiographs positive for proximal humerus, scapular, or clavicle fracture. Next imaging study.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations 1 2 3 4 5 6 7 8 9

	Appropri	ateness	~ ~ ~							F	'inal '	Tabu	latio	ıs		
Procedure	Categ		SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CT shoulder without IV contrast	Usua approp		Strong	ତତତ 1-10 mSv		9	9	0	0	0	0	1	1	3	1	8
			References		Study	/ Quality										
			25 (16054146)			2										
			24 (19724000)			4										
			23 (17169583)			4							<mark>6 7 8</mark>			
			22 (19836976)			1 2 3 4 5 6 7 9 9 0 0 0 0 1 1 3 ady Quality 2 4										
			16 (17325929)													
			12 (35813132)			2										
			7 (20206348)		I	4										
MRI shoulder without IV contrast	May approp		Limited	O 0 mSv	O 0 mSv [ped]	4	4	0	2	4	2	5	0	0	0	0
			References		Study	/ Quality										
			15 (26295635)			4										
			19 (21940587)			3										
			26 (19685061)			4			1		1			1		
CT arthrography shoulder	Usuall approp		Expert Consensus	ଝଝଝଝ 10-3 mSv	0	1	1	13	0	0	0	1	0	0	0	0
CT shoulder with IV contrast	Usuall approp		Expert Consensus	≎≎≎ 1-10 mSv		1	1	11	1	1	0	0	1	0	0	0
CT shoulder without and with IV contrast	Usuall approp		Expert Consensus	ତତତ 1-10 mSv		1	1	11	2	0	0	0	1	0	0	0
MR arthrography shoulder	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	0	0	1	0	1	0	0	0
MRI shoulder without and with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	0	1	0	1	0	0	0
Bone scan shoulder	Usuall approp		Expert Consensus	ତତତ 1-10 mSv		1	1	13	1	0	0	0	0	0	0	0

FDG-PET/CT skull base to mid- thigh	Usually not appropriate	Expert Consensus	ବ୍ଟବ୍ଟ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	13	0	1	0	0	0	0	0	0
US shoulder	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	0	1	1	0	0	0	0

Variant 4: Adult. Acute shoulder pain. History or physical examination consistent with dislocation or instability. Radiographs positive, negative, or indeterminate. Next imaging study.

Procedure	Appropri Categ	iateness gory	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	F 3	inal	Tabu 5	lation		8	9
MRI shoulder without IV contrast	Usua approp		Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	1	0	0	0	0	2	0	10
			References		Study	v Quality										
			29 (19556150)			2										
			33 (19098184)			3										
			31 (24060014)			3										
CT shoulder without IV contrast	May approp (Disagre	oriate	Expert Opinion	ତେତେ 1-10 mSv		5	5	0	4	0	1	4	1	3	0	0
		y be priate eement) Expert Opinion mSv References			Study	v Quality										
			8 (25231817)			3										
			30 (23716283)			3										
			28 (24318071)			2										
			27 (29119123)			2										
			29 (19556150)			2		-								
MR arthrography shoulder	May approp (Disagre	oriate	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	4	2	4	1	0	0	1	1	0
			References		Study	Quality										
			32 (16244267)			3										
			31 (24060014)			3										

CT arthrography shoulder	Usually not appropriate	Expert Consensus	ବଟଟତ 10-30 mSv		1	1	7	1	2	2	1	0	0	0	0
CT shoulder with IV contrast	Usually not appropriate	Expert Consensus	ବ୍ୟବହ 1-10 mSv		1	1	10	1	0	0	2	1	0	0	0
CT shoulder without and with IV contrast	Usually not appropriate	Expert Consensus	ଝଝଝ 1-10 mSv		1	1	11	1	1	1	0	0	0	0	0
MRI shoulder without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	0	0	1	0	1	0	0
Bone scan shoulder	Usually not appropriate	Expert Consensus	ଝେଝେ 1-10 mSv		1	1	13	0	1	0	0	0	0	0	0
FDG-PET/CT skull base to mid- thigh	Usually not appropriate	Expert Consensus	ବ୍ତବ୍ତବ୍ତ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	13	0	1	0	0	0	0	0	0
US shoulder	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	0	0	1	1	0	0	0

Variant 5: Adult. Acute shoulder pain. Physical examination consistent with labral tear. Radiographs negative or indeterminate. Next imaging study.

	Appropriateness				D. (]	Final	Tabı	ılatio	ons		
Procedure	Category	SOE	Adults RR	L Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MR arthrography shoulder	Usually appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	9	9	1	0	0	1	1	2	0	2	7
		References		Study	Quality										
		45 (35122144))	(Good										
		44 (29582141))	(Good										
		43 (27826700))	(Good										
		41 (24794570))		3										
		40 (20950767))		3										
		39 (23801390))		3										
		38 (17896393))		4										

			37 (21907516)			2										
			32 (16244267)			3										
			33 (19098184)			3										
			42 (22401678)			3		_	1							
MRI shoulder without IV contrast	Usua approp		Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	0	0	4	3	7
			References		Study	/ Quality										
			47 (26779556)			3										
			46 (28604236)		(Good										
			44 (29582141)		(Good										
			31 (24060014)			3										
			33 (19098184)			3										
CT arthrography shoulder	Usua approp		Strong	ଡଡଡଡ 10-3 mSv	0	7	7	1	0	0	0	4	1	3	5	0
			References		Study	/ Quality		-	-	-	-	-				
			36 (21074344)			2										
			29 (19556150)			2										
			34 (22358006)			2										
			35 (31541346)			2										
CT shoulder with IV contrast	Usually approp	y not riate	Expert Consensus	ଡଡଡ 1-10 mSv		1	1	11	1	1	0	0	0	1	0	0
CT shoulder without IV contrast	Usually approp		Expert Consensus	ତତତ 1-10 mSv		1	1	11	1	0	0	0	1	1	0	0
CT shoulder without and with IV contrast	Usually approp		Expert Consensus	ଡଡଡ 1-10 mSv		1	1	11	1	1	0	0	1	0	0	0
MRI shoulder without and with IV contrast	Usually approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	0	0	1	0	1	0	0
Bone scan shoulder	Usually approp		Expert Consensus	ତତତ 1-10 mSv		1	1	13	1	0	0	0	0	0	0	0

FDG-PET/CT skull base to mid- thigh	Usually not appropriate	Expert Consensus	ବ୍ରବ୍ୟୁ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	1	1	13	0	1	0	0	0	0	0	0
US shoulder	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	1	0	1	0	0	0	0

Variant 6: Adult. Acute shoulder pain. Physical examination consistent with rotator cuff tear. Radiographs negative or indeterminate. Next imaging study.

	Appropriateness Category		SOE	Adults RRL		Rating	Median	Final Tabulations									
Procedure					Peds RRL			1	2	3	4	5	6	7	8	9	
MRI shoulder without IV contrast	Usually appropriate		Limited	O 0 mSv	O 0 mSv [ped]	9	9	1	0	0	0	0	0	2	1	10	
			References Study Quality														
			29 (19556150)		2												
			31 (24060014)		3												
			49 (25677796)		М												
US shoulder	Usua approp		Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	5	6	3	
		References			Study Quality												
	<u>31 (24060014)</u> 57 (15674840)				3 2 2												
		56 (18651142) 55 (30744304)															
						4											
			54 (17149764)			2											
		53 (19457838) 52 (18449121) 51 (18160242) 50 (18591598) 49 (25677796)			M 3 3 2												
					M												
MR arthrography shoulder	Usually approp		Limited	O 0 mSv	O 0 mSv [ped]	2	2	5	2	2	3	0	0	0	0	1	

		References			Study											
		49 (25677796)			М											
		48 (34939473)			Good											
		31 (24060014)			3											
CT arthrography shoulder	Usuall approp		Expert Consensus	ଡେଡେଡ 10-3 mSv	0	1	1	8	2	1	2	0	0	0	0	0
CT shoulder with IV contrast	Usuall approp		Expert Consensus	ତେତେ 1-10 mSv		1	1	11	1	1	0	0	0	1	0	0
CT shoulder without IV contrast		ually not Expert propriate Consensus		ଝେଝ 1-10 mSv		1	1	11	1	1	0	1	0	0	0	0
CT shoulder without and with IV contrast	Usuall approp		Expert Consensus	ଝେଝ 1-10 mSv		1	1	11	1	1	0	0	0	1	0	0
MRI shoulder without and with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	11	1	0	1	0	0	0	1	0
Bone scan shoulder	Usuall approp		Expert Consensus	ଝେଝ 1-10 mSv		1	1	13	1	0	0	0	0	0	0	0
FDG-PET/CT skull base to mid- thigh	Usuall approp		Expert Consensus	֎֎֎֎ 10-3 mSv	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1	1	13	0	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.