## American College of Radiology ACR Appropriateness Criteria®

## **Thoracic Outlet Syndrome**

Variant 1: Neurogenic thoracic outlet syndrome. Initial imaging and follow-up imaging after surgery or intervention.

	Appropriateness	opriateness SOE Adults RRL Peds RRL Rating Media							F	inal	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI chest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	1	0	0	1	4	0	13	3	0
		References		Study	Quality										
		16 (22782291)			4										
MRI chest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	3	1	11	6	1
		References		Study	Quality		•		•	•				•	
		16 (22782291)			4										
Radiography chest	Usually appropriate	Limited	<b>≎</b> <0.1 mSv		7	7	0	0	0	0	0	1	14	7	0
		References		Study	Quality										
		26 (21129894)			4										
		20 (22140211)			4										
		25 (22544354)			4										
		27 (19010280)			4										
		23 (23446121)			4										
		24 (22542345)			4										
CTA chest with IV contrast	May be appropriate	Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	5	5	0	0	0	7	14	1	0	0	0

CT chest with IV contrast	May be appropriate	Limited	��⊕ 1-10 mSv	<b>≎≎≎≎</b> 3- 10 mSv [ped]	5	5	0	0	2	3	7	6	2	2	0
		References		Study	Quality										
		20 (22140211)			4										
		12 (10864068)			3										
		13 (10845503)			3										
		21 (22790240)			4										
		22 (22931987)			4										
US duplex Doppler subclavian artery and vein	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	1	2	10	6	3	0	0
		References		Study	Quality										
		29 (12917117)			4										
		30 (19440705)			4										
		28 (16439785)			3										
CT chest without IV contrast	Usually not appropriate	Limited	<b>999</b> 1-10 mSv	���� 3- 10 mSv [ped]	3	3	4	3	11	3	1	0	0	0	0
		References		Study	Quality		•								
		20 (22140211)		_	4										
		12 (10864068)			3										
		13 (10845503)			3										
		21 (22790240)			4										
		22 (22931987)			4										
CT chest without and with IV contrast	Usually not appropriate	Limited	<b>999</b> 1-10 mSv	���� 3- 10 mSv [ped]	3	3	6	5	7	3	1	0	0	0	0
		References		Study	Quality										
		20 (22140211)			4										
		12 (10864068)			3										
		13 (10845503)			3										
		21 (22790240)			4										
		22 (22931987)			4										

CTV chest with IV contrast	Usually not appropriate	Expert Consensus	ଡ଼େଡ଼େଡ଼ 10-30 mSv		3	3	6	4	3	3	6	0	0	0	0
MRA chest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	6	3	13	0	0	0	0	0	0
MRA chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	4	3	9	3	2	1	0	0	0
MRV chest without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	9	4	7	0	1	0	1	0	0
MRV chest without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	4	7	0	2	0	1	0	0
Catheter venography upper extremity	Usually not appropriate	Expert Consensus	��� 1-10 mSv		2	2	11	4	5	1	0	0	0	1	0
Arteriography upper extremity	Usually not appropriate	Expert Consensus	<b>≎</b> <0.1 mSv		1	1	12	3	3	3	0	0	0	1	0

Variant 2: Venous thoracic outlet syndrome. Initial imaging and follow-up imaging after surgery or intervention.

ъ .	Appropriateness	COF	A L L DDI	D I DDI		3.6.11			F	inal '	Гаbи	latio	ns		
Procedure	ocedure SOE Adults RRL Peds RRI	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9		
US duplex Doppler subclavian artery and vein	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	1	0	0	2	0	5	6	8

References	Study Quality
5 (11221942)	4
37 (11707008)	3
38 (17928256)	4
28 (16439785)	3
39 (19161749)	3
40 (11444739)	4

Catheter venography upper extremity	Usually appropriate	Strong	��� 1-10 mSv	)	8	8	0	0	0	0	1	0	10	9	2
		References		Study	y Quality										
		31 (22156150)			2										
		32 (29112470)			2										
		33 (30217714)			3										
CT chest with IV contrast	Usually appropriate	Expert Consensus	��� 1-10 mSv	9	7	7	0	0	1	1	3	5	7	5	0
Radiography chest	Usually appropriate	Limited	<b>≎</b> <0.1 mS		7	7	0	0	0	0	3	0	10	9	0
		References		Study	y Quality					•					
		26 (21129894)			4										
		20 (22140211)			4										
		25 (22544354)			4										
		23 (23446121)			4										
		24 (22542345)			4										
CTV chest with IV contrast	May be appropriate	Expert Consensus	���� 10-3 mSv	30	6	6	0	0	0	0	4	8	6	3	1
MRI chest without and with IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	1	0	9	5	7	0	0
		References		Study	y Quality										
		17 (12637678)			3										
MRV chest without and with IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	6	6	0	0	1	0	2	10	5	3	1
MRA chest without IV contrast	May be appropriate (Disagreement)	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	2	2	3	3	8	3	1	0	0
		References			y Quality										
		19 (22528911)			3										

MRA chest without and with IV contrast	May t appropr		Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	2	5	10	4	1	0	0
			References		Study	Quality										
			19 (22528911)			3										
MRI chest without IV contrast		May be appropriate Limit		O 0 mSv	O 0 mSv [ped]	5	5	0	1	1	6	8	5	1	0	0
		Referen			Study	Quality										
			17 (12637678)			3										
MRV chest without IV contrast	May l appropr		Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	0	1	3	1	10	6	1	0	0
CT chest without IV contrast	May t		Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	4	4	5	1	3	3	8	2	0	0	0
CT chest without and with IV contrast	Usually appropr		Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	3	3	7	3	9	2	0	0	1	0	0
CTA chest with IV contrast	Usually appropr		Expert Consensus	��� 1-10 mSv	���� 3- 10 mSv [ped]	2	2	7	7	8	0	0	0	0	0	0
Arteriography upper extremity	Usually appropr		Expert Consensus	<b>⊕</b> <0.1 mS	v	2	2	10	3	5	1	2	1	0	0	0

Variant 3: Arterial thoracic outlet syndrome. Initial imaging and follow-up imaging after surgery or intervention.

ъ	Appropriateness	COF	A L L DDI	D I DDI	D 41	3.7.11			F	inal '	Гаbи	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CTA chest with IV contrast	Usually appropriate	Limited	<b>≎≎≎</b> 1-10 mSv	���� 3- 10 mSv [ped]	8	8	0	0	1	1	0	1	8	7	4

References	Study Quality
12 (10864068)	3
13 (10845503)	3

		44 (45504004)													
		41 (17704334)			4										
		1 (17102047)			4					1	I				
MRA chest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	1	0	1	0	2	7	4	7
		References		Study	Quality										
		42 (22127993)			4										
		36 (15208064)			3										
		35 (24840478)			2										
		34 (25348136)			3										
Radiography chest	Usually appropriate	Limited	<b></b> <0.1 mSv		8	8	0	0	0	0	2	0	7	12	1
		References		Study	Quality										
		26 (21129894)			4										
		20 (22140211)			4										
		25 (22544354)			4										
		23 (23446121)			4										
		24 (22542345)			4										
US duplex Doppler subclavian artery and vein	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	5	13	4
		References		Study	Quality										
		28 (16439785)			3										
Arteriography upper extremity	Usually appropriate	Expert Consensus	<b>≎</b> <0.1 mSv		7	7	1	0	0	0	2	5	7	7	0
CT chest with IV contrast	May be appropriate	Limited	<b>999</b> 1-10 mSv	���� 3- 10 mSv [ped]	6	6	1	0	1	4	5	1	9	1	0
		References		Study	Quality										
		13 (10845503)			3										
MRI chest without and with IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	10	4	4	3	0

MRA chest without IV contrast	May approp	Limited	O 0 mSv	,	O 0 mSv [ped]	5	5	1	0	1	2	12	4	1	0	1
		References			Study	Quality										
		42 (22127993)				4										
		36 (15208064)				3										
		35 (24840478)				2										
		34 (25348136)				3										
MRI chest without IV contrast	May approp	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	5	5	0	1	2	5	9	3	2	0	0
CT chest without IV contrast	May approp	Limited	��� 1-10 mSv	0	<b>≎≎≎≎</b> 3- 10 mSv [ped]	4	4	2	2	5	6	6	1	0	0	0
	•	References			Study	Quality										
		13 (10845503)				3										
CT chest without and with IV contrast	Usuall: approp	Limited	��� 1-10 mSv	0	���� 3- 10 mSv [ped]	3	3	6	3	7	4	2	0	0	0	0
		References			Study	Quality		•	•	•	•	•		•	•	
		13 (10845503)				3										
CTV chest with IV contrast	Usualli approp	Expert Consensus	���� 10- mSv	30		2	2	7	5	7	0	2	0	0	0	0
MRV chest without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	,	O 0 mSv [ped]	2	2	10	4	5	1	2	0	0	0	0
MRV chest without and with IV contrast	Usualli approp	Expert Consensus	O 0 mSv	′	O 0 mSv [ped]	2	2	9	4	5	2	2	0	0	0	0
Catheter venography upper extremity	Usualli approp	Expert Consensus	��� 1-10 mSv	0		2	2	9	4	5	3	0	0	0	0	1

## **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.