American College of Radiology ACR Appropriateness Criteria[®]

Congenital or Acquired Heart Disease

Variant 1: Child or adult. Repaired tetralogy of Fallot or pulmonary valve stenosis with concern for pulmonary valve dysfunction or branch pulmonary artery stenosis. Incomplete or inadequate assessment of cardiovascular morphology and function after transthoracic echocardiography. Next imaging study.

	Appropri	ateness	005								F	inal [Fabu	latio	ns		
Procedure	Categ	gory	SOE	Adults RR	LP	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRA chest without and with IV contrast	Usua approp		Expert Consensus	O 0 mSv	, (O 0 mSv [ped]	8	8	0	0	0	0	5	2	3	6	7
MRI heart function and morphology without IV contrast	Usua approp		Limited	O 0 mSv	, (O 0 mSv [ped]	8	8	0	0	0	0	2	2	4	10	5
			References			Study	Quality										
			17 (33022183)				3										
			16 (32653300)				4										
			15 (7677083)				3										
MRI heart function and morphology without and with IV contrast	Usua approp		Limited	O 0 mSv	, (O 0 mSv [ped]	8	8	0	0	1	0	1	0	3	8	10
			References			Study	Quality										
			17 (33022183)				3										
			16 (32653300)				4										
			15 (7677083)				3										
CTA chest with IV contrast	Usua approp		Expert Consensus	ଝେଝ 1-1(mSv		89999 3- 10 mSv [ped]	7	7	0	0	1	0	5	2	9	6	0
CT heart function and morphology with IV contrast	Usua approp		Limited	ତତତତ 10∹ mSv		89999 3- 10 mSv [ped]	7	7	0	0	0	0	2	4	7	5	5

		References		Study	V Quality										
		14 (26679548)			4										
		13 (26272851)			4			-	-	-					
Radiography chest	Usually appropriate	Limited	❸ <0.1 mSv		7	7	0	0	0	2	3	3	9	4	0
		References		Study	V Quality										
		9 (18377431)			4										
CTA coronary arteries with IV contrast	May be appropriate	Expert Consensus	ବଟର 1-10 mSv	&&&& 3- 10 mSv [ped]	6	6	0	0	0	2	5	4	8	2	0
MRA chest without IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	6	6	1	0	0	2	6	5	5	3	1
Perfusion scan lung	May be appropriate	Limited	ଡେଡେ 1-10 mSv	&&&& 3- 10 mSv [ped]	6	6	1	1	0	2	7	6	4	0	2
		References		Study	V Quality										
		12 (24468055)			4			-	-	-	-				
Arteriography pulmonary	May be appropriate	Limited	ତତତତ 10-30 mSv		5	5	0	0	0	5	12	4	0	0	0
		References		Study	V Quality										
		12 (24468055)			4										
Arteriography coronary with ventriculography	May be appropriate	Limited	֎֎֎ 1-10 mSv	ଡଡଡଡ 3- 10 mSv [ped]	5	5	0	0	0	2	17	2	0	0	0
		References		Study	Quality										
		11 (20837914)			1										
		10 (16638542)			4										
		9 (18377431)			4										
US echocardiography transesophageal	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	0	1	6	8	5	0	0	0
		References		Study	Quality										

		12 (24468055)			4										
		18 (15975339)			3										
MRI heart function with stress without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	7	3	4	1	0	0	0	0
MRI heart function with stress without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	6	3	3	2	0	0	0	1
SPECT or SPECT/CT MPI rest and stress	Usuall approp	Expert Consensus	ଡେଡେଡ 10-3(mSv	0 000000000000000000000000000000000000	2	2	7	5	8	1	0	0	0	0	0
MRA abdomen without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	21	1	1	0	0	0	0	0	0
MRA abdomen without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	21	1	1	0	0	0	0	0	0
MRA neck without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	1	2	0	0	0	0	0	0
MRA neck without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	1	2	0	0	0	0	0	0
FDG-PET/CT heart	Usuall approp	Expert Consensus	ଡେଡଡ େ 10-3(mSv)	1	1	17	4	2	0	0	0	0	0	0

Variant 2: Child or adult. Transposition of the great arteries after atrial switch. Incomplete or inadequate assessment of cardiovascular morphology and function after transthoracic echocardiography. Next imaging study.

	Appropriateness	SOF			D. (F	'inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI heart function and morphology without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	9	9	0	0	1	0	1	0	2	5	13
		References		Study	Quality										
		22 (15851616)			3										

MRA chest without and with IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	8	8	1	0	1	0	2	3	3	8	4
MRI heart function and morphology without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	0	1	0	5	9	6
		References		Study	y Quality										
		22 (15851616)			3										
CTA chest with IV contrast	Usually appropriate	Expert Consensus	ଷଷଷ 1-10 mSv	&&&& 3- 10 mSv [ped]	7	7	0	1	1	1	3	5	8	3	0
CT heart function and morphology with IV contrast	Usually appropriate	Expert Consensus	ବ୍ୟବ୍ୟବ୍ୟ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	7	7	0	0	0	1	3	3	7	4	4
MRA chest without IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	7	7	0	1	0	0	1	1	9	9	0
CTA coronary arteries with IV contrast	May be appropriate	Expert Consensus	ଡେଡେଡ 1-10 mSv	&&&& 3- 10 mSv [ped]	5	5	0	2	0	7	8	3	1	0	0
US echocardiography transesophageal	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	0	1	0	3	8	7	2	0	0
Radiography chest	May be appropriate	Expert Consensus	& <0.1 mSv		5	5	0	1	0	4	14	2	0	0	0
Arteriography pulmonary	May be appropriate	Limited	ଝଝଝଝ 10-30 mSv		4	4	1	1	3	7	4	5	1	0	0
		References		Study	y Quality		-					•			•
		21 (27372954)			4									-	
Arteriography coronary with ventriculography	Usually not appropriate	Limited	ବେବତ 1-10 mSv	≎≎≎≎ 3- 10 mSv [ped]	2	2	9	6	6	0	0	0	0	0	0
		References		Study	y Quality										
r		21 (27372954)		I	4		_								
MRI heart function with stress without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	8	5	0	0	0	0	0	0

MRI heart function with stress without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	8	6	6	1	0	0	0	0	0
MRA abdomen without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	21	0	0	0	0	0	1	0	0
MRA abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	21	0	0	0	0	0	1	0	0
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	2	0	0	0	0	0	0
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	2	0	0	0	0	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	ବ୍ରବ୍ତବ୍ତ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	17	2	3	0	0	0	0	0	0
SPECT or SPECT/CT MPI rest and stress	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv	ହତ୍ତ୍ରହତ୍ତ 10-30 mSv [ped]	1	1	15	3	3	0	0	0	1	0	0

Variant 3: Child or adult. Transposition of the great arteries after arterial switch. Incomplete or inadequate assessment of cardiovascular morphology and function after transthoracic echocardiography. Next imaging study.

	Appropri	iateness	COL		.		D (1				ŀ	inal	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RR	L	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI heart function and morphology without and with IV contrast	Usua approp		Strong	O 0 mSv	,	O 0 mSv [ped]	9	9	0	0	0	1	2	0	1	5	13
			References			Study	V Quality										
			28 (29748700)				3										
			27 (20452235)				2										
			26 (15591430)				2										
			21 (27372954)				4										

MRA chest without and with IV contrast	Usually appropria	Expert Consensus	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	1	3	3	4	6	5
MRI heart function and morphology without IV contrast	Usually appropria	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	3	0	4	9	6
		References		Study	y Quality				-						
		28 (29748700)			3										
		27 (20452235)													
		26 (15591430)			2										
		21 (27372954)			4										
CTA chest with IV contrast	Usually appropria	Expert Consensus	ତତତ 1-10 mSv	ହତତତ 3- 10 mSv [ped]	7	7	0	1	0	0	5	4	9	3	0
CT heart function and morphology with IV contrast	Usually appropria	Expert Consensus	ଡେଡେଡ 10-30 mSv	ଡଡଡଡ 3- 10 mSv [ped]	7	7	0	0	0	1	3	3	7	5	3
MRA chest without IV contrast	Usually appropria	Expert Consensus	O 0 mSv	O 0 mSv [ped]	7	7	0	1	0	1	3	5	5	5	2
MRI heart function with stress without and with IV contrast	Usually appropria	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	1	1	4	3	7	4	0
		References		Study	y Quality										
		29 (20416135)			4										
		28 (29748700)			3										
		 26 (15591430)			2										
Radiography chest	Usually appropria	Expert Consensus	愛 < 0.1 mSv	€ <0.03 mSv [ped]	7	7	0	0	1	2	5	1	10	1	0
CTA coronary arteries with IV contrast	May be appropria	Moderate	ଝେଝଝ 1-10 mSv	**** 3- 10 mSv [ped]	6	6	0	0	0	0	6	8	4	2	0
		 References		Study	y Quality										
		 19 (28632651)			4										
		 25 (19356445)			2										
		24 (29090351)			3										

		23 (33028389)			Good			-				-			
MRI heart function with stress without IV contrast	May be appropriate (Disagreement)	Expert Opinion	O 0 mSv	O 0 mSv [ped]	5	5	0	0	2	1	6	3	6	2	0
		References		Study	V Quality										
		29 (20416135)			4										
		28 (29748700)			3										
		26 (15591430)			2										
SPECT or SPECT/CT MPI rest and stress	May be appropriate	Limited	ଡଡଡଡ 10-30 mSv	ବ୍ରବ୍ରବ୍ର 10-30 mSv [ped]	5	5	0	0	2	2	12	3	1	0	0
		References		Study	V Quality										
		30 (31119712)			4										
Arteriography pulmonary	Usually not appropriate	Expert Consensus	֎֎֎֎ 10-30 mSv		3	3	3	3	7	2	4	1	0	0	0
Arteriography coronary with ventriculography	Usually not appropriate	Limited	ଡଡଡ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	3	3	4	2	6	4	2	2	0	0	0
		References		Study	/ Quality										
		21 (27372954)			4										
US echocardiography transesophageal	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	4	2	5	3	4	2	0	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	ବ୍ୟବ୍ୟକ୍ତ 10-30 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	3	3	8	2	2	1	7	1	1	0	0
MRA abdomen without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	1	0	0	0	1	0	0
MRA abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	1	0	0	0	1	0	0
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	19	1	2	0	0	0	0	0	0

MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	19	1	2	0	0	0	0	0	0	
---------------------------------------	-------------------------	---------------------	---------	------------------	---	---	----	---	---	---	---	---	---	---	---	--

Variant 4: Child. Suspected or confirmed congenital or acquired coronary artery abnormality. Incomplete or inadequate assessment of coronary morphology after transthoracic echocardiography. Next imaging study.

	Appropriateness	COL							F	'inal '	Fabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CTA coronary arteries with IV contrast	Usually appropriate	Limited	ଡେଡଡ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	9	9	0	0	0	0	1	0	0	4	17
		References		Study	v Quality										
		35 (33755749)			2										
MRA chest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	1	0	0	0	1	5	9	4	0
		References		Study	v Quality										
		38 (21921132)			2										
		37 (34540764)			3										
		36 (31371063)			3					_					
MRA chest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	2	5	9	4	0
	,	References		Study	Quality		-	•							
		38 (21921132)			2										
		37 (34540764)			3										
		36 (31371063)			3		_								
MRI heart function and morphology without IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	1	5	4	7	3	0
MRI heart function and morphology without and with IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	4	5	8	3	0

Arteriography coronary with ventriculography	May approp		Limited	ତତତ 1-10 mSv	&&& 3- 10 mSv [ped]	6	6	0	0	0	2	3	7	4	1	5
			References		Study	y Quality										
			33 (33614558)			2					-		-			
MRI heart function with stress without and with IV contrast	May approp		Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	0	9	7	2	2	0
			References		Study	y Quality										
			36 (31371063)			3										
			39 (32069111)			2										
CTA chest with IV contrast	May approp		Limited	ତତତ 1-10 mSv	&&&& 3- 10 mSv [ped]	5	5	1	1	7	1	4	7	0	0	1
			References		Study	y Quality										
			34 (28356445)			4										
CT heart function and morphology with IV contrast	May approp		Expert Consensus	ତତତତ 10-3 mSv	0 \$\$\$\$\$ 3- 10 mSv [ped]	5	5	0	0	0	1	10	6	1	1	1
MRA abdomen without and with IV contrast	May approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	2	0	1	5	9	3	0	0	0
MRI heart function with stress without IV contrast	May approp		Limited	O 0 mSv	O 0 mSv [ped]	5	5	1	0	0	0	13	5	0	1	0
			References		Study	y Quality										
			36 (31371063)			3										
			39 (32069111)			2			-	_						
SPECT or SPECT/CT MPI rest and stress	May approp (Disagre	riate	Expert Opinion	ଡଡଡଡ 10-3 mSv	0 \$€€€€€ 0 10-30 mSv [ped]	5	5	0	0	2	1	4	3	8	2	0
			References		Study	y Quality										
			40 (28385257)			4										
MRA abdomen without IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	9	2	2	3	4	1	1	0	0

US echocardiography transesophageal	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	5	0	10	1	4	1	1	0	0
Arteriography pulmonary	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv		1	1	12	5	2	1	0	0	2	0	0
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	17	1	2	1	0	1	0	0	0
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	16	1	2	1	0	2	0	0	0
Radiography chest	Usually not appropriate	Expert Consensus	& <0.1 mSv		1	1	11	6	2	0	1	0	0	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	ବ୍ଟବ୍ଟ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	13	5	1	0	1	1	0	1	0

Variant 5: Child. Known single ventricle physiology. Preoperative evaluation for stage 2 single ventricle palliation. Incomplete or inadequate assessment of cardiovascular morphology and function after transthoracic echocardiography. Next imaging study.

	Appropri	ateness	005			D.C				F	inal	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RRI	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRA chest without and with IV contrast	Usua approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	0	0	0	6	10	4
MRI heart function and morphology without IV contrast	Usua approp		Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	0	1	2	1	4	8	6
			References		Study	Quality										
			42 (19616678)			2				-	_					
MRI heart function and morphology without and with IV contrast	Usua approp		Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	1	1	0	2	9	8
			References		Study	V Quality										
			42 (19616678)			2										

CTA chest with IV contrast	Usually appropriate	Moderate	େଇଡେଡ 1-10 mSv	ଡଡଡଡ 3- 10 mSv [ped]	7	7	0	0	0	0	5	5	7	4	1
		References		Study	Quality										
		44 (33078501)		~	2										
CT heart function and morphology with IV contrast	Usually appropriate	Limited	ବବବବ 10-30 mSv	&&&& 3- 10 mSv [ped]	7	7	0	0	1	1	5	2	4	5	4
		References		Study	v Quality			-							
		43 (24930614)			4										
Arteriography pulmonary	Usually appropriate	Limited	ବ୍ୟବ୍ୟକ୍ତ 10-30 mSv		7	7	0	0	2	0	6	1	6	6	1
		References		Study	Quality										
		41 (26356648)			4										
Arteriography coronary with ventriculography	Usually appropriate	Limited	ବ୍ୟତ୍ୟ 1-10 mSv	&&&& 3- 10 mSv [ped]	7	7	0	0	0	0	0	0	11	8	1
		References		Study	v Quality										
		41 (26356648)			4										
		42 (19616678)			2										
MRA chest without IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	1	11	5	2
US echocardiography transesophageal	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	1	0	0	2	8	9	0	0	0
Radiography chest	Usually not appropriate	Expert Consensus	≎ < 0.1 mSv		3	3	3	4	5	1	7	0	0	1	1
CTA coronary arteries with IV contrast	Usually not appropriate	Expert Consensus	ତେତେ 1-10 mSv	000000 3- 10 mSv [ped]	2	2	6	8	4	1	1	0	0	0	0
MRI heart function with stress without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	10	9	1	0	0	0	0	0	0

MRI heart function with stress without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	10	7	3	0	0	0	0	0	0
MRA abdomen without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	1	0	0	0	0	1	0
MRA abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	1	0	0	0	0	1	0
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	1	0	0	1	0	0	0
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	1	0	0	1	0	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	ବ୍ରବ୍ତବ୍ତ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	18	2	1	0	0	1	0	0	0
SPECT or SPECT/CT MPI rest and stress	Usually not appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv	ଷତ୍ତରତ୍ର 10-30 mSv [ped]	1	1	16	3	1	0	0	1	1	0	0

Variant 6: Child. Known single ventricle physiology. Preoperative evaluation for stage 3 single ventricle palliation (total cavopulmonary connection). Incomplete or inadequate assessment of cardiovascular morphology and function after transthoracic echocardiography. Next imaging study.

	Appropri	ateness	COF			D. (F	inal	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RRI	2 Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI heart function and morphology without IV contrast	Usua approp		Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	1	2	1	3	8	6
			References		Study	Quality										
			50 (24254479)			4										
			49 (-3194075)			4					_					
MRI heart function and morphology without and with IV contrast	Usua approp		Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	2	0	1	0	2	7	10
			References		Study	Quality	•			-	•	•	•			

		50 (24254479)			4										
		49 (-3194075)			4										
CTA chest with IV contrast	Usually appropriate	Limited	ତତତ 1-10 mSv	&&&& 3- 10 mSv [ped]	7	7	0	0	0	0	5	6	8	2	1
		References		Study	Quality			_				-			
		48 (27618316)			4										
CT heart function and morphology with IV contrast	Usually appropriate	Limited	ବ୍ୟତ୍ୟ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	7	7	0	0	1	0	2	3	9	4	3
		References		Study	/ Quality										
		47 (28889811)			3										
Arteriography pulmonary	Usually appropriate	Expert Consensus	ଷଷଷଷ 10-30 mSv		7	7	0	0	0	0	2	3	10	4	1
Arteriography coronary with ventriculography	Usually appropriate	Strong	ତତତ 1-10 mSv	≎≎≎≎ 3- 10 mSv [ped]	7	7	0	0	0	0	0	1	11	7	1
		References		Study	V Quality										
		46 (22077996)			2										
		45 (19660367)			2										
MRA chest without and with IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	7	7	1	0	1	0	3	5	4	6	2
MRA chest without IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	8	8	3	0	0
US echocardiography transesophageal	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	2	9	7	2	0	0
Radiography chest	May be appropriate	Expert Consensus	愛 <0.1 mSv		5	5	0	1	3	4	10	2	0	0	0
CTA coronary arteries with IV contrast	Usually not appropriate	Expert Consensus	ଝେଝ 1-10 mSv	€€€€ 3- 10 mSv [ped]	3	3	5	3	8	2	0	2	0	0	0

MRI heart function with stress without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	11	2	4	1	3	0	0	1	0
MRI heart function with stress without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	10	2	5	0	3	0	1	1	0
MRA abdomen without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	19	0	1	1	0	0	0	1	0
MRA abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	18	1	1	1	0	0	0	0	1
MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	19	1	1	0	0	0	1	0	0
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	19	1	1	0	0	0	1	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	ବବବବ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	18	1	3	0	0	0	0	0	0
SPECT or SPECT/CT MPI rest and stress	Usually not appropriate	Expert Consensus	ବ୍ୟବ୍ୟବ 10-30 mSv	ବବବବବ 10-30 mSv [ped]	1	1	15	2	2	0	1	1	1	0	0

Variant 7: Child or adult. Known single ventricle physiology. Postoperative evaluation after stage 3 single ventricle palliation (total cavopulmonary connection). Incomplete or inadequate assessment of cardiovascular morphology and function after transthoracic echocardiography. Next imaging study.

	Appropri	iateness	COF							F	inal	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RRI	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRI heart function and morphology without and with IV contrast	Usua approp	ally priate	Moderate	O 0 mSv	O 0 mSv [ped]	9	9	0	0	0	0	2	0	3	4	13
			References		Study	y Quality										
			56 (34934948)			2										
			55 (-3194077)			4										
			54 (28548989)			4										

		53 (12234957)			3										
MRI heart function and morphology without IV contrast	Usually appropriate	Moderate	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	0	2	1	4	8	6
		References		Study	Quality										
		56 (34934948)			2										
		55 (-3194077)			4										
		54 (28548989)			4										
		53 (12234957)			3										
CTA chest with IV contrast	Usually appropriate	Limited	ଷଷଷ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	7	7	0	0	0	0	2	8	6	4	2
		References		Study	V Quality										
		48 (27618316)			4										
		52 (-3194076)			4										
		53 (12234957)			3										
CT heart function and morphology with IV contrast	Usually appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv	&&&& 3- 10 mSv [ped]	7	7	0	0	0	1	2	7	8	2	2
MRA chest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	1	0	1	0	5	1	10	3	1
		References		Study	Quality										
		52 (-3194076)			4										
		53 (12234957)			3										
MRA chest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	2	1	8	5	4
		References		Study	Quality										
		52 (-3194076)			4										
		53 (12234957)			3										
CTA coronary arteries with IV contrast	May be appropriate	Limited	ଡେଡେଡ 1-10 mSv	ତତତତ 3- 10 mSv [ped]	6	6	0	0	0	0	9	8	3	0	0
		References		Study	y Quality										
		52 (-3194076)			4										

Arteriography coronary with ventriculography	May approp	Limited	ଡଡଡ 1-1(mSv)	6	6	0	0	0	0	10	8	2	0	0
		References		Study	y Quality										
		52 (-3194076)			4										
US echocardiography transesophageal	May approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	6	6	0	0	1	1	6	11	1	0	0
Arteriography pulmonary	May approp	Limited	֎֎֎֎ 10∹ mSv	30	5	5	0	0	0	0	13	5	2	0	0
	•	References		Study	Quality		-	-							
		52 (-3194076)			4										
Radiography chest	May approp	Expert Consensus	≎ < 0.1 mS	v	4	4	3	2	5	6	4	0	0	1	1
MRI heart function with stress without IV contrast	Usuall approp	Limited	O 0 mSv	O 0 mSv [ped]	3	3	7	2	7	3	2	0	1	0	0
		References		Study	Quality										
		57 (26917538)			2										
		58 (20631032)			3										
MRI heart function with stress without and with IV contrast	Usuall approp	Limited	O 0 mSv	O 0 mSv [ped]	3	3	7	0	6	5	3	0	0	1	0
		References		Study	y Quality										
		57 (26917538)			2										
		58 (20631032)			3								-	_	
SPECT or SPECT/CT MPI rest and stress	Usuall approp	Expert Consensus	ଷଷଷଷ 10-3 mSv	30 30 30 30 30 30 30 30 30	2	2	10	3	5	4	0	0	0	0	0
MRA abdomen without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	18	2	1	0	0	0	0	1	0
MRA abdomen without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	18	1	2	0	0	0	0	0	1

MRA neck without IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	2	0	0	0	0	0	0
MRA neck without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	2	0	0	0	0	0	0
FDG-PET/CT heart	Usually not appropriate	Expert Consensus	ବେବେବ 10-30 mSv	≎≎≎≎ 3- 10 mSv [ped]	1	1	13	4	1	3	0	0	1	0	0

Variant 8: Child or adult. Known or suspected anomalous pulmonary venous return with inadequate evaluation after transthoracic echocardiography. Next imaging study.

	Appropri	ateness	207				-				F	inal	Tabu	latio	ns		
Procedure	Categ	ory	SOE	Adults RR		eds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
CTA chest with IV contrast	Usua approp		Limited	େଇଇ 1-1(mSv		999999 3- 10 mSv [ped]	9	9	0	0	0	0	0	2	6	3	11
			References			Study	v Quality										
			68 (22236895)				4										
			67 (29550261)				4										
			66 (19506848)				3										
			65 (23341089)				2										
			64 (11044048)		<u>.</u>		3			_							
MRA chest without and with IV contrast	Usua approp	lly riate	Limited	O 0 mSv	, C	0 mSv [ped]	9	9	0	0	1	0	0	0	3	7	11
			References		·	Study	v Quality										
			70 (8126275)				4										
			69 (19184180)				4										
			68 (22236895)				4							-			
MRI heart function and morphology without and with IV contrast	Usua approp		Limited	O 0 mSv	C	0 mSv [ped]	8	8	0	0	0	0	0	2	8	6	4
			References			Study	v Quality										
			68 (22236895)				4										

		71 (12804753)			2										
MRA chest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	1	3	4	6	5	3
		References		Study	y Quality				•				•		
		70 (8126275)			4										
		69 (19184180)			4										
		68 (22236895)			4					-					
MRI heart function and morphology without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	1	12	5	2
		References		Study	y Quality										
		68 (22236895)			4										
		71 (12804753)			2										
CT heart function and morphology with IV contrast	May be appropriate	Expert Consensus	ଡଡଡଡ 10-30 mSv)	6	6	0	0	0	0	10	6	4	0	0
MRA abdomen without IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	0	0	1	4	10	4	1	0	0
MRA abdomen without and with IV contrast	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	5	5	0	0	1	1	13	3	2	0	0
US echocardiography transesophageal	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	6	3	8	2	1	0	0	0	0
		References		Study	y Quality				•						
		74 (16238553)			4										
		73 (9137235)			4										
		72 (1772706)			4					_					
Radiography chest	Usually not appropriate	Limited	& <0.1 mSv	Image: Second state 0.03 mSv [ped]	3	3	7	3	4	2	4	0	0	0	0
		References		Study Quality											
		65 (23341089)		2											

CTA coronary arteries with IV contrast	Usuall approp	Expert Consensus	ହତତ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	2	2	10	3	4	1	3	1	0	0	0
Arteriography pulmonary	Usuall approp	Expert Consensus	ଡଡଡ ଡ 10-3 mSv	30	2	2	6	5	8	0	1	0	0	0	0
Arteriography coronary with ventriculography	Usuall approp			���� 3- 10 mSv [ped]	2	2	5	6	7	2	0	0	0	0	0
		References		Study	V Quality										
		63 (16580428)			4										
		 62 (6235060)			4										
		 61 (16784931)			3										
		60 (27831520)			4							I			
MRI heart function with stress without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	11	3	4	3	1	0	0	0	0
MRA neck without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	20	0	2	0	0	0	0	0	0
MRA neck without and with IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	19	1	2	0	0	0	0	0	0
MRI heart function with stress without IV contrast	Usuall approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	3	5	2	0	0	0	0	0
FDG-PET/CT heart	Usuall approp	Expert Consensus	֎֎֎֎ 10-3 mSv	30	1	1	20	0	1	1	0	0	0	0	0
SPECT or SPECT/CT MPI rest and stress	Usuall approp	Expert Consensus	ଷଷଷଷ 10-3 mSv	30 ****** 10-30 mSv [ped]	1	1	18	2	2	0	0	0	0	0	0

Variant 9: Child or adult. Suspected aortic coarctation with inadequate evaluation after transthoracic echocardiography. Next imaging study.

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

	Appropriateness	<i></i>													
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	ଝେଡେଡ 1-10 mSv	₩₩₩ 3- 10 mSv [ped]	8	8	0	0	1	0	1	0	4	7	9
		References		Study	v Quality										
		79 (25714305)			4										
		78 (28377475)			4										
		77 (14975985)			3			-			-	1		1	
MRA chest without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	0	0	1	6	4	10
		References		Study	v Quality										
		82 (21861960)			3										
		81 (15699283)			3										
		80 (8489869)			3										
		79 (25714305)			4			-							
MRA chest without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	1	0	0	1	1	3	8	4	4
		References		Study	v Quality										
		82 (21861960)			3										
		81 (15699283)			3										
		80 (8489869)			3										
		79 (25714305)			4			-							
MRI heart function and morphology without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	1	5	9	4	1
		References		Study	v Quality										
		75 (21947983)			4										
MRI heart function and morphology without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	2	10	6	2
		References		Study	v Quality										
		75 (21947983)			4										

CT heart function and morphology with IV contrast	May approp (Disagre	oriate	Expert Opinion	ଡହ େଡ 10-30 mSv	ତତତତ 3- 10 mSv [ped]	5	5	1	4	3	2	7	3	0	0	0
Arteriography coronary with ventriculography	May approp		Limited	ଝେଝେ 1-10 mSv	&&&& 3- 10 mSv [ped]	5	5	0	1	2	4	9	4	0	0	0
			References		Study	V Quality										
			76 (7585760)			2										
US echocardiography transesophageal	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	3	3	7	1	9	2	1	0	0	0	0
Radiography chest	Usuall approp		Expert Consensus	參 <0.1 mSv		3	3	7	1	7	2	3	0	0	0	0
CTA coronary arteries with IV contrast	Usuall approp		Expert Consensus	ତେତେ 1-10 mSv	&&&& 3- 10 mSv [ped]	2	2	10	3	3	3	2	0	1	0	0
Arteriography pulmonary	Usuall approp		Expert Consensus	ଡଟଟଟ 10-30 mSv		1	1	13	5	2	0	0	2	0	0	0
MRA abdomen without IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	18	1	1	1	0	0	1	0	0
MRA abdomen without and with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	18	0	2	1	0	0	0	1	0
MRA neck without IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	18	0	3	0	0	0	1	0	0
MRA neck 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	1	0
MRI heart function with stress without IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	2	6	0	0	0	1	0	0
MRI heart function with stress without and with IV contrast	Usuall approp		Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	12	3	6	0	0	0	0	1	0
FDG-PET/CT heart	Usuall approp		Expert Consensus	ତତତତ 10-30 mSv	ଚଚଚଚଚ 3- 10 mSv [ped]	1	1	18	2	1	1	0	0	0	0	0

SPECT or SPECT/CT MPI rest and stress	Usually not appropriate	Expert Consensus	ବନ୍ତବନ୍ତ 10-30 mSv	≎≎≎≎≎≎ 10-30 mSv [ped]	1	1	17	1	4	0	0	0	0	0	0	
--	-------------------------	---------------------	-----------------------	---------------------------------	---	---	----	---	---	---	---	---	---	---	---	--

Variant 10: Child. Known aortopathy or connective tissue disease. Surveillance of the aorta after inadequate or incomplete evaluation by transthoracic echocardiography. Next imaging study.

	Appropriateness								F	'inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
MRA chest without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	9	9	0	0	1	0	0	0	0	7	14
		References		Study	Quality										
		91 (32453278)			2										
		92 (32531300)			4										
		93 (32167203)			2				-	_					
CTA chest with IV contrast	Usually appropriate	Expert Consensus	ଷଷଷ 1-10 mSv	≎≎≎≎≎ 3- 10 mSv [ped]	8	8	0	0	0	0	4	3	3	4	8
MRA chest without IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	0	2	1	5	7	6
		References		Study	V Quality										
		91 (32453278)			2										
		92 (32531300)			4										
		93 (32167203)		_	2										
MRA abdomen without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	1	0	0	2	12	5	0
		References		Study	Quality										
		86 (20687249)			4										
MRA abdomen without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	2	0	13	4	1
		References		Study	Quality										

		86 (20687249)		4 O 0 mSv 7 7 [ped] 7 7							-	-			
MRA neck without IV contrast	Usually appropriate	Limited	O 0 mSv		7	7	0	0	1	0	1	1	12	5	0
		References		Study	y Quality										
		94 (21730308)			2								-		
MRA neck without and with IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	1	0	1	11	6	1
		References		Study	y Quality										
		94 (21730308)			2							-			
MRI heart function and morphology without and with IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	6	6	0	0	0	1	7	8	3	1	0
		References		Study	y Quality										
		97 (20861133)			3										
		96 (31342116)			3										
		95 (2913733)				-					-				
CTA coronary arteries with IV contrast	May be appropriate	Expert Consensus	ଝେଡ 1-10 mSv	֎֎֎֎ 3- 10 mSv [ped]	5	5	0	0	0	3	8	5	4	0	0
MRI heart function and morphology without IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	3	8	6	2	1	0
		References		Study	y Quality										
		97 (20861133)			3										
		96 (31342116)			3										
		95 (2913733)			4					1					
US echocardiography transesophageal	May be appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	4	4	4	1	3	8	4	1	0	0	1
CT heart function and morphology with IV contrast	Usually not appropriate	Limited	ଡଡ≎≎ 10-30 mSv	ବଟଟେ 3- 10 mSv [ped]	3	3	1	4	6	4	4	1	0	0	0
		References		Study Quality											
		90 (19375878)			2										

Radiography chest	Usually approp	Limited	֎ < 0.1 mSv		3	3	5	3	6	4	2	0	0	0	0
		References		Study	v Quality										
		98 (20591885)			4										
Arteriography pulmonary	Usually approp	Expert Consensus	ତେତେତ 10-3(mSv)	2	2	8	5	4	3	0	1	0	0	1
Arteriography coronary with ventriculography	Usually approp	Limited	ଡଡଡ 1-10 mSv	ଡେଡଡଡ 3- 10 mSv [ped]	2	2	8	3	5	2	1	1	0	0	0
		References		Study	Quality										
		89 (27733430)			2										
MRI heart function with stress without and with IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	2	2	11	6	5	0	0	0	0	0	0
MRI heart function with stress without IV contrast	Usually approp	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	13	4	5	0	0	0	0	0	0
FDG-PET/CT heart	Usually approp	Expert Consensus	ତତତତ 10-3(mSv)	1	1	18	0	2	1	0	0	0	0	1
SPECT or SPECT/CT MPI rest and stress	Usually approp	Expert Consensus	ଡଡଡଡ 10-30 mSv	0 000000 0 10-30 mSv [ped]	1	1	17	2	3	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.