Appendix C. Evidence Tables

Note. The numbering of references below is for this Appendix only; it is different from that of the full evidence report. See List of Included Studies following Table C18.

Diagnostic Test Accuracy Studies

Table C1. Study Characteristics for Eligible Diagnostic Test Accuracy Studies of CMRA in Adults With Suspected CAD, Part 1

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
Bettencourt et al., 2013[1] NR Low risk of bias	To evaluate the additive diagnostic value of a 3-dimensional whole-heart CMRA integration into a 1.5 T CMR-MPI/LGE protocol for the detection of functionally significant CAD	Cardiology outpatient clinic in a nonacademic hospital, Portugal	Prospective	Patients with suspected CAD	43	Included if age > 40 years and symptoms compatible with CAD and at least 1 of the following: ≥ 2 risk factors or positive/inconclusive treadmill test	133 from 176 referred	Excluded if unstable clinical status, known CAD, valvular heart disease, AF/irregular heart rhythm, creatinine clearance ≤ 60 mL/min and standard contraindications to CMR, contrast media, and adenosine Also excluded if refused consent, not able to scan due to resource issues, testing not completed, or protocol violations

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
Bogaert et al., 2003[2] NR Moderate risk of bias	To examine the value of a commercially available 3D real Time navigator CMRA examination for detection of significant coronary artery stenoses, with conventional CA as the standard of reference	2 clinics, 1 each in Belgium and the US	Unclear	Patients with known or suspected CAD	19	Included if referred for ICA (e.g., owing to stable angina pectoris, positive stress test results, recurrent chest pain after previous CABG surgery)	2 from 21 enrolled	Excluded if artificial pacemakers, intracranial clips, or severe claustrophobia Also excluded if image quality inadequate
Dewey et al., 2006[3] NR Moderate risk of bias	To compare the diagnostic accuracy of multislice CT and MRI for noninvasive detection of clinically significant coronary stenoses (> or =50%)	Single tertiary referral center, Germany	Prospective	Patients with suspected CAD	108	Included if scheduled to undergo conventional CA within 14 days for clinically suspected CAD based on symptoms or results of diagnostic tests (for example, treadmill exercise test, myocardial scintigraphy, and echocardiography), at least 40 years of age, and were in sinus rhythm	75 from 183 eligible	Excluded if previous conventional CA, unstable angina or acute MI, CABG or stent, pregnancy or breastfeeding, or orthopnea, under guardianship at the time of the study, or contraindications to MRI (pacemaker, severe claustrophobia, or intracranial or intra-auricular metallic implants) or multislice CT

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
								(renal insufficiency [creatinine level 132.6 mol/L (1.5 mg/dL)] or allergy to iodinated contrast agents) Also excluded if known CAD, time constraints, included in a different study, declined to participate, or pulmonary embolism detected on CT
Greenwood et al., 2012[4] CE-MARC Moderate risk of bias	To establish the diagnostic accuracy of a multiparametric cardiovascular magnetic resonance protocol with x-ray CA as the reference standard, and to compare CMR with SPECT, in patients with suspected coronary heart disease	Multisite study in 2 hospitals (1 a university hospital) in the UK	Prospective	Patients with suspected CAD (angina)	628	Included if suspected angina pectoris, at least one major cardiovascular risk factor and a cardiologist judged them to have stable angina needing investigation	124 from 752 randomly assigned	Excluded if previous coronary artery bypass surgery; crescendo angina or ACS; contraindication to CMR (e.g., pacemaker) or adenosine infusion (e.g., reversible airways disease, AV block); pregnancy; inability to lie

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
								supine; and a GFR of 30 mL/min per 173m^2 or less Also excluded if tests not completed
Hamdan et al., 2011[5] NR Low risk of bias	To directly compare the diagnostic accuracy of MRI and multislice CT for the detection of coronary artery stenosis	2 hospitals, 1 each in Germany and Israel	Prospective	Patients with known or suspected CAD	110	Included if aged 50 and older, referred for ICA for suspected or known CAD	10 from 120 consented	Excluded if AF, ACS, NYHA functional class III or IV HF, previous CABG operation, BMI of more than 40 kg/m^2, pregnancy, and breastfeeding, contraindications to MRI (noncompatible implants or severe claustrophobia) or CT (impaired renal function with serum creatinine level >.4 mg/dl or known allergy to iodinated contrast agents)

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
Heer et al., 2013[6] NR Moderate risk of bias	To evaluate the diagnostic performance of 1.5 T non-contrast enhanced whole-heart CMRA alone and in combination with adenosine stress	University hospital in Germany	Prospective	Patients with known or suspected CAD	59	Included if had combined protocol of CMRA and CMR-perfusion	73 from 169 meeting inclusion criteria	Excluded if history of CABG or standard CMR contraindications such as an internal pacemaker or defibrillator, cerebral aneurysm clips, or metal in the eye, or contraindications for adenosine including history of asthma or bronchospasm
Ikonen et al., 2003[7] NR Moderate risk of bias	To assess the clinical value of three-dimensional CMRA in the detection of significant coronary artery stenosis using conventional X-ray angiography as the standard reference	Clinic in a university medical hospital, Finland	Unclear	Patients with known or suspected CAD	69	Included if referred to a university hospital for x-ray CA because of suspected or previously diagnosed CAD stable angina pectoris Canadian Cardiovascular Society class 2–3	NR	Excluded if unstable angina pectoris, AF, or pacemakers
Kato et al., 2010[8] NR Moderate risk of bias	To determine the diagnostic performance of 1.5 T whole-heart	Multisite study conducted in 7 hospitals, Japan	Prospective	Patients with suspected CAD	127	Included if had suspected CAD and presented with chest pain that suggested newly developed or recurrent coronary	NR	Excluded if general contraindications to MRI (e.g., pacemakers, claustrophobia),

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
	CMRA in patients with suspected CAD					artery stenosis and were scheduled for x-ray CA Included only patients with successful acquisition of CMRA images in the analysis for diagnostic accuracy		ACS, AF, and previous CABG surgery
Kefer et al., 2005[9] NR Moderate risk of bias	To compare the diagnostic accuracy of three-dimensional navigator-gated MRI and 16-slice multidetector row CT versus quantitative CA for the detection of coronary artery stenosis in patients	Clinic in a university medical hospital, Belgium	Unclear	Patients with suspected CAD. Also to evaluate coronary anatomy before noncoronary cardiac surgery or for ventricular tachycardia	52	Included if referred for conventional diagnostic x-ray CA, in sinus rhythm and no prior revascularization procedure (no stents or bypass operation)	4 of 56 enrolled	Excluded if hemodynamic instability, constant arrhythmia (AF or more than 5 premature beats/min), HF in NYHA functional class III or worse, renal insufficiency (serum creatinine > 1.4 mg/dL), known allergy to iodated contrast agents, or any contraindication to MRI (cerebral aneurysm clips, pacemaker, or severe claustrophobia);

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
								also if tests were not completed
Kim et al, 2001[10] NR Low risk of bias	To evaluated the accuracy of cardiac magnetic resonance angiography among patients with suspected coronary disease	Multisite study across 7 institutions in Denmark, Germany, Netherlands, Switzerland, UK, and US	Prospective		103	Included if at least 21 years of age with sinus rhythm and with a body weight of ≤ 100 kg and to be scheduled to undergo elective x-ray CA for suspected CAD within 14 days	NR	Excluded if contraindication to MRI (for example, a pacemaker, intra-auricular implants, or intracranial clips), previous x-ray CA or thoracotomy, claustrophobia, orthopnea, or inability to take sublingual nitroglycerin (as a result, for example, of aortic stenosis or obstructive cardiomyopathy)
Klein et al., 2008[11] NR Moderate risk of bias	To evaluate the feasibility/diagnostic performance of rest/stress perfusion, late gadolinium enhancement and CMRA and their combination in patients with suspected CAD in	Specialist clinic, Germany	Prospective	Patients with suspected CAD	54	Included if suspected CAD who were referred for invasive CA	NR	Excluded if contraindications for CMR, known MI, AF, instable angina, AV block > I°, obstructive lung disease or claustrophobia

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
	comparison to invasive angiography							
Kunimasa et al., 2009[12] NR Moderate risk of bias	To examine the accuracy of coronary MRA to identify the presence or absence of coronary artery stenosis in comparison with conventional CA.	Clinic in a university medical hospital, Japan	Unclear	Patients with suspected CAD	43	Included if suspected CAD and had been scheduled for conventional CA	NR	Excluded if underwent stent implantation and CABG surgery, ACS within 2 weeks, or contraindication to MRI (intracerebral aneurysm clips, pacemaker, or severe claustrophobia)
Langer et al., 2009[13] NR Low risk of bias	To compare multislice CT with MRI-based noninvasive CA	Clinic in a university medical hospital, Germany	Prospective		68	Included if referred for elective CA	4 of 72 recruited	Excluded if refused MRI scan, women of childbearing age, prior CA, ACS, arrhythmias, contra-indications against iodinated contrast agents (e.g., known allergy, impaired renal function [increased serum creatinine levels ≥ 1.6 mg/dL] and thyroid disorders),

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
								established contra-indications against MRI, or not able to hold breath for 25 seconds
Maintz et al., 2007[14] NR High risk of bias	To compare steady-state free precession whole heart coronary MRI with multidetector coronary CT angiography for the detection of CAD using catheter angiography as the standard of reference	Clinic in a university medical hospital, Germany	Unclear	Patients with known or suspected CAD	25	Included if previously undergone X-ray CA and coronary CTA	NR	NR
Nagata et al., 2011[15] NR Low risk of bias	To compare the imaging time and image quality obtained with whole-heart CMRA in healthy subjects and to determine the accuracy of CMRA in the detection of obstructive CAD	Radiology and cardiology departments in a university hospital, Japan	Prospective	Patients with suspected CAD	67	Included if suspected of having CAD and presented with chest pain suggestive of newly developed or recurrent coronary artery stenosis and who were scheduled for conventional CAG	20 from 87 screened	Excluded if had implantable cardiac devices, claustrophobia, ACS, AF, or previously undergone CABG
Ogawa et al., 2020[16]	To compare the efficacy of compressed sensing	Single hospital in Japan	Unclear	Patients who underwent	28	No details provided	11 from 39 who had CMRA	Excluded if had coronary stents

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
NR Moderate risk of bias	and conventional CMRA in detecting coronary artery stenosis			CMRA; majority had suspected CAD				Also excluded if no CA within 2 months of CMRA
Piccini et al., 2014[17] NR Moderate risk of bias	To assess the diagnostic performance of respiratory self-navigation for whole-heart CMRA in a patient cohort referred for diagnostic cardiac MRI	University hospital in Switzerland	Unclear	Patients with known or suspected CAD	29	Included if referred for cardiac MRI because they were known to have or were suspected of having CAD, for evaluation of congenital coronary anomalies, for evaluation of cardiomyopathy, and for other reasons	NR	Excluded if no CAD, or low quality images
Plein et al, 2002[18] NR High risk of bias	To evaluate the feasibility of a comprehensive MRI protocol in patients with CAD	Clinic in a university medical hospital, UK	Unclear	Patients with known or suspected CAD	10	Included if attended the cardiology outpatient clinic and had recently undergone or were waiting to undergo CA	NR	Excluded if contraindications to MRI (arrhythmia, obstructive airway disease, unstable angina, or treatment with orally administered dipyridamole)
Pouleur et al., 2008[19] NR Low risk of bias	To directly compare the diagnostic accuracy of these noninvasive imaging techniques using the invasive quantitative	Cardiac clinic in a university medical	Prospective	Patients with suspected CAD	77	Included if referred for conventional diagnostic x-ray CA, sinus rhythm and who had no prior revascularization	28 from 105 screened	Excluded if hemodynamic instability, constant arrhythmia (AF or more than 5

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
	CA as a reference standard	hospital, Belgium				procedure (no stent or bypass operation)		premature bpm), decompensated HF (NYHA IV class), renal insufficiency (serum creatinine levels > 1.4 mg/dL), known allergy to iodated contrast agents, or any contraindication to MRI (cerebral aneurysm clips, pacemaker, or severe claustrophobia); also excluded if refused consent
Regenfus et al., 2000[20] NR Moderate risk of bias	To evaluate a contrast-enhanced 3D breath-hold MRI technique for detection of coronary artery stenoses	Clinic in a university medical hospital, Germany	Unclear		50	Included if admitted for diagnostic CA due to clinically suspected CAD	NR	Excluded if arrhythmias, in unstable clinical condition, with contraindications to MRI (e.g., cardiac pacemakers, other ferromagnetic implants or claustrophobia) or with contraindications

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
								to the administration of MRI contrast agent (e.g., COPD and chronic renal insufficiency)
Sakuma et al., 2005[21] NR Moderate risk of bias	To prospectively evaluate the use of whole-heart 3D CMRA in patients suspected of having CAD	Clinic in a university medical hospital, Japan	Prospective	Patients with suspected CAD	20	Included if suspected of having CAD	14 of 39 enrolled	Excluded if contraindications to MRI (e.g., presence of a pacemaker, claustrophobia, irregular heart rate) or with unstable hemodynamic parameters; also excluded if tests not completed
Sakuma et al., 2006[22] NR Moderate risk of bias	To determine the diagnostic performance of whole-heart CMRA for detecting significant CAD.	Clinic in a university medical hospital, Japan	Prospective	Patients with suspected CAD	113	Included if suspected CAD and scheduled for elective X-ray CA	32 from 145 enrolled	Excluded if general contraindications to MRI examination, unstable angina, AF, and previous CABG surgery; also excluded if image acquisition failed
Sardanelli et al., 2000[23]	To test 3D navigator-echo CMRA in detecting	Clinic in a university medical	Unclear	Patients with	39	Included if angina and ECG signs of	11 from 50 screened	Excluded if coronary intervention

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
NR Moderate risk of bias	stenoses of the coronary arteries.	hospital, Italy		suspected CAD		ischemic heart disease		during cardiac catheterization, AF, hemodynamic instability, frequent ventricular ectopic rhythms, or general contraindications for CMRA
Wagner et al., 2011[24] NR Moderate risk of bias	To evaluate the impact of the blood-pool contrast agent gadofosveset trisodium on diagnostic accuracy of whole-heart CMRA at 1.5 T	Clinic in a university medical hospital, Germany	Prospective	Patients with suspected CAD	27	Included if suspected CAD on multislice CT (suspected significant coronary stenosis in any coronary segment, nonassessable coronary segments due to motion artifacts or severe calcification) and clinical indication for invasive CA	5 from 32 enrolled	Excluded if contraindication to MRI (i.e., cerebral aneurysm clips, pacemaker, severe claustrophobia), unstable angina, MI, or cerebral ischemia less than 14 days before MRI examination, coronary bypass grafting or intracoronary stent, cardiac arrhythmia, or severe renal impairment (eGFR 50 mL/min per 1.73 m^2); also excluded if did

Citation Study Number or Name Risk of Bias	Aim	Location	Timing of Study	Study Participants	Number of Included Participants	Inclusion Criteria	Number of Excluded Participants	Exclusion Criteria
								not undergo CA or if image quality was not adequate
Yang et al., 2003[25] NR Moderate risk of bias	To test the clinical implementation of spiral CMRA with rapid real time localization	VA hospitals, US	Unclear	Patients with suspected CAD	40	Included if suspected CAD	4 from 44 enrolled	Excluded if refused consent
Yonezawa et al., 2014[26] NR Low risk of bias	To develop a method to determine significant stenosis at whole heart CMRA and to evaluate the accuracy and reproducibility of this approach	Radiology and cardiology departments in a university hospital, Japan	Prospective	Patients with suspected CAD	62	Included if suspected of having CAD and who presented with chest pain suggestive of newly developed or recurrent coronary artery stenosis	18 from 84 screened, with a further 4 for CMRA acquisition noncompletion	Excluded if acute MI, unstable angina, CABG surgery, and refusal to participate; also excluded from the analysis if the CMRA acquisition was not completed

Abbreviations. 3D: 3-dimensional; ACS: acute coronary syndrome; AF: atrial fibrillation; AV: atrioventricular; BMI: body mass index; CA: coronary angiography; CABG: coronary artery bypass graft; CAD: coronary artery disease; CMR: cardiac magnetic resonance; CMRA: cardiac magnetic resonance angiography; COPD: chronic obstructive pulmonary disease; CT: computed tomography; CTA: computed tomography angiography; ECG: electrocardiography; eGFR: estimated glomerular filtration rate; GFR: glomerular filtration rate; HF: heart failure; ICA: invasive coronary angiography; LGE: late gadolinium enhancement; MI: myocardial infarction; MPI: myocardial perfusion imaging; MRI: magnetic resonance imaging; NR: not reported; NYHA: New York Heart Association; SPECT: single-photon emission computed tomography; T: Tesla.

Table C1. Study Characteristics for Eligible Diagnostic Test Accuracy Studies of CMRA in Adults With Suspected CAD, Part 2

Citation Study Number or Name Risk of Bias Participants (N)	Mean Age[a] (SD)	Male (%)	CAD (%)	MVD (%)	Diabetes (%)	HT (%)	Dyslipidemia (%)	Prior MI (%)	Prior PCI or CABG (%)	Smoking (%)	Mean BMI[b] (SD)	Race/ Ethnicity
Bettencourt et al., 2013[1] Low risk of bias N = 43	61 (8.3)	28 (65.1)	24 (55.8)	13 (30.2)	19 (44.2)	30 (69.8)	37 (86.0)	NR	NR	14 (32.6)	28.4 (5.4)	NR
Bogaert et al., 2003[2] NR Moderate risk of bias N = 19	62 (5)	15 (78.9)	13 (68.4)	10 (52.6)	NR	NR	NR	NR	NR	NR	NR	NR
Dewey et al., 2006[3] NR Moderate risk of bias N = 108	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Greenwood et al., 2012[4] CE-MARC Moderate risk of bias N = 628	60.4 (9.4)	393 (62.6)	248 (39.5)	211 (33.6)	83 (13.1)	314 (50.0)	280 (44.6)	NR	35 (5.6)	404 (64.3)	29.0 (4.3)	White: 597 (95.1%) Black: 4 (0.6%) Asian: 23 (3.7%) Other: 4 (0.6%)

Citation Study Number or Name Risk of Bias Participants (N)	Mean Age[a] (SD)	Male (%)	CAD (%)	MVD (%)	Diabetes (%)	HT (%)	Dyslipidemia (%)	Prior MI (%)	Prior PCI or CABG (%)	Smoking (%)	Mean BMI[b] (SD)	Race/ Ethnicity
Hamdan et al., 2011[5] NR Low risk of bias N = 110	65.1 (8.2)	77 (70.0)	62 (56.4)	28 (25.5)	28 (25.5)	78 (70.9)	67 (60.9)	18 (16.4)	22 (20.0)	22 (20.0)	27.0 (3.9)	NR
Heer et al., 2013[6] NR Moderate risk of bias N = 59	63.3 (9.9)	36 (61.0)	23 (39.0)	NR	6 (10.1)	37 (62.7)	21 (35.6)	10 (16.9)	NR	13 (22.0)	25.7 (3.4)	NR
Ikonen et al., 2003[7] NR Moderate risk of bias N = 69	58 (NR)	43 (62.3)	47 (68.1)	NR	2 (2.9)	33 (47.8)	44 (63.8)	16 (23.2)	NR	17 (24.6)	NR	NR
Kato et al., 2010[8] NR Moderate risk of bias N = 127	67 (9)	86 (67.7)	56 (44.1)	15 (11.8)	41 (32.3)	95 (74.8)	61 (48.0)	28 (22.0)	14 (11.0)	54 (42.5)	24 (4)	NR
Kefer et al., 2005[9] NR Moderate risk of bias N = 52	NR	NR	34 (65.4)	22 (42.3)	NR	NR	NR	NR	0	NR	NR	NR

Citation Study Number or Name Risk of Bias Participants (N)	Mean Age[a] (SD)	Male (%)	CAD (%)	MVD (%)	Diabetes (%)	HT (%)	Dyslipidemia (%)	Prior MI (%)	Prior PCI or CABG (%)	Smoking (%)	Mean BMI[b] (SD)	Race/ Ethnicity
Kim et al, 2001[10] NR Low risk of bias N = 103	59 (10)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Klein et al., 2008[11] NR Moderate risk of bias N = 54	60 (10)	35 (64.8)	26 (48.1)	14 (25.9)	12 (22.2)	37 (68.5)	41 (75.9)	NR	NR	18 (33.3)	27.6 (4.1)	NR
Kunimasa et al., 2009[12] NR Moderate risk of bias N = 43	NR	NR	33 (76.7)	16 (37.2)	16 (37.2)	25 (58.1)	25 (58.1)	12 (27.9)	NR	NR	NR	NR
Langer et al., 2009[13] NR Low risk of bias N = 68	63.6 (11.4)	NR	26 (38.2)	16 (23.5)	NR	NR	NR	NR	NR	NR	27.6 (3.5)	NR
Maintz et al., 2007[14] High risk of bias N = 25	58 (9.7)	15 (60.0)	16 (64.0)	10 (40.0)	NR	NR	NR	NR	NR	NR	NR	NR

Citation Study Number or Name Risk of Bias Participants (N)	Mean Age[a] (SD)	Male (%)	CAD (%)	MVD (%)	Diabetes (%)	HT (%)	Dyslipidemia (%)	Prior MI (%)	Prior PCI or CABG (%)	Smoking (%)	Mean BMI[b] (SD)	Race/ Ethnicity
Nagata et al., 2011[15] NR Low risk of bias N = 67	69 (13)	49 (73.1)	39 (58.2)	18 (26.9)	19 (28.3)	42 (62.7)	33 (49.3)	36 (53.7)	3 (4.5)	17 (25.4)	23 (3)	NR
Ogawa et al., 2020[16] NR Moderate risk of bias N = 28	NR	19 (67.9)	20 (71.4)	NR	9 (32.1)	18 (64.3)	20 (71.4)	NR	NR	9 (32.1)	NR	NR
Piccini et al., 2014[17] NR Moderate risk of bias N = 29	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Plein et al, 2002[18] NR High risk of bias N = 10	NR	NR	10 (100)	NR	NR	NR	NR	5 (50.0)	NR	NR	NR	NR
Pouleur et al., 2008[19] NR Low risk of bias N = 77	61 (14)	56 (72.7)	17 (22.1)	13 (16.9)	13 (16.9)	40 (51.9)	48 (62.3)	NR	0	25 (32.5)	26 (4)	NR

Citation Study Number or Name Risk of Bias Participants (N)	Mean Age[a] (SD)	Male (%)	CAD (%)	MVD (%)	Diabetes (%)	HT (%)	Dyslipidemia (%)	Prior MI (%)	Prior PCI or CABG (%)	Smoking (%)	Mean BMI[b] (SD)	Race/ Ethnicity
Regenfus et al., 2000[20] NR Moderate risk of bias N = 50	60.7 (NR)	40 (80.0)	36 (72.0)	16 (32.0)	NR	NR	NR	NR	NR	NR	NR	NR
Sakuma et al., 2005[21] NR Moderate risk of bias N = 20	64.9 (11.7)	16 (80.0)	12 (60.0)	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sakuma et al., 2006[22] NR Moderate risk of bias N = 113	66.1 (10.7)	98 (86.7)	51 (45.1)	17 (15.0)	34 (30.1)	69 (61.1)	60 (53.1)	36 (31.9)	19 (16.8)	46 (40.7)	NR	NR
Sardanelli et al., 2000[23] NR Moderate risk of bias N = 39	65.3 (8.5)	33 (84.6)	34 (87.2)	NR	NR	NR	NR	NR	NR	NR	NR	NR

Citation Study Number or Name Risk of Bias Participants (N)	Mean Age[a] (SD)	Male (%)	CAD (%)	MVD (%)	Diabetes (%)	HT (%)	Dyslipidemia (%)	Prior MI (%)	Prior PCI or CABG (%)	Smoking (%)	Mean BMI[b] (SD)	Race/ Ethnicity
Wagner et al., 2011[24] NR Moderate risk of bias N = 27	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Yang et al., 2003[25] NR Moderate risk of bias N = 40	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Yonezawa et al., 2014[26] NR Low risk of bias N = 62	69 (13)	46 (74.2)	33 (53.2)	12 (19.3)	18 (29.0)	40 (64.5)	31 (50.0)	34 (54.8)	7 (11.3)	17 (27.4)	23 (3)	NR

Notes. [a] *Mean age reported in years.* [b] *BMI reported in kg/m^2.*
Abbreviations. BMI: body mass index; CABG: coronary artery bypass graft; CAD: coronary artery disease; CMRA: cardiac magnetic resonance angiography; HT: hypertension; MVD: multivessel disease; NR: not reported; PCI: percutaneous coronary intervention; SD: standard deviation.

Table C1. Study Characteristics for Eligible Diagnostic Test Accuracy Studies of CMRA in Adults with Suspected CAD, Part 3

Citation Study Number and Name Risk of Bias	Timing Between Tests	Reported Harms
Bettencourt et al., 2013[1] Low risk of bias	Within a week of the index test	NR
Bogaert et al., 2003[2] NR Moderate risk of bias	Within 24 hours of the index test	NR
Dewey et al., 2006[3] NR Moderate risk of bias	Not clear	A total of 7 adverse events occurred in 6 of the 129 patients who completed the study. After conventional coronary angiography, 6 adverse events were experienced by 5 patients: 2 femoral false aneurysms and 4 cases in which a large groin hematoma occurred. All these complications were successfully treated without surgery, but they prolonged the in-hospital stay
Greenwood et al., 2012[4] CE-MARC Moderate risk of bias	Median time between CMR or SPECT and x-ray angiography was 21 days (IQR 10–32) and 21 days (12–31), respectively Median time between CMR and SPECT was 7 days (range, 5 to 13)	95 patients failed to complete one or more tests because of claustrophobia, emergency hospital admission, anxiety, personal or domestic reasons, unrelated illness, death, technical reasons, and eligibility violations
Hamdan et al., 2011[5] NR Low risk of bias	Median time between noninvasive tests and x-ray CA: 1 day Mean time between noninvasive tests and x-ray CA: , 0.8 days (range 0 to 3 days) MRI and CT were performed as same day examinations in 85 patients (77%; mean interval, 0.1 day [range 0 to 3 days])	3 patients had minor allergic reactions to contrast dye after CT angiography

Citation Study Number and Name Risk of Bias	Timing Between Tests	Reported Harms
Heer et al., 2013[6] NR Moderate risk of bias	Within 72 hours of the index test	NR
Ikonen et al., 2003[7] NR Moderate risk of bias	CMRA within 24 hours of CA	CMRA was performed in all 69 patients (148 slabs) without complications.
Kato et al., 2010[8] NR Moderate risk of bias	Not clear	NR
Kefer et al., 2005[9] NR Moderate risk of bias	Patients underwent MRI and MDCT in random order on the same day. Both tests were performed at a median of 1 day (range 0 to 30 days) before conventional CA	NR
Kim et al, 2001[10] NR Low risk of bias	Median interval between the performance of CMRA and x-ray CA was 1 day (mean, 3; range, 0 to 14)	All subjects completed CMRA without complications
Klein et al., 2008[11] NR Moderate risk of bias	All x-ray CAs were performed within 24 hours after CMR examination	NR
Kunimasa et al., 2009[12] NR Moderate risk of bias	Within 14 day	NR

Citation Study Number and Name Risk of Bias	Timing Between Tests	Reported Harms
Langer et al., 2009[13] NR Low risk of bias	Within 1 day of the index test	NR
Maintz et al., 2007[14] High risk of bias	Time interval between MRI, CTA, and x-ray CA was 1 to 29 days (mean, 15 days)	NR
Nagata et al., 2011[15] NR Low risk of bias	Mean interval between CMRA and CA was 9.7 (SD, 10.0) days	NR
Ogawa et al., 2020[16] NR Moderate risk of bias	No longer than 2 months between CMRA and CA	NR
Piccini et al., 2014[17] NR Moderate risk of bias	Average time between the 2 examinations was 45 days	NR
Plein et al, 2002[18] NR High risk of bias	CA was performed within a mean 89.7 days (SD, 65) of MRI	No adverse events occurred, and the adenosine infusion was well tolerated by all patients
Pouleur et al., 2008[19] NR Low risk of bias	Not clear	NR
Regenfus et al., 2000[20] NR Moderate risk of bias	Conventional invasive CA was performed within 3 days after MRI according to standard techniques	In all patients, CMRA was performed without complications. None of the patients experienced nausea or other adverse reactions to the contrast agent.

Citation Study Number and Name Risk of Bias	Timing Between Tests	Reported Harms
Sakuma et al., 2005[21] NR Moderate risk of bias	Not clear	NR
Sakuma et al., 2006[22] NR Moderate risk of bias	Not clear	NR
Sardanelli et al., 2000[23] NR Moderate risk of bias	Within 2 weeks of reference test	NR
Wagner et al., 2011[24] NR Moderate risk of bias	Median interval between CMRA and cardiac catheterization was 14 days, ranging from 1 to 52 days	NR
Yang et al., 2003[25] NR Moderate risk of bias	30 patients had undergone CMRA within one month before x-ray CA; 10 patients had CMRA after x-ray CA	NR
Yonezawa et al., 2014[26] NR Low risk of bias	Interval between CMRA and CA was 13 days (range, 0 to 58 days)	NR

Abbreviations.CA: coronary angiography; CAD: coronary artery disease; CMR: cardiac magnetic resonance; CMRA: cardiac magnetic resonance angiography; CT: computed tomography; CTA: computed tomography angiography; IQR: interquartile range; MDCT: multidetector row computed tomography; MRI: magnetic resonance imaging; NR: not reported; SD: standard deviation; SPECT: single-photon emission computed tomography

Table C2. Study Characteristics for Diagnostic Test Accuracy Studies

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
A. Adults With Suspected CAD					
See Table C1					
B. Adults With Suspected Coronary Vessel Anomalies					
Bunce et al., 2003[27] Hospital, UK NR High risk of bias	To evaluate a simplified protocol by using free-breathing 3D CMRA to determine the anatomy of anomalous coronary arteries Timing unclear	Inclusion criteria (must meet all): known or suspected coronary artery anomalies Exclusion criteria (excluded if any criteria met): NR	N = 26 participants Male: 18 of 26 (69.2%) Race/ethnicity: NR Mean (range) age: 50 (18 to 77) years	CMR protocol, comprising free-breathing 3D CMRA	Conventional coronary angiography
Gharib et al., 2008[28] University hospital, US NR High risk of bias	To prospectively use a whole-heart 3D CMRA technique specifically adapted for use at 3.0 T and a parallel imaging technique (sensitivity encoding) to evaluate coronary arterial anomalies and variants Prospective	Inclusion criteria (must meet all): with symptoms and referred for evaluation of known or suspected anomalies Exclusion criteria (excluded if any criteria met): NR	N = 12 participants Male: 8 of 12 (75.0%) Race/ethnicity: NR Mean (SD) age: 42.1 (15.7) years	CMR protocol, comprising scout imaging and 3D CMRA	ICA CCTA
Taylor et al., 2000[29] Hospital, UK NR High risk of bias	To compare the use of x-ray angiography and MRCA for identification of the coronary artery origin and proximal course in adults with a variety of congenital heart abnormalities	Inclusion criteria (must meet all): congenital heart disease Exclusion criteria (excluded if any criteria met): NR	N = 25 participants Male: 13 of 25 (52.0%) Race/ethnicity: NR Mean (range) age: 38 (20 to 63) years	CMR protocol, respiratory-gated	ICA

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
	Retrospective				
C. Adults Who Have Undergone CABG Surgery					
No eligible studies identified					
D. Adults Being Assessed For Cardiac Device Lead Placement					
Duckett et al., 2011[30] University hospital, UK NR High risk of bias	To evaluate a CMR examination with slow infusion of a high-relaxivity contrast agent to visualize coronary venous anatomy (CVA) and myocardial scar in heart failure patients awaiting CRT Prospective	Inclusion criteria (must meet all): having a CMR as part of assessment for CRT implants Exclusion criteria (excluded if any criteria met): contraindications to MRI, history of anaphylaxis to contrast agent or GFR of < 30 mL/min/1.73 m2	N = 14 participants Male: 12 of 14 (85.7%) Race/ethnicity: NR Mean (SD) age: 59.3 (14.5) years Mean (SD) weight: 86.0 (12.5) kg	CMR protocol, comprising dynamic ECG-triggered inversion recovery scan subsequent to starting an ECG-triggered respiratory-navigated 3D-SSFP MRI scan with inversion recovery preparation	X-ray venography
Lam et al., 2015[31] University hospital, US NR High risk of bias	To evaluate the ability of contrast-enhanced MRI to visualize the coronary veins with validation by the gold standard, X-ray venography, and to determine whether MRI can visualize the coronary vein branch used for LV lead implantation Retrospective	Inclusion criteria (must meet all): scheduled to undergo CRT Exclusion criteria (excluded if any criteria met): NR	N = 19 participants Male: 9 of 19 (47.4%) Race/ethnicity: NR Mean (SD) age: 70 (10) years Mean (SD) weight: NR	CMR protocol, comprising cine images and 3D-whole heart imaging	X-ray venography

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
E. Children With Suspected or Confirmed Congenital Heart Disease					
Albrecht et al., 2019[32] University hospital, US NR High risk of bias	To evaluate the diagnostic accuracy of a prototype noncontrast, freebreathing, self-navigated 3D CMRA technique for the assessment of coronary artery anatomy in children with known or suspected coronary anomalies, using CCTA as the reference standard Prospective	Inclusion criteria (must meet all): referred after inconclusive echocardiography Exclusion criteria (excluded if any criteria met): implanted cardiac device, arrhythmias	N = 21 participants Male: 15 of 21 (71.4%) Race/ethnicity: NR Mean (range) age: 12.3 (8 to 17) years Mean (SD) BMI: 21.3 (6.1) kg/m^2	Prototype noncontrast, freebreathing, self-navigated 3D CMRA technique	CCTA
Beerbaum et al., 2009[33] Not clear NR High risk of bias	To determine the value of whole-heart 3D MRI for coronary artery imaging in children and adolescents with congenital heart disease Prospective	Inclusion criteria (must meet all): referred for further routine diagnostic evaluation Exclusion criteria (excluded if any criteria met): none reported	N = 40 participants Male: NR Race/ethnicity: NR Mean (range) age: 14.1 (2.6 to 25.8) years Mean (SD) weight: NR	MRI examination, which included ventricular volumetry, quantitative flow studies, and 3D contrast-enhanced CMRA	ICA
Greil et al., 2002[34] Children's hospital, US NR	To evaluate the diagnostic value of 3D MRA in a cohort of pediatric and adult patients with congenital and acquired	Inclusion criteria (must meet all): diagnosis of pulmonary or systemic venous anomaly by any imaging modality, underwent CMRA, and had an echocardiogram, cardiac catheterization, computed	N = 61 participants Male: 32 of 61 (52.5%) Race/ethnicity: NR	CMR protocol, gadolinium enhanced and breath hold where possible	Other tests, including ICA

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
High risk of bias	anomalies of the pulmonary and systemic veins Retrospective	tomography, surgical confirmation or autopsy Exclusion criteria (excluded if any criteria met): NR	Median (range) age: 15 (1 day to 60 years) years		
Nguyen et al., 2015[35] University hospital, US NR High risk of bias	To determine whether high-resolution (HR) contrast-enhanced MRA and SSFP cine can be performed reliably at 3.0 T in children with congenital heart disease and to compare the image quality to similar techniques performed at 1.5 T Retrospective	Inclusion criteria (must meet all): underwent CMRA for known or suspected congenital cardiovascular disorders Exclusion criteria (excluded if any criteria met): NR	N = 56 participants, with 28 in the 3.0 T group and 28 in the 1.5 T group Male: 17 of 28 (60.7%) 3.0 T vs. 18 of 28 (64.3%) 1.5 T Race/ethnicity: NR Median (range) age: 5 (3 days to 8 years) months 3.0 T vs. 30 (2 days to 7 years) months 1.5 T Mean (SD) weight: 9.0 (7.8) kg 3.0 T vs. 9.6 (6.4) kg 1.5 T	CMR protocol, comprising cine sequence, and high resolution CMRA	ICA Surgery
Prakash et al., 2007[36]	To evaluate the quality of the visualization of extracardiac thoracic vessels by CMRA in young	Inclusion criteria (must meet all): aged < 3 months,	N = 28 participants Male: NR	CMR protocol, using gadopentetate dimeglumine	ICA Surgery

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
Children's hospital, US NR High risk of bias	infants with congenital heart disease Retrospective	underwent contrast-enhanced CMRA, prior echo Exclusion criteria (excluded if any criteria met): NR	Race/ethnicity: NR Median (range) age: 6 (1 to 90) days Mean (range) weight: 3 (2.1 to 3.9) kg		
Tangcharoen et al., 2011[37] University hospital, UK NR High risk of bias	To evaluate the feasibility and accuracy of CMRA for the detection of coronary artery anomalies in infants and children by using surgical findings as a reference Timing unclear	Inclusion criteria (must meet all): referred for CMRA with general anesthesia and 3D whole-heart data set indicated Exclusion criteria (excluded if any criteria met): NR	N = 100 participants Male: 57 of 100 (57.0%) Race/ethnicity: NR Mean (SD) age: 3.9 (3) years Mean (SD) weight: NR	CMR protocol, comprising initial survey, rest cine, first-pass 3D angiography technique after injection of gadopentetate dimeglumine, and 3D-whole heart	Surgery

Abbreviations. 3D: 3-dimensional; APC: aortopulmonary collaterals; APVD: anomalous pulmonary venous drainage; ASD: atrial septal defect; BMI: body mass index; CCTA: coronary computed tomography angiography; CMRA: cardiac magnetic resonance angiography; CMR: cardiac magnetic resonance; CRT: cardiac resynchronization therapy; ECG: electrocardiography; GFR: glomerular filtration rate; ICA: invasive coronary angiography; LV: left ventricle; MRCA: magnetic resonance coronary angiography; MRI: magnetic resonance imaging; NR: not reported; SD: standard deviation; SSFP: steady-state free precession; T: Tesla; TEE: transesophageal echocardiography.

Table C3. Findings From Diagnostic Test Accuracy Studies

Citation Setting Study Number or Name Risk of Bias	Diagnostic Accuracy	Impact of Testing	Safety
A. Adults With Suspected CAD			
See Table C1			
B. Adults With Suspected Coronary Vessel Anomalies			
Bunce et al., 2003[27] Hospital, UK NR High risk of bias	See Table C4 CMRA and ICA were performed in 25 of 26 (96.1%) of patients In 18 of 25 (72.0%) patients, CMRA and ICA were concordant for the origin of the vessel anomaly In 14 of 25 (56.0%) patients, CMRA and ICA were concordant for the proximal course of the vessel anomaly In 8 patients with anomalous arteries that coursed between the aortic root and the right ventricular outflow tract, ICA could not be used confidently to identify the proximal course	All patients received medical or surgical treatment but it is not clear if the CMRA or the ICA influenced the treatment outcome	NR
Gharib et al., 2008[28] University hospital, US NR High risk of bias	In 10 of 12 (83.3%) patients were diagnosed with coronary arterial anomalies and variants using CMRA 2 of 12 (16.7%) CMRA tests could not be completed 8 of 8 (100%) patients had concordant results for CMRA and ICA	NR	1 test could not be completed because the patient experienced diaphoresis and restlessness

Citation Setting Study Number or Name Risk of Bias	Diagnostic Accuracy	Impact of Testing	Safety
Taylor et al., 2000[29] Hospital, UK NR High risk of bias	Index test: CMRA Reference standard: combined CMRA and ICA CMRA had a sensitivity of 88% (95% CI, 62% to 98%) and a specificity of 100% (95% CI, 66% to 100%)	NR	No significant complications occurred
C. Adults Who Have Undergone CABG Surgery			
No eligible studies identified			
D. Adults Being Assessed For Cardiac Device Lead Placement			
Duckett et al., 2011[30] University hospital, UK NR High risk of bias	In 11 of 11 patients, CMR visualized the vein used for LV lead placement	NR	NR
Lam et al., 2015[31] University hospital, US NR High risk of bias	The vein used for LV lead placement was visible by CMRA in 16 of 16 patients and had an average MRI visibility score of 1.9	NR	NR

Citation Setting Study Number or Name Risk of Bias	Diagnostic Accuracy	Impact of Testing	Safety
E. Children With Suspected or Confirmed Congenital Heart Disease			
Albrecht et al., 2019[32] University hospital, US NR High risk of bias	15 patients with known or suspected congenital coronary anomalies and 6 individuals with repaired transposition of the great arteries who had reimplatation of their coronary origins as part of their surgical repair Evaluation of CTA images revealed coronary artery abnormalities in 14 of 21 children (66.6%) Sensitivity for detection of a coronary artery anomaly, compared with CCTA: 92.8% Specificity for detection of a coronary artery anomaly, compared with CCTA: 92.8% Positive predictive value for detection of a coronary artery anomaly, compared with CCTA: 96.1% Negative predictive value for detection of a coronary artery anomaly, compared with CCTA: 87.5%	NR	No complications observed
Beerbaum et al., 2009[33] Not clear NR	Most patients had surgical repair 14 had tetralogy of Fallot, with 1 before ad 10 after surgical repair 6 had very complex lesions	NR	2 of 42 (47.6%) of tests could not be completed

Citation Setting Study Number or Name Risk of Bias	Diagnostic Accuracy	Impact of Testing	Safety
High risk of bias	6 had d-transposition of the great arteries, with 5 after arterial switch operation, and 1 after Mustard-type repair 6 had sinus-venosus atrial septal defect associated with partial anomalous pulmonary venous return before repair 3 had truncus arteriosus communis Type 1–2 after repair 3 had coarctation and arch hypoplasia after repair 1 had undergone cardiac transplantation 1 had Bland-White- Garland syndrome after Takeuchi-repairCMRA detected congenital heart defects in 17 of 40 (42.5%) patients CMRA and ICA were in complete agreement in 6 patients with a coronary anomaly and 6 patients with normal coronary anatomy		
Greil et al., 2002[34] Children's hospital, US NR High risk of bias	The examination was performed under general anesthesia in 24 patients (median age 0.8 years) and no sedation was required in the remaining 43 patients (median age 29 years) All confirmed vessel anomalies were diagnosed using CMRA	CMRA provided information useful for planning of transcatheter and surgical interventions in 8 of 61 (13%) patients	All CMRA studies were technically successful without adverse events

Citation Setting Study Number or Name Risk of Bias	Diagnostic Accuracy	Impact of Testing	Safety
	Previously unsuspected diagnoses of venous anomalies were found by CMRA in 17 patients (28%) In another 28 patients (46%), the suspected diagnoses were confirmed and additional clinically important information was provided In the remaining 16 patients (26%), the referral diagnoses were confirmed without additional information In 3 patients, cardiac catheterization did not diagnose anomalies of the pulmonary veins that were subsequently demonstrated by CMRA		
Nguyen et al., 2015[35] University hospital, US NR High risk of bias	See Table C5 for indications No significant false-positive or false-negative findings in any patient with surgical or catheter angiographic correlation Overall image quality scores and percent of images that were rated as good or excellent were similar at both field strengths	NR	NR
Prakash et al., 2007[36] Children's hospital, US	See Table C6 for primary diagnoses The diagnostic questions at referral were accurately answered by CMRA in each subject	NR	There were no complications No immediate adverse effects were noted after the injection of contrast medium. Clinical and laboratory data for a period of ≥ 72 hours were available after 25 of 29 scans in subjects who remained admitted to the hospital.

Citation Setting Study Number or Name Risk of Bias	Diagnostic Accuracy	Impact of Testing	Safety
NR High risk of bias	No discrepancies were noted between the official magnetic resonance angiographic, x-ray angiographic, and operative reports		None of these subjects demonstrated an increase in serum creatinine, abnormal hepatic function, or other adverse effects during this period. 3 of 29 subjects were discharged home soon after the magnetic resonance imaging scans, and although laboratory data were unavailable, none had a clinical adverse event on follow-up. In 1 patient, the magnetic resonance imaging scan was performed emergently before cardiac surgery. This patient died in the operating room.
Tangcharoen et al., 2011[37] University hospital, UK NR High risk of bias	CMRA allowed visualization of the coronary artery origins and course in 84% of all patients, with the highest success rate in patients older than 4 months (88% ≥ 4 months vs. 17% < 4 months, *P* < .001) 58 of 100 (58.0%) underwent surgery and origin and course of the artery was correctly imaged with MRI and confirmed with surgery in all patients	NR	NR

Abbreviations. CABG: coronary artery bypass graft; CAD: coronary artery disease; CCTA: coronary computed tomography angiography; CI: confidence interval; CMRA: cardiac magnetic resonance angiography; ICA: invasive coronary angiography; LV: left ventricle; MRI: magnetic resonance imaging; NR; not reported.

Table C4. Comparison of Conventional Coronary Angiography and 3D CMRA From Bunce et al., 2003[27]

Patient	Symptoms	Origin	Proximal Course	Outcome Treatment
1	Chest pain	Agree	Agree	Surgical
2	Palpitations	Both tests not completed		Medical
3	Chest pain	Agree	Agree	Medical
4	Chest pain, abnormal thallium	Some differences	CMRA uncertain; CCA identified	Surgical
5	Chest pain	Some differences	Agree	Medical
6	Collapse	Agree	Agree	Medical
7	Chest pain	Agree	Agree	Medical
8	Atypical chest pain, positive ETT results	Agree	CMRA uncertain; CCA identified	Surgical
9	Dyspnea	Some differences	Agree	Medical
10	Cardiac arrest, inferior myocardial infarction	Agree	CMRA uncertain; CCA identified	Surgical
11	Chest pain	Agree	Agree	Medical
12	Chest pain, positive thallium	Agree	Agree	Surgical
13	Chest pain	Agree	Agree	Medical
14	Chest pain, positive ETT results	Agree	Agree	Medical
15	Dyspnea	Some differences	CMRA uncertain; CCA identified	Surgical
16	Chest pain, positive thallium	Agree	Agree	Surgical
17	Chest pain, normal ETT results	Some differences	CMRA uncertain; CCA identified	Surgical
18	Dyspnea	Some differences	CMRA uncertain; CCA identified	Medical
19	Chest pain	Agree	Agree	Medical
20	Chest pain	Agree	CMRA uncertain; CCA identified	Medical
21	Chest pain, positive ETT results	Agree	CMRA uncertain; CCA identified	Surgical
22	Chest pain	Agree	CMRA uncertain; CCA identified	Medical
23	Chest pain, abnormal thallium	Agree	Agree	Surgical
24	Chest pain, positive ETT results	Some differences	Agree	Surgical
25	Chest pain	Agree	CMRA uncertain; CCA identified	Medical
26	Ventricular fibrillation arrest during sport	Agree	CMRA uncertain; CCA identified	Surgical

Abbreviations. 3D: 3-dimensional; CCA: conventional coronary angiography; CMRA: cardiac magnetic resonance angiography; ETT: exercise treadmill test.

Table C5. Indications for Testing From Nguyen et al., 2015[35]

Indication	3.0 T N = 28	1.5 T N = 28
Anomalous pulmonary venous return	2	4
Aortic coarctation	2	1
Atrial septal defect, interrupted arch, ventricular septal defect, status post arch repair & Kono/Ross procedure	0	1
Atrioventricular canal defect, hypoplastic aortic arch	1	0
Bicuspid aortic valve	1	0
Congenital valvar/supravalvar aortic stenosis s/p Ross procedure with right ventricle to pulmonary artery conduit	0	1
Crisscross heart s/p pulmonary artery band and Glenn shunt	1	0
Double outlet right ventricle	4	4
Endocardial cushion defect	0	1
Familial cardiomyopathy	0	1
Heterotaxy with left atrial isomerism	0	1
Hypoplastic left heart syndrome	0	3
Hypoplastic preductal aortic arch	1	0
Interrupted aortic arch	1	0
Interventricular mass	1	0
Major aortopulmonary collateral artery	1	0
Marfan with dilated root & mitral valve prolapse	0	1
Pulmonary atresia	2	0
Pulmonary arteriovenous malformation	1	0
Right aortic arch with vascular ring	2	0
S/p aortic coarctation repair	1	0
S/p atrial septal defect closure, muscular ventricular septal defect	0	1
Tetralogy of Fallot	5	4
Tricuspid atresia; s/p Stansel procedure & Glenn shunt	0	1
Unbalanced atrioventricular canal defect, heterotaxy, hypoplastic arch, s/p modified Norwood & Kawashima procedure	1	0
Ventricular cardiac mass	1	1
Ventricular septal defect, interrupted arch s/p Norwood & Rastelli	0	2
Widened patent ductus arteriosus	0	1

Abbreviations. s/p: status post (previous condition); T: Tesla (unit of magnetic field intensity).

Table C6. Primary Diagnoses After Testing From Prakash et al., 2007[36]

Primary Diagnosis	No. of Patients N = 28
Single ventricle physiology	10
Pulmonary venous anomaly	4
Scimitar syndrome	4
Tetralogy of Fallot, pulmonary atresia	5
Left pulmonary artery sling	2
Situs inversus, coarctation of aorta	1
Truncus arteriosus with isolated left pulmonary artery	1
Tetralogy of Fallot, absent pulmonary valve	1

Abbreviation. No.: number.

Nonrandomized Studies

Table C7. Study Characteristics for Nonrandomized and Registry-Based Studies

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
A. Adults With Suspected CAD					
No eligible nonrandomized studies identified					
B. Adults With Suspected Coronary Vessel Anomalies					
Casolo et al., 2005[38] University hospital, Italy NR High risk of bias	To evaluate the ability of CMRA to detect and assess coronary artery anomalies Noncomparative, prospective study	Inclusion criteria (must meet all): suspected partial anomalous pulmonary venous return Exclusion criteria (excluded if any criteria met): NR	N = 19 participants Male: 12 of 19 (63.1%) Race/ethnicity: NR Mean (SD) age: 53 (18) years	CMR protocol, comprising a spin-echo echo-planar T1 weighted scan, , followed by repeated breath-hold cine-balanced FFE series, with 3D-TFE as appropriate	No comparator
C. Adults Who Have Undergone CABG Surgery					
No eligible studies identified					
D. Adults Being Assessed For Cardiac Device Lead Placement					
No eligible studies identified					
E. Children With Suspected or Confirmed Congenital Heart Disease					
Albrecht et al., 2018[39] Not clear NR	To evaluate a SNFB3D radial whole-heart MRA technique for assessment of main coronary arteries (CAs) and side branches	Inclusion criteria (must meet all): underwent CMRA for the evaluation of coronary anatomy	N = 109 participants Male: NR Race/ethnicity: NR Median age: 16.9 years	SNFB3D MRA, with protocol specific to the specific congenital malformation	No comparator

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
High risk of bias	in patients with congenital heart disease Noncomparative, retrospective study	Exclusion criteria (excluded if any criteria met): contraindications to MRA (implanted cardiac devices or arrhythmia)	Mean (SD) BMI: 23.1 (6.2) kg/m^2		
Biko et al., 2015[40] Children's hospital, US NR High risk of bias	To demonstrate that CMRA can accurately determine the presence or absence of an intramural segment in an anomalous coronary artery Noncomparative, retrospective study	Inclusion criteria (must meet all): underwent CMRA for suspected or known anomalous coronary artery, diagnosis of left coronary or right coronary artery originating from the contralateral sinus Exclusion criteria (excluded if any criteria met): did not have surgical follow-up or intervention, only had postoperative CMRA, loss to follow-up, or presence of an anomalous left coronary artery from the pulmonary artery	N = 14 participants Male: 11 of 14 (78.6%) Race/ethnicity: NR Mean (range) age: 13.7 (7 to 17) years Mean (SD) weight: NR	CMRA protocol, comprising steady-state free precession sequence looking at the motion of the right atrioventricular groove/right coronary artery Scan parameters were adjusted accordingly for each patient	No comparator

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
Clemente et al., 2010[41] University hospital, Italy NR High risk of bias	To assess the diagnostic potential of CMRA on AOCA in young patients Noncomparative, prospective study	Inclusion criteria (must meet all): clinical and echocardiographic suspicion of AOCA Exclusion criteria (excluded if any criteria met): NR	N = 15 participants Male: NR Race/ethnicity: NR Mean (SD) age: 13.5 (5.6) years Mean (SD) weight: NR	CMR protocol, comprising a whole heart technique, using a navigator gated and corrected free breathing 3D steady-state free precession sequence	No comparator
Holmqvist et al., 2001[42] University hospital, Sweden NR High risk of bias	To optimize breath-hold contrast-enhanced CMRA in infants and children with suspected congenital heart or thoracic vessel malformation Noncomparative, prospective study	Inclusion criteria (must meet all): known or suspected congenital heart defect or thoracic vessel malformation, referred for MRI Exclusion criteria (excluded if any criteria met): NR	N = 39 participants Male: 28 of 39 (71.8%) Race/ethnicity: NR Mean (range) age: 3.5 (0 to 15) years Mean (range) weight: 3.8 (1.8 to 4.6) kg	CMRI protocol, comprising contrast-enhanced 3D-MRA, using gadoterate meglumine	No comparator
Monney et al., 2015[43] University hospital, Switzerland NR High risk of bias	To determine if self-navigated 3D-CMR enables the reliable assessment of cardiovascular anatomy in patients with congenital heart disease Noncomparative study (timing unclear)	Inclusion criteria (must meet all): aged ≥ 2 years, congenital disease involving the heart or the great vessels, and referred for CMR Exclusion criteria (excluded if any criteria	N = 111 participants Male: 61 of 111 (55.0%) Race/ethnicity: NR Mean (SD) age: 23.4 (12.2) years Mean (SD) weight: 58.0 (21.1) kg	CMRI protocol, comprising a free-breathing 3D self-navigated sequence	No comparator

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
		met): irregular heart rhythm			
Odegard et al., 2004[44] Children's hospital, US NR High risk of bias	To evaluate practice and outcomes of children with congenital heart disease undergoing general anesthesia for cardiac MRI Noncomparative, retrospective study	Inclusion criteria (must meet all): underwent general anesthesia for cardiac MRI Exclusion criteria (excluded if any criteria met): NR	N = 250 participants, with 223 from the cardiology ward and 27 from the cardiac intensive care unit Male: 135 of 250 (54.0%) Race/ethnicity: NR Median (range) age: 5 (1.0 month to 15 years) years cardiology ward; 5.2 (1 day to 20 months) weeks cardiac intensive care unit Mean (SD) weight: 16.7 (4.0 to 9.0) kg cardiology ward; 2.9 (1.3 to 9.0) kg cardiac intensive care unit	CMRI, with general anesthesia	No comparator
Secchi et al., 2011[45] National centre, Italy NR High risk of bias	To evaluate the impact of CMR on the management of patients with congenital heart disease Noncomparative, retrospective study	Inclusion criteria (must meet all): known or suspected congenital heart disease who underwent CMR Exclusion criteria (excluded if any criteria met): NR	N = 214 participants Male: 133 of 214 (62.1%) Race/ethnicity: NR Mean (range) age: 23 (1 to 77) years	CMR protocol, comprising a series of ECG-gated sequences and gadolinium-enhanced 3D-angiography, using gadopentetate dimeglumine	No comparator

Citation Setting Study Number or Name Risk of Bias	Study Aim Study Design	Inclusion and Exclusion Criteria	Patient Characteristics	Description of Intervention	Description of Comparator(s)
				Protocol was adapted on a case-by-case basis	
Safety Studies					
Rangamani et al., 2012[46] Children's hospital, US NR High risk of bias	To report a 10-year experience with CMR in neonates and small infants with particular focus on the safety profile and incidence of AEs Noncomparative, prospective study	Inclusion criteria (must meet all): underwent CMR for evaluation of congenital heart disease and who were ≤ 120 days old Exclusion criteria (excluded if any criteria met): incomplete data	N = 143 participants Male: 74 of 143 (51.7%) Race/ethnicity: NR Mean (SD) age: 23.9 (28.6) days Mean (SD) weight: 3,4 (0.8) kg	CMR protocol, using gadopentetate dimeglumine, with phase-contrast velocity mapping,	No comparator

Abbreviations. 3D: 3-dimensional; AE: adverse event; AOCA: anomalous origin of coronary arteries; BMI: body mass index; CABG: coronary artery bypass graft; CAD: coronary artery disease; CMR: cardiac magnetic resonance; CMRA: CMR angiography; CMRI: CMR imaging; CRT: cardiac resynchronization therapy; DSCMR: dobutamine stress CMR; DTPA: diethylenetriamine pentaacetic acid; IQR: interquartile range; LGE: late gadolinium enhancement; LV: left ventricular; MAPCA: major aortopulmonary collateral; MI: myocardial infarction; MPI: myocardial perfusion imaging; MRA: magnetic resonance angiography; MRI: magnetic resonance imaging; NR: not reported or not relevant; PAPVD: partial anomalous venous drainage; PCI: percutaneous coronary intervention; QCA: quantitative coronary angiography; SD: standard deviation; SNFB3D: self-navigated free-breathing 3D radial whole-heart MRA; SPECT: single-photon emission computed tomography; TFE: turbo field echo.

Table C8. Findings From Nonrandomized and Registry-Based Studies

Citation Setting Study Number or Name Risk of Bias	Process of Testing and Personnel Involved	Test Performance	Utility	Safety
A. Adults With Suspected CAD				
No eligible nonrandomized studies identified				
B. Adults With Suspected Coronary Vessel Anomalies				
Casolo et al., 2005[38] University hospital, Italy NR High risk of bias	NR	Diagnostic Ability 6 of 19 (31.5%) had suspected coronary artery anomalies based on prior tests 13 of 19 (68.5%) had coronary artery anomalies identified using CMRA for other reasons (unexplained ventricular arrhythmias in 7 patients, congenital heart disease in 3 patients, stable coronary artery disease with prior myocardial infarction in 1 patient and hypertrophic cardiomyopathy in 2 patients) In the 5 patients who were studied after x-ray coronary angiography, MRCA added some information on the origin and course of the anomalies In 1 patient whose coronary artery anomaly was suspected by transesophageal echocardiography, CMRA	Indication(s) or Diagnosis See Table C9 Use of Sedation NR Test Completion NR	NR

Citation Setting Study Number or Name Risk of Bias	Process of Testing and Personnel Involved	Test Performance	Utility	Safety
		provided all the information useful for clinical management, avoiding the need for conventional angiography Interrater Agreement NR		
C. Adults Who Have Undergone CABG Surgery				
No eligible nonrandomized studies identified				
D. Adults Being Assessed For Cardiac Device Lead Placement				
Lam et al., 2015[31] University hospital, US NR High risk of bias	Catheter-based x-ray venography was performed during the CRT procedure, immediately before pacemaker lead implantation by an experienced cardiac electrophysiologist to visualize the coronary venous system	Diagnostic Ability 16 of 16 (100%) MRI and x-ray venographies were in agreement MRI visualized 64 of 71 (90.1%) of vein segments identified using the x-ray venography	Indication(s) or Diagnosis MRI visualized the vein used for lead placement in 16 of 16 (100%) patients, with an average visibility score of 1.9 Test Completion 19 of 19 (100%) MRI exams were complete and successful 19 of 19 (100%) X-ray venography exams were completed, with 3 (15.8%) being noninterpretable	NR

Citation Setting Study Number or Name Risk of Bias	Process of Testing and Personnel Involved	Test Performance	Utility	Safety
E. Children With Suspected or Confirmed Congenital Heart Disease				
Albrecht et al., 2018[39] Not clear NR High risk of bias	SNFB3D MRA examinations were independently reviewed by a pediatric cardiologist and two radiologists with 12, 6 and 3 years of experience in cardiovascular imaging, respectively	Diagnostic Ability 109 of 109 (100%) tests were diagnostic Interrater Agreement ICC (95% CI) by artery: 0.66 (0.53 to 0.57) LM; 0.59 (0.44 to 0.70) LAD; 0.74 (0.65 to 0.81) LCX; 0.64 (0.51 to 0.74) DIA; 0.55 (0.38 to 0.67) RCA; 0.46 (0.26 to 0.62) PDA ICC (95% CI) for coronary dominance: 0.46 (0.25 to 0.16) ICC (95% CI) for image quality: 0.95 (0.93 to 0.96) ICC (95% CI) for respiratory motion freezing: 0.81 (0.74 to 0.86) ICC (95% CI) for cardiac motion freezing: 0.85 (0.80 to 0.89) ICC (95% CI) for blood pool homogeneity: 0.79 (0.72 to 0.85)	Indication(s) or Diagnosis See Table C10 Use of Sedation NR Test Completion NR	NR

Citation Setting Study Number or Name Risk of Bias	Process of Testing and Personnel Involved	Test Performance	Utility	Safety
Biko et al., 2015[40] Children's hospital, US NR High risk of bias	The CMRA examinations were retrospectively reviewed by 2 pediatric radiologists, with 4 and 20 years' clinical experience in consensus and blinded to the clinical history	Diagnostic Ability 14 of 14 (100%) studies were considered to be diagnostic, with no additional imaging required Interrater Agreement NR	Indication(s) or Diagnosis Suspected or known anomalous coronary artery Use of Sedation NR Test Completion 14 of 14 (100%) of exams were completed successfully	NR
Clemente et al., 2010[41] University hospital, Italy NR High risk of bias	NR	Diagnostic Ability CMRA confirmed the AOCA suspicion in 6 of 15 (40.0%) of patients, with 7 of 15 (60.0%) patients having normal vasculature confirmed Interrater Agreement NR	Indication(s) or Diagnosis NR Use of Sedation NR Test Completion NR	NR
Holmqvist et al., 2001[42] University hospital, Sweden	NR	Diagnostic Ability No CMRA examination was classified as a technical failure 4 of 40 (10%) of scans were classified as poor quality	Indication(s) or Diagnosis See Table C11 Use of Sedation	NR

Citation Setting Study Number or Name Risk of Bias	Process of Testing and Personnel Involved	Test Performance	Utility	Safety
NR High risk of bias		Interrater Agreement NR	3 of 39 (7.7%) patients were tested under general anesthesia Test Completion All tests were completed	
Monney et al., 2015[43] University hospital, Switzerland NR High risk of bias	NR	Diagnostic Ability Image quality was sufficient for a complete anatomical diagnosis (grades 3–5) in 90% of examinations; 70% had good to excellent quality (grades 4–5). Only 9% had limited image quality allowing for a partial diagnosis and only 1 examination had completely nondiagnostic quality See Table C12 Interrater Agreement Generally, agreement on the identification or exclusion of residual structural defects was good between the 2 readers (range, 66.7% to 100%)	Indication(s) or Diagnosis See Table C13 Use of Sedation Sedation was used in 10 of 30 (33.3%) children Test Completion All tests were successful (100%)	NR

Citation Setting Study Number or Name Risk of Bias	Process of Testing and Personnel Involved	Test Performance	Utility	Safety
Odegard et al., 2004[44] Children's hospital, US NR High risk of bias	In addition to monitoring within the MRI scanner, a slave monitor was placed outside the scanner for review by MRI staff 2 anesthetists were involved with each case, one in the scanner controlling ventilation and monitoring depth of anesthesia, and a second anesthetist outside the scanner coordinating management with the MRI cardiologist Earplugs were placed in the patients to protect them from the noise during scanning, particularly during acquisition of MRA images Parents were present during induction of anesthesia in the majority of the same day admit patients	Diagnostic Ability NR Interrater Agreement NR	Indication(s) or Diagnosis See Table C14 Use of Sedation All patients were under general anesthetic Test Completion NR	No patient was admitted overnight to the hospital because of complications resulting from general anesthesia 7 patients from the cardiac intensive care unit were receiving inotropes when they underwent the MRI procedure, two other patients needed inotropic infusion (dopamine) started after induction of anesthesia A brief episode of hypotension occurred in 5 patients which responded to IV calcium gluconate or phenylephrine and 1 inhouse patient from the cardiology ward was admitted to the cardiac intensive care unit after the MRI because of cyanosis and hypotension
Secchi et al., 2011[45] National centre, Italy NR	A radiologist with 2 years experience in CMR performed the post-processing	Diagnostic Ability See Table C15 Interrater Agreement NR	Indication(s) or Diagnosis See Table C16 Use of Sedation NR	NR

Citation Setting Study Number or Name Risk of Bias	Process of Testing and Personnel Involved	Test Performance	Utility	Safety
High risk of bias			Test Completion NR	
Safety Studies				
Rangamani et al., 2012[46] Children's hospital, US NR High risk of bias	1 pediatric anesthetist, 1 CMR technologist and 1 sedation nurse were present during the entire procedure The laboratory was equipped with CMR-compatible anesthesia and monitoring equipment. There was a checklist for patients and family members entering the CMR unit 4 safety zones were reinforced. For pregnant staff members, staying out of the CMR scan room was recommended until after the first trimester. Noise-reducing headphones and earplugs were provided to the child and the family member who accompanied the child into the scan room	Diagnostic Ability NR Interrater Agreement NR	Indication(s) or Diagnosis See Table C17 Use of Sedation Deep sedation: 50 of 143 (35.0%) General anesthesia: 86 of 143 (60.1%) Comforting methods (feed, swaddle, sleep): 7 of 143 (4.9%) Test Completion 1 child woke prior to completion of the test	See Table C18 No gadolinium-contrast-related AEs observed No changes in hepatic function observed

Abbreviations. AOCA: anomalous origin of the coronary artery; CAD: coronary artery disease; CI: confidence interval; CMR: cardiac magnetic resonance; CMRA: cardiac magnetic resonance angiography; CRT: cardiac resynchronization therapy; DIA: first diagonal artery; ICC: intraclass correlation coefficient; IV: intravenous; LAD: left anterior descending artery; LCX: left circumflex artery; LM: left main coronary artery; LV: left ventricle; MPI: myocardial perfusion imaging; MRA: magnetic resonance angiography; MRCA: magnetic resonance coronary angiography; MRI: magnetic resonance imaging; NR: not reported or not relevant; PDA: posterior descending artery; RCA: right coronary artery; SD: standard deviation; SNFB3D: self-navigated free-breathing 3D radial whole-heart MRA; WMA: wall motion abnormalities.

Table C9. Diagnosis From Casolo et al., 2005 [38]

Diagnosis	Number of Patients N = 19
Ventricular arrhythmias	7 (36.8%)
Anomaly detected by x-ray angiography for coronary artery disease	5 (26.3%)
Corrected transposition of great vessels	2 (10.5%)
Hypertrophic cardiomyopathy	2 (10.5%)
Anomaly suspected by transesophageal echocardiography for atrial septal defect	1 (5.3%)
Bicuspid aortic valve	1 (5.3%)
Coronary artery disease	1 (5.3%)

Table C10. Diagnosis From Albrecht et al., 2018[39]

Diagnosis	Number of Patients N = 109
Tetralogy of Fallot	31 (28.4%)
Tricuspid atresia status post Fontan	18 (16.5%)
Pulmonary stenosis/atresia	14 (12.8%)
Aortic coarctation	13 (11.9%)
Transposition of great arteries	12 (11.0%)
Hypoplastic left heart syndrome	11 (10.1%)
Atrial septum defect	5 (4.6%)
Atrioventricular septum defect	3 (2.7%)
Double outlet right ventricle	2 (1.8%)

Table C11. Diagnoses From Holmqvist et al., 2001[42]

Diagnosis	Number of Patients N = 39
Coarctation of the aorta	15 (38.5%)
Pulmonary atresia	5 (12.8%)
Double outlet right ventricle	2 (5.1%)
Hypoplastic left/right heart syndrome	2 (5.1%)
Truncus arteriosus	2 (5.1%)

Diagnosis	Number of Patients N = 39
Tetralogy of Fallot	1 (2.6%)
Truncus arteriosus type 4	1 (2.6%)
Truncus arteriosus type 2	1 (2.6%)
Congenitally corrected transposition of the great arteries	1 (2.6%)
Double outlet right ventricle, ventricular septal defect	1 (2.6%)
Pulmonary atresia, hypoplastic right heart syndrome	1 (2.6%)
Coarctation of the aorta, postoperative	1 (2.6%)
Atrial septal defect, asthma	1 (2.6%)
Atrioventricular commune	1 (2.6%)
Chronic parenchymal changes	1 (2.6%)
Atrial septal defect	1 (2.6%)
Dysphagia	1 (2.6%)
Transposition of the great arteries	1 (2.6%)

Table C12. Factors Associated With Poor Image Quality From Monney et al., 2015[43,a]

Factor	Bivariate			Multivariate		
	Odds Ratio	*P* Value	95% Confidence Interval	Odds Ratio	*P* Value	95% Confidence Interval
Age (years)	0.98	ns	0.92 to 1.04	**0.89**	**< .05**	**0.80 to 0.99**
Heart rate (bpm)	**1.07**	**< .01**	**1.02 to 1.12**	**1.11**	**< .01**	**1.03 to 1.20**
Height (cm)	**0.97**	**< .05**	**0.95 to 0.99**	Not reported		
Weight (kg)	**0.96**	**< .05**	**0.93 to 0.99**	Not reported		
Ejection fraction (%)	**5.8×10^{-6}**	**< .01**	**1.3×10^{-9} to 0.03**	**1.2×10^{-6}**	**< .01**	**2.4×10^{-14} to 6.0×10^{-4}**
Complex malformation	**4.26**	**< .05**	**1.05 to 17.35**	Not reported		
Surgical correction	0.31	.07	0.08 to 1.11	Not reported		
Acquisition window (msec)	**0.96**	**< .05**	**0.92 to 0.99**	Not reported		
Scan duration (sec)	1.16	.09	0.98 to 1.38	Not reported		
Use of IV contrast	**0.14**	**< .01**	**0.03 to 0.55**	**0.007**	**< .01**	**0.0004 to 0.15**

Note. [a] Bold text indicates the result is statistically significant.
Abbreviations. bpm: beats per minute; IV: intravenous; ns: nonsignificant.

Table C13. Indications for Testing From Monney et al., 2015[43]

Indication	Number of Patients N = 111
Complex Malformation	
Any	49 (44.1%)
Tetralogy of Fallot	20 (18.0%)
d-transposition of the great arteries	13 (11.7%)
Fontan circulation	3 (2.7%)
Other complex	13 (11.7%)
Noncomplex Malformation	
Any	62 (55.9%)
Aortic dilatation	22 (19.8%)
Coarctation aorta	7 (6.3%)
After Ross operation	8 (7.2%)
Septal defect	5 (4.5%)
Abnormal venous return	8 (7.2%)
Other noncomplex	12 (10.8%)
Corrected Malformation	
Any	76 (68.5%)

Table C14. Diagnosis From Odegard et al., 2004[44]

Indication	Number of Patients
Cardiology Ward (N = 223)	
LVOT defect	56 (25%)
RVOT defect	71 (32%)
C-P anastomosis	26 (12%)
Septal defects	18 (8%)
Vascular rings/airway obstruction	15 (7%)
Cardiac tumor/aneurysm	15 (7%)
Miscellaneous lesions	22 (9%)
Cardiac Intensive Care Unit (N = 27)	
LVOT defect	6 (22%)
RVOT defect	11 (42%)

Indication	Number of Patients
Vascular rings/airway obstruction	2 (7%)
Cardiac tumor/aneurysm	2 (7%)
Heterotaxy	3 (11%)
Miscellaneous lesions	3 (11%)

Abbreviations. C-P anastomosis: cavopulmonary anastomosis; LVOT: left ventricular outflow tract; RVOT: right ventricular outflow tract.

Table C15. Clinical Evaluation After Testing From Secchi et al., 2011[45]

Outcome	2003 to 2004 N = 81	2005 to 2006 N = 133	2003 to 2006 N = 214
Not reliable	0	1 (< 1%)	1 (< 1%)
Findings already known	2 (2.5%)	0	2 (< 1%)
New findings not resulting in a change of therapy or suggested lifestyle	53 (65.4%	6 (4.5%)	59 (27.6%)
New findings resulting in a change of therapy or suggested lifestyle	19 (23.5%)	123 (92.5%)	142 (66.3%)
New findings resulting in a change of diagnosis	7 (8.6%)	3 (2.3%)	10 (4.7%)

Table C16. Indications for Testing From Secchi et al., 2011[45]

Indication	Number of Patients N = 214
Vessels	
Aortic coarctation	61 (28.5%)
Aortic arch aneurysm	5 (2.3%)
Right-sided aorta	2 (< 1%)
Pulmonary valve stenosis	2 (< 1%)
Pulmonary aneurysm	1 (< 1%)
Other	10 (4.7%)
Total	**81 (37.9%)**
Cardiac	
Fallot tetralogy	30 (14.0%)
Transposition of great arteries	15 (7.0%)
Ventricular septal defect	14 (6.5%)
Bicuspid aortic valve	13 (6.1%)
Single ventricle	10 (4.7%)

Indication	Number of Patients N = 214
Pulmonary valve atresia	8 (3.7%)
Pulmonary stenosis/regurgitation	7 (3.3%)
Aortic stenosis/regurgitation	6 (2.8%)
Atrial septal defect	4 (1.9%)
Non-compaction myocardium	3 (1.4%)
Ebstein's syndrome	3 (1.4%)
Tricuspid valve atresia	3 (1.4%)
Anomalous pulmonary venous return	2 (< 1%)
Masses	2 (< 1%)
Other	13 (6.1%)
Total	**133 (62.1%)**

Table C17. Indications for Testing From Rangamani et al., 2012[46]

Cardiac Diagnosis	No. of Patients N = 143
Aortic arch	56 (39.2%)
Complex congenital heart disease	40 (28.0%)
Pulmonary vein	14 (9.8%)
Intracardiac mass	8 (5.6%)
Vascular ring	8 (5.6%)
Pulmonary artery	7 (4.9%)
Ventricular volume	4 (2.8%)
Systemic vein	3 (2.1%)
Aortic arch and pulmonary vein	3 (2.1%)

Table C18. Adverse Events From Rangamani et al., 2012[46]

Adverse Event	Inpatient or Outpatient	Deep Sedation	General Anesthesia	Comforting Methods
Major Adverse Events				
Respiratory arrest	Inpatient	1		
Minor Adverse Events				
Hypoxia	Inpatient	1	1	
	Outpatient			
Hypothermia	Inpatient		5	
	Outpatient			
Bradycardia and hypoxia	Inpatient		2	
	Outpatient			
Bradycardia	Inpatient	1	1	

List of Included Studies

Note. The numbering of references below is for this Appendix only; it is different from that of the full evidence report.

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