

Table 1. Individual rating of scenarios compared to original scores

WGM	Individual rating compared to original score		
	similar	1 level difference	2 level difference
Nr 1	113	30	8
Nr 2	129	20	4
Nr 3	136	17	0
Nr 4	132	20	1
Nr 5	117	32	4
Nr 6	115	33	5
Nr 7	91	34	20
Nr 8	132	14	7
Nr 9	122	23	8

WGM = working group member, 1 level difference means appropriate versus uncertain, or inappropriate versus uncertain. 2 levels difference means appropriate versus inappropriate.

Table 2. Scenarios with a different judgement after the individual assessment

Scenario	Table	Rating in original paper	Mean rating on individual level	Mean rating after consensus meeting
8	1	1	2	1
9	1	3	2	3
20	2	2	3	3
28	2	1	2	1
30	2	1	2	1
35	3	1	2	2
38	3	1	2	1
40	3	1	2	1
56	3	1	2	2
66	5	1	2	1
68	6	1	2	1
77	6	2	3	2
98	7	2	3	2
99	8	3	2	3
104	8	3	2	3
110	8	2	1	1
115	9	3	2	3
116	9	3	2	3
184	17	2	1	2
185	17	3	2	2
187	17	2	1	1
188	17	3	2	2
194	17	2	1	2
195	17	3	2	3

Tabel 3 TTE for general evaluation of cardiac structure and function (former tAble 1)

	Suspected Cardiac Etiology—General With TTE	
1	Symptoms or conditions potentially related to suspected cardiac etiology including but not limited to chest pain, shortness of breath, palpitations, TIA, stroke, or peripheral embolic event	A
2	Prior testing that is concerning for heart disease or structural abnormality including but not limited to chest X-ray, baseline scout images for stress echocardiogram, ECG, or cardiac biomarkers	A
3	Infrequent APCs or infrequent VPCs without other evidence of heart disease	I
4	Frequent VPCs or exercise-induced VPCs	A
5	Sustained or nonsustained atrial fibrillation, SVT, or VT	A
6	Asymptomatic isolated sinus bradycardia	I
	Lightheadedness/Presyncope/Syncope With TTE	
7	Clinical symptoms or signs consistent with a cardiac diagnosis known to cause lightheadedness/presyncope/syncope (including but not limited to aortic stenosis, hypertrophic cardiomyopathy, or HF)	I
8	Lightheadedness/presyncope when there are no other symptoms or signs of cardiovascular	U
9	Syncope when there are no other symptoms or signs of cardiovascular disease	A
	Evaluation of Ventricular Function With TTE	
10	Routine surveillance of ventricular function with known CAD and no change in clinical status or cardiac exam	I
11	Routine surveillance of ventricular function with known CAD and no change in clinical status or cardiac exam	I
12	Evaluation of LV function with prior ventricular function evaluation showing normal function (e.g., prior echocardiogram, left ventriculogram, CT, SPECT MPI, CMR) in patients in whom there has been no change in clinical status or cardiac exam	I
	Perioperative Evaluation With TTE	
13	Routine perioperative evaluation of ventricular function with no symptoms or signs of cardiovascular disease	I
14	Routine perioperative evaluation of cardiac structure and function prior to noncardiac solid organ transplantation	U
	Pulmonary Hypertension With TTE	
15	Evaluation of suspected pulmonary hypertension including evaluation of right ventricular function and estimated pulmonary artery pressure	A
16	Routine surveillance (<1 y) of known pulmonary hypertension without change in clinical status or cardiac exam	I
17	Routine surveillance (≥1 y) of known pulmonary hypertension without change in clinical status or cardiac exam	A
18	Re-evaluation of known pulmonary hypertension if change in clinical status or cardiac exam or to guide therapy	A

Table 4 TTE for cardiovascular evaluation in an acute setting (former table 2)

Suspected Cardiac Etiology—General With TTE		
19	Hypotension or hemodynamic instability of uncertain or suspected cardiac etiology	A
20	Assessment of volume status in a critically ill patient	A
Myocardial Ischemia/Infarction With TTE		
21	Acute chest pain with suspected MI and nondiagnostic ECG when a resting echocardiogram can be performed during pain	A
22	Evaluation of a patient without chest pain but with other features of an ischemic equivalent or laboratory markers indicative of ongoing MI	A
23	Suspected complication of myocardial ischemia/infarction, including but not limited to acute mitral regurgitation, ventricular septal defect, free-wall rupture/tamponade, shock, right ventricular involvement, HF, or thrombus	A
Evaluation of Ventricular Function after ACS With TTE		
24	Initial evaluation of ventricular function following ACS	A
25	Re-evaluation of ventricular function following ACS during recovery phase when results will guide therapy	A
Respiratory Failure With TTE		
26	Respiratory failure or hypoxemia of uncertain etiology	A
27	Respiratory failure or hypoxemia when a noncardiac etiology of respiratory failure has been established	U
Pulmonary Embolism With TTE		
28	Suspected pulmonary embolism in order to establish diagnosis	I
29	Known acute pulmonary embolism to guide therapy (e.g., thrombectomy and thrombolytics)	A
30	Routine surveillance of prior pulmonary embolism with normal right ventricular function and pulmonary artery systolic pressure	I
31	Re-evaluation of known pulmonary embolism after thrombolysis or thrombectomy for assessment of change in right ventricular function and/or pulmonary artery pressure	A
Cardiac Trauma With TTE		
32	Severe deceleration injury or chest trauma when valve injury, pericardial effusion, or cardiac injury are possible or suspected	A
33	Routine evaluation in the setting of mild chest trauma with no electrocardiographic changes or biomarker elevation	I

Table 5 TTE for evaluation of valvular function (former table 3)

Murmur or Click With TTE		
34	Initial evaluation when there is a reasonable suspicion of valvular or structural heart disease	A
35	Initial evaluation when there are no other symptoms or signs of valvular or structural heart disease	U
36	Re-evaluation in a patient without valvular disease on prior echocardiogram and no change in clinical status or cardiac exam	I
37	Re-evaluation of known valvular heart disease with a change in clinical status or cardiac exam or to guide therapy	A
Native valvular Stenosis with TTE		
38	Routine surveillance (<3 y) of mild valvular stenosis without a change in clinical status or cardiac exam	I
39	Routine surveillance (≥3 y) of mild valvular stenosis without a change in clinical status or cardiac exam	A
40	Routine surveillance (<1 y) of moderate or severe valvular stenosis without a change in clinical status or cardiac exam	U
41	Routine surveillance (≥1 y) of moderate or severe valvular stenosis without a change in clinical status or cardiac exam	A
Native valvular Regurgitation with TTE		
42	Routine surveillance of trace valvular regurgitation	I
43	Routine surveillance (<3 y) of mild valvular regurgitation without a change in clinical status or cardiac exam	I
44	Routine surveillance (≥3 y) of mild valvular regurgitation without a change in clinical status or cardiac exam	U
45	Routine surveillance (<1 y) of moderate or severe valvular regurgitation without a change in clinical status or cardiac exam	U
46	Routine surveillance (≥1 y) of moderate or severe valvular regurgitation without change in clinical status or cardiac exam	A
Prosthetic Valve With TTE		
47	Initial postoperative evaluation of prosthetic valve for establishment of baseline	A
48	Routine surveillance (<3 y after valve implantation) of prosthetic valve if no known or suspected valve dysfunction	I
49	Routine surveillance (≥3 y after valve implantation) of prosthetic valve if no known or suspected valve dysfunction	A
50	Evaluation of prosthetic valve with suspected dysfunction or a change in clinical status or cardiac exam	A
51	Re-evaluation of known prosthetic valve dysfunction when it would change management or guide therapy	A
Infective Endocarditis (Native or Prosthetic Valves) With TTE		
52	Initial evaluation of suspected infective endocarditis with positive blood cultures or a new murmur	A
53	Transient fever without evidence of bacteremia or a new murmur	I
54	Transient bacteremia with a pathogen not typically associated with infective endocarditis and/or a documented nonendovascular source of infection	I
55	Re-evaluation of infective endocarditis at high risk for progression or complication or with a change in clinical status or cardiac exam	A
56	Routine surveillance of uncomplicated infective endocarditis when no change in management is contemplated	U

Table 6 TTE for evaluation of intracardiac and extracardiac structures and chambers (former table 4)

57	Suspected cardiac mass	A
58	Suspected cardiovascular source of embolus	A
59	Suspected pericardial conditions	A
60	Routine surveillance of known small pericardial effusion with no change in clinical status	I
61	Re-evaluation of known pericardial effusion to guide management or therapy	A
62	Guidance of percutaneous noncoronary cardiac procedures including but not limited to pericardiocentesis, septal ablation, or right ventricular biopsy	A
		A

Table 7 TTE for evaluation of aortic disease (former table 5)

63	Evaluation of the ascending aorta in the setting of a known or suspected connective tissue disease or genetic condition that predisposes to aortic aneurysm or dissection (e.g., Marfan syndrome)	A
64	Re-evaluation of known ascending aortic dilation or history of aortic dissection to establish a baseline rate of expansion or when the rate of expansion is excessive	A
65	Re-evaluation of known ascending aortic dilation or history of aortic dissection with a change in clinical status or cardiac exam or when findings may alter management or therapy	A
66	Routine re-evaluation for surveillance of known ascending aortic dilation or history of aortic dissection without a change in clinical status or cardiac exam when findings would not change management or therapy	I

Table 8 TTE for evaluation of hypertension, HF, or cardiomyopathy (former table 6)

	Hypertension With TTE	
67	Initial evaluation of suspected hypertensive heart disease	A
68	Routine evaluation of systemic hypertension without symptoms or signs of hypertensive heart disease	I
69	Re-evaluation of known hypertensive heart disease without a change in clinical status or cardiac exam	U
	HF With TTE	
70	Initial evaluation of known or suspected HF (systolic or diastolic) based on symptoms, signs, or abnormal test results	A
71	Re-evaluation of known HF (systolic or diastolic) with a change in clinical status or cardiac exam without a clear precipitating change in medication or diet	A
72	Re-evaluation of known HF (systolic or diastolic) with a change in clinical status or cardiac exam with a clear precipitating change in medication or diet	U
73	Re-evaluation of known HF (systolic or diastolic) to guide therapy	A
74	Routine surveillance (<1 y) of HF (systolic or diastolic) when there is no change in clinical status or cardiac exam	I
75	Routine surveillance (≥1 y) of HF (systolic or diastolic) when there is no change in clinical status or cardiac exam	U
	Device Evaluation (including Pacemaker, ICD, or CRT) with TTE	
76	Initial evaluation or re-evaluation after revascularization and/or optimal medical therapy to determine candidacy for device therapy and/or to determine optimal choice of device	A
77	Initial evaluation for CRT device optimization after implantation	U
78	Known implanted pacing device with symptoms possibly due to device complication or suboptimal pacing device settings	A
79	Routine surveillance (<1 y) of implanted device without a change in clinical status or cardiac exam	I
80	Routine surveillance (≥1 y) of implanted device without a change in clinical status or cardiac exam	I
	Ventricular Assist Devices and Cardiac Transplantation With TTE	
81	To determine candidacy for ventricular assist device	A
82	Optimization of ventricular assist device settings	A
83	Re-evaluation for signs/symptoms suggestive of ventricular assist device-related complications	A
84	Monitoring for rejection in a cardiac transplant recipient	A
85	Cardiac structure and function evaluation in a potential heart donor	A
	Cardiomyopathies With TTE	
86	Initial evaluation of known or suspected cardiomyopathy (e.g., restrictive, infiltrative, dilated, hypertrophic, or genetic cardiomyopathy)	A
87	Re-evaluation of known cardiomyopathy with a change in clinical status or cardiac exam or to guide therapy	A
88	Routine surveillance (<1 y) of known cardiomyopathy without a change in clinical status or cardiac exam	I
89	Routine surveillance (≥1 y) of known cardiomyopathy without a change in clinical status or cardiac exam	U
90	Screening evaluation for structure and function in first-degree relatives of a patient with an inherited cardiomyopathy	A
91	Baseline and serial re-evaluations in a patient undergoing therapy with cardiotoxic agents	A

Table 9 TTE for adult congenital heart disease (former table 7)

92	Initial evaluation of known or suspected adult congenital heart disease	A
93	Known adult congenital heart disease with a change in clinical status or cardiac exam	A
94	Re-evaluation to guide therapy in known adult congenital heart disease	A
95	Routine surveillance (<2 y) of adult congenital heart disease following complete repair + without a residual structural or hemodynamic abnormality + without a change in clinical status or cardiac exam	I
96	Routine surveillance (≥2 y) of adult congenital heart disease following complete repair + without residual structural or hemodynamic abnormality + without a change in clinical status or cardiac exam	U
97	Routine surveillance (<1 y) of adult congenital heart disease following incomplete or palliative repair + with residual structural or hemodynamic abnormality + without a change in clinical status or cardiac exam	U
98	Routine surveillance (≥1 y) of adult congenital heart disease following incomplete or palliative repair + with residual structural or hemodynamic abnormality + without a change in clinical status or cardiac exam	U

Table 10 TEE (former table 8)

	General Uses	
99	Use of TEE when there is a high likelihood of a nondiagnostic TTE due to patient characteristics or inadequate visualization of relevant structures	A
100	Routine use of TEE when a diagnostic TTE is reasonably anticipated to resolve all diagnostic and management concerns	I
101	Re-evaluation of prior TEE finding for interval change (e.g., resolution of thrombus after anticoagulation, resolution of vegetation after antibiotic therapy) when a change in therapy is anticipated	A
102	Surveillance of prior TEE finding for interval change (e.g., resolution of thrombus after anticoagulation, resolution of vegetation after antibiotic therapy) when no change in therapy is anticipated	I
103	Guidance during percutaneous noncoronary cardiac interventions including but not limited to closure device placement, radiofrequency ablation, and percutaneous valve procedures	A
104	Suspected acute aortic pathology including but not limited to dissection/transsection (not as initial test)	A
105	Routine assessment of pulmonary veins in an asymptomatic patient status post pulmonary vein isolation	I
	Valvular Disease	
106	Evaluation of valvular structure and function to assess suitability for, and assist in planning of, an intervention	A
107	To diagnose infective endocarditis with a low pretest probability (e.g., transient fever, known alternative source of infection, or negative blood cultures/atypical pathogen for endocarditis)	I
108	To diagnose infective endocarditis with a moderate or high pretest probability (e.g., staph bacteremia, fungemia, prosthetic heart valve, or intracardiac device)	A
	Embolic Event	
109	Evaluation for cardiovascular source of embolus with no identified noncardiac source	A
110	Evaluation for cardiovascular source of embolus with a previously identified noncardiac source	I
111	Evaluation for cardiovascular source of embolus with a known cardiac source in which a TEE would not change management	I
	Atrial Fibrillation/Flutter	
112	Evaluation to facilitate clinical decision making with regard to anticoagulation, cardioversion, and/or radiofrequency ablation	A
113	Evaluation when a decision has been made to anticoagulate and not to perform cardioversion	I

Table 11 Stress echocardiography for detection of CAD/Risk assessment: Symptomatic or ischemic equivalent (former table 9)

Evaluation of Ischemic Equivalent (Nonacute) With Stress Echocardiography		
114	Low pretest probability of CAD ECG interpretable and able to exercise	I
115	Low pretest probability of CAD ECG uninterpretable or unable to exercise	A
116	Intermediate pretest probability of CAD ECG interpretable and able to exercise	A
117	Intermediate pretest probability of CAD ECG uninterpretable or unable to exercise	A
118	High pretest probability of CAD Regardless of ECG interpretability and ability to exercise	A

Table 12 Stress echocardiography for risk assessment: Perioperative evaluation for noncardiac surgery without active cardiac conditions (former table 13)

Low-Risk Surgery With Stress Echocardiography		
154	Perioperative evaluation for risk assessment	I
Intermediate-Risk Surgery With Stress Echocardiography		
155	Moderate to good functional capacity (≥ 4 METs)	I
156	No clinical risk factors	I
157	≥ 1 clinical risk factor Poor or unknown functional capacity (< 4 METs)	U
158	Asymptomatic < 1 y post normal catheterization, noninvasive test, or previous revascularization	I
Vascular Surgery With Stress Echocardiography		
159	Moderate to good functional capacity (≥ 4 METs)	I
160	No clinical risk factors	I
161	≥ 1 clinical risk factor Poor or unknown functional capacity (< 4 METs)	A
162	Asymptomatic < 1 y post normal catheterization, noninvasive test, or previous revascularization	I

Table 13 Stress echocardiography for assessment of viability/ischemia (former table 16)

Ischemic Cardiomyopathy/Assessment of Viability With Stress Echocardiography		
176	Known moderate or severe LV dysfunction Patient eligible for revascularization Use of dobutamine stress only	A

Table 14 Stress echocardiography for hemodynamics (includes doppler during stress) (former table 17)

Chronic Valvular Disease—Asymptomatic With Stress Echocardiography		
177	Mild mitral stenosis	I
178	Moderate mitral stenosis	U
179	Severe mitral stenosis	A
180	Mild aortic stenosis	I
181	Moderate aortic stenosis	U
182	Severe aortic stenosis	U
183	Mild mitral regurgitation	I
184	Moderate mitral regurgitation	I
185	Severe mitral regurgitation LV size and function not meeting surgical criteria	U
186	Mild aortic regurgitation	I
187	Moderate aortic regurgitation	I
188	Severe aortic regurgitation LV size and function not meeting surgical criteria	U
Chronic Valvular Disease—Symptomatic With Stress Echocardiography		
189	Mild mitral stenosis	U
190	Moderate mitral stenosis	A
191	Severe mitral stenosis	I
192	Severe aortic stenosis	I
193	Evaluation of equivocal aortic stenosis Evidence of low cardiac output or LV systolic dysfunction (“low gradient aortic stenosis”) Use of dobutamine only	A
194	Mild mitral regurgitation	U
195	Moderate mitral regurgitation	A
196	Severe mitral regurgitation Severe LV enlargement or LV systolic dysfunction	I
Acute Valvular Disease With Stress Echocardiography		
197	Acute moderate or severe mitral or aortic regurgitation	I
Pulmonary Hypertension With Stress Echocardiography		
198	Suspected pulmonary artery hypertension Normal or borderline elevated estimated right ventricular systolic pressure on resting echocardiographic study	U
199	Routine evaluation of patients with known resting pulmonary hypertension	I
200	Re-evaluation of patient with exercise-induced pulmonary hypertension to evaluate response to therapy	U

Table 13 Contrast use in TTE/TEE or stress echocardiography (former table 18)

201	Routine use of contrast All LV segments visualized on noncontrast images	I
202	Selective use of contrast ≥2 contiguous LV segments are not seen on noncontrast images	A