

VA/DoD Cardiovascular Clinical Practice Guidelines

PROVIDER REFERENCE CARDS

Diagnosis and Management of Dyslipidemia - Update 2006

Diagnosis and Management of Hypertension - Update 2004

Management of Ischemic Heart Disease

Pharmacologic Management of Chronic Heart Failure - Update 2007

Pharmacotherapy for Cardiovascular Diseases in Primary Care

VA/DoD Clinical Practice Guidelines for the Diagnosis and Management of Dyslipidemia

Key Points, Update 2006

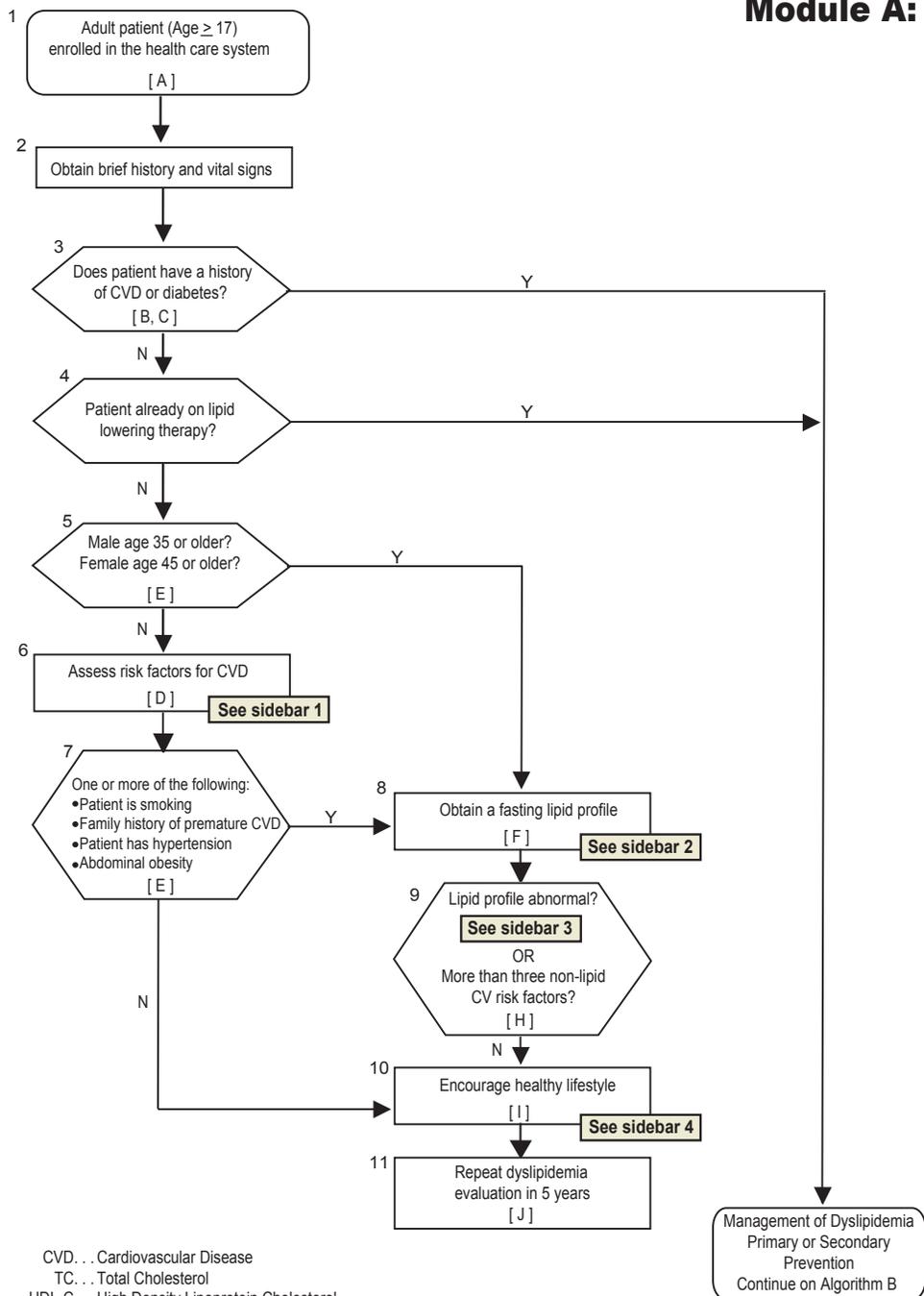
1. Base recommendations on high quality evidence with a focus on interventions that improve clinically significant patient-centered outcomes.
2. Address primary and secondary prevention of coronary disease.
3. Use specific screening criteria to identify the patient with dyslipidemia who is most likely to benefit from appropriate intervention.
4. Incorporate global cardiovascular risk assessment to guide treatment for dyslipidemia.
5. Use lipid lowering therapies to reduce cardiovascular risk and events that include:
 - a. Evidence driven rationale for medication choices
 - b. Lifestyle modification and diet with appropriate intensity
6. Manage modifiable cardiovascular risks, not just dyslipidemia.
7. Define treatment goals.
8. Clarify contribution of triglycerides (TG) and HDL-C to cardiovascular disease (CVD) risk.



MANAGEMENT OF DYSLIPIDEMIA

A

Module A: Screening



Sidebar 1

Non-Lipid CV Risk Factors [D]

Age
 Male Gender
 Family history of premature CVD
 Hypertension
 Smoking
 Diabetes mellitus
 Abdominal obesity

Sidebar 2

Lipid Profile Test [G]

- TC/HDL/TG can be measured directly, LDL-C value is calculated by formula and may be inaccurate in high TG
- Consider direct LDL measurement if TG > 400 mg/dL and cannot be reduced with diet and exercise

Sidebar 3

Screening Threshold Levels [H]

Total cholesterol	≥ 240 mg/dL
HDL cholesterol	< 40 mg/dL
Triglycerides	≥ 200 mg/dL
LDL cholesterol	≥ 130 mg/dL

Sidebar 4

Healthy Lifestyle Modification [I]

Smoking cessation
 Healthy diet
 Increase physical activity
 Weight loss, if indicated
 Reduce excessive alcohol use

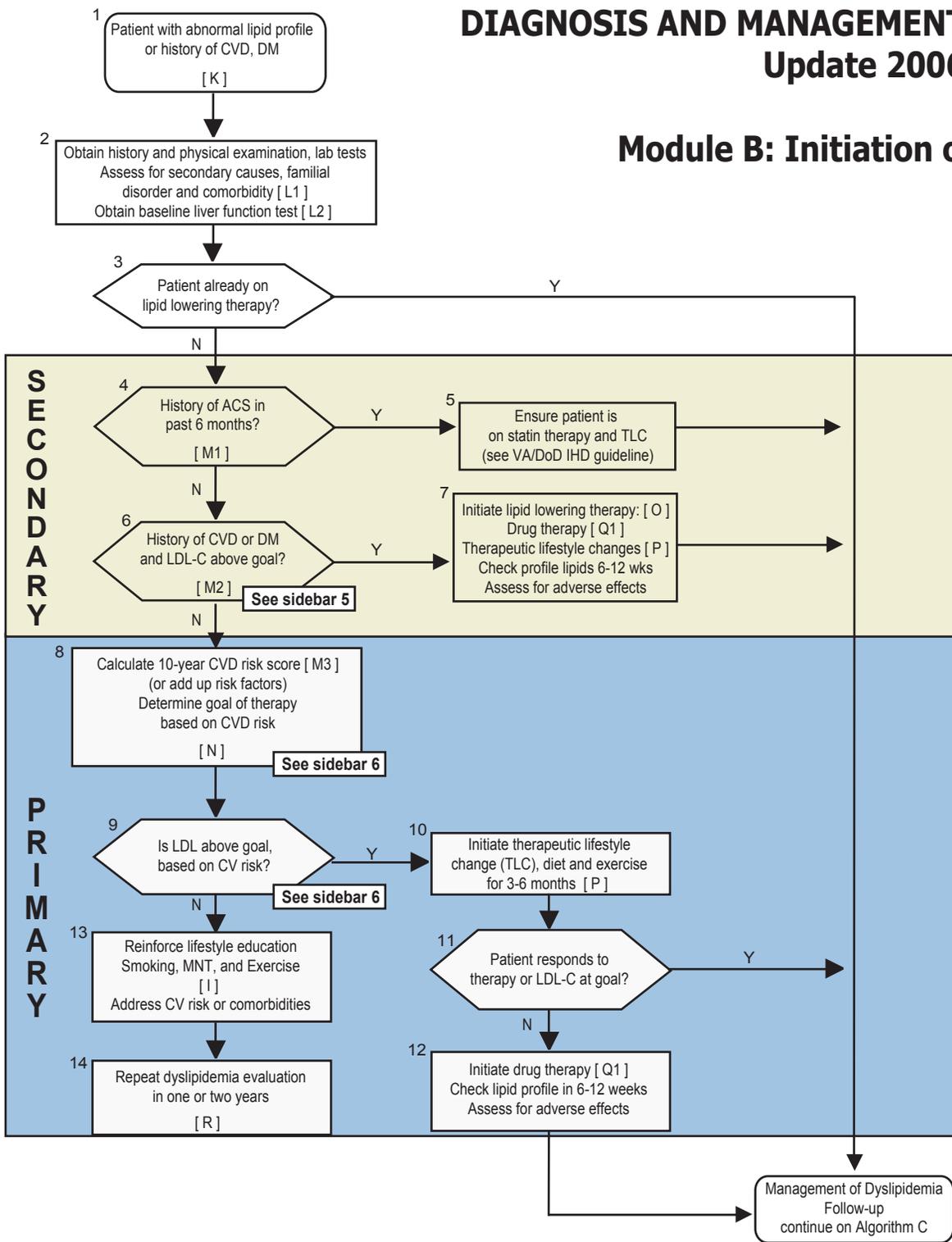
DIAGNOSIS AND MANAGEMENT OF DYSLIPIDEMIA

Update 2006

B

Module B: Initiation of Therapy

CVD. . . Cardiovascular Disease
 DM. . . Diabetes Mellitus
 MNT. . . Medical Nutrition Therapy
 TLC. . . Therapeutic Lifestyle Changes
 HDL-C. . . High Density Lipoprotein Cholesterol
 LDL-C. . . Low Density Lipoprotein Cholesterol
 TG. . . Triglycerides



SECONDARY

PRIMARY

Sidebar 5 Lipid Lowering Therapy in Patients with CVD or CVD Equivalent (Secondary Prevention)

	TLC	LDL-C (mg/dl) Drug	Goal
Recent ACS	All	All	<100*
CVD	All	≥100	<100
DM no RF	All	≥130**	<130

* Optional <70 mg/dL
 ** Optional 100-129 mg/dL

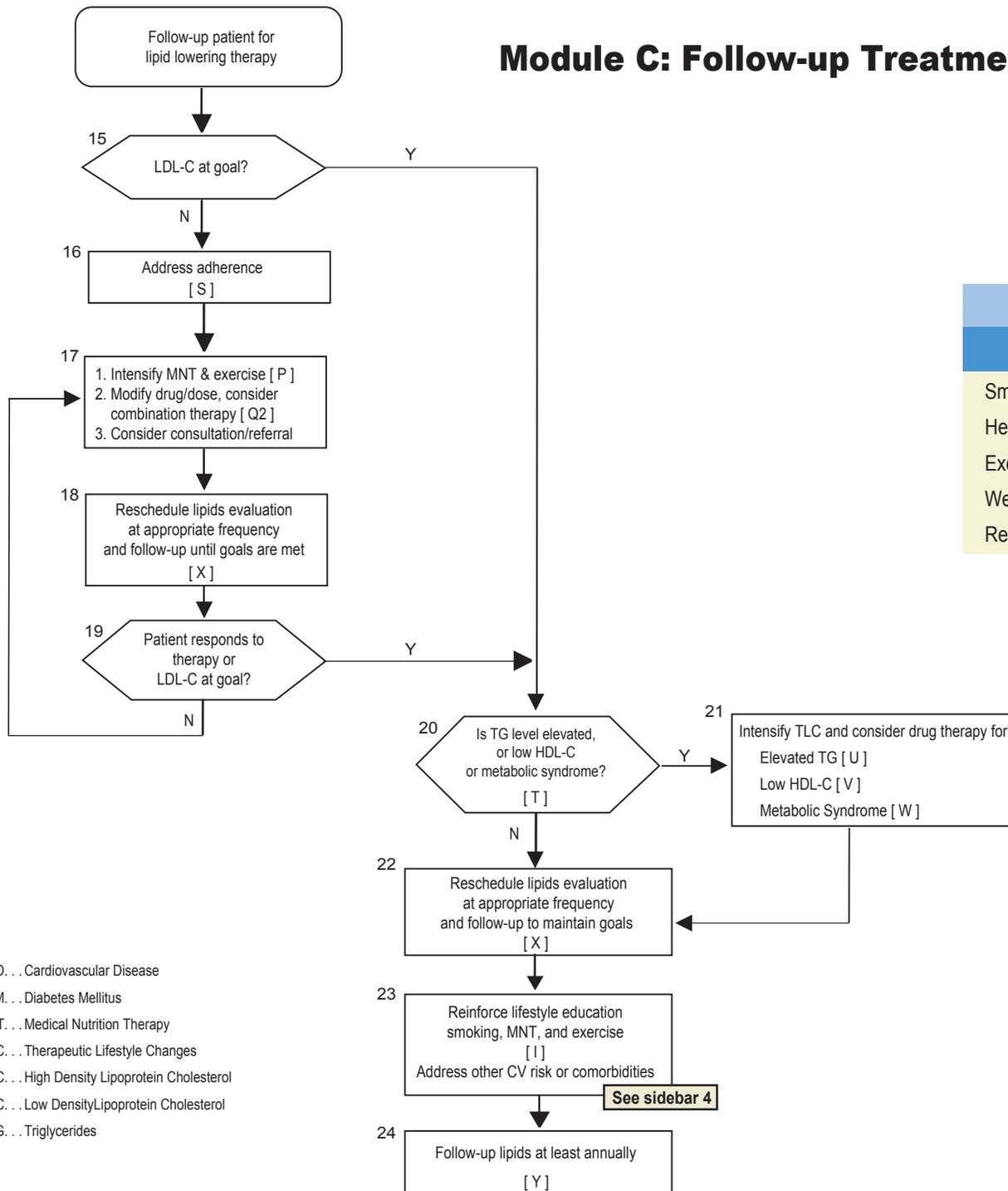
Sidebar 6 Lipid Lowering Therapy in Patients based on 10-year CV risk (Primary Prevention)

Risk	10-year Risk	TLC	Drug	Goal
High >2+RF	>20%	All	≥130*	<100
Mod >2+RF	15-20%	All	≥130	<130
2+RF	10-14%	All	≥160	<130
Low 0-1 RF	<10%	All	≥190	<160

* (or HDL-C < 40) Optional LDL-C 100-129



Module C: Follow-up Treatment



Sidebar 4 Healthy Lifestyle Modification

- Smoking cessation
- Healthy diet
- Exercise/physical activity
- Weight loss, if indicated
- Reduce excessive alcohol use

CVD... Cardiovascular Disease
 DM... Diabetes Mellitus
 MNT... Medical Nutrition Therapy
 TLC... Therapeutic Lifestyle Changes
 HDL-C... High Density Lipoprotein Cholesterol
 LDL-C... Low Density Lipoprotein Cholesterol
 TG... Triglycerides

Ten-Year Risk Estimates for Coronary Heart Disease for Men and Women (Framingham Point Scores)

Men Estimate of 10-Y ear Risk for Men

(Framingham Point Scores)

Age	Points
20-34	-9
35-39	-4
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	11
70-74	12
75-79	13

Total Cholesterol of	Points			
	Age 20-39	Age 40-49	Age 50-59	Age 60-69
<160	0	0	0	0
160-199	4	3	2	1
200-239	7	5	3	1
240-279	9	6	4	2
³ 280	11	8	5	3

Total Cholesterol of	Points			
	Age 20-39	Age 40-49	Age 50-59	Age 60-69
<160	0	0	0	0
160-199	4	3	2	1
200-239	7	5	3	1
240-279	9	6	4	2
³ 280	11	8	5	3

HDL (mg/dL)	Points
³ 60	-1
50-59	0
40-49	1
<40	2

Systolic BP (mmHg)	Points	
	If Untr. eated	If T.reated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
³ 160	2	3

Point T. total	10-Year Risk-%
<0	<1
0	1
1	1
2	1
3	1
4	1
5	2
6	2
7	3
8	4
9	5
10	6
11	8
12	10
13	12
14	16
15	20
16	25
³ 17	30

10-Year risk _____%

Women Estimate of 10-Y ear Risk for Women

(Framingham Point Scores)

Age	Points
20-34	-7
35-39	-3
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	12
70-74	14
75-79	16

Total Cholesterol of	Points			
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Point T. total	10-Year Risk-%
<9	<1
9	1
10	1
11	1
12	1
13	2
14	2
15	3
16	4
17	5
18	6
19	8
20	11
21	14
22	17
23	22
24	27
³ 25	30

10-Year risk _____%



VA/DoD Clinical Practice Guideline for the Diagnosis and Management of Hypertension

Level A Recommendations

(update 2004)

RECOMMENDATIONS WITH THE HIGHEST EVIDENCE: The highest evidence for recommendations is **A**, defined as “a strong recommendation based on randomized controlled trials that the intervention is always indicated and acceptable.”

The following practices are strongly recommended based on evidence reviews:

1. Blood pressure should be measured with a technique using a properly calibrated and validated instrument **[R=A]**
2. Blood pressure measurement can identify adults at increased risk for cardiovascular (CV) disease due to high blood pressure **[R=A]**
3. The treatment of high blood pressure substantially decreases the incidence of cardiovascular disease and causes few major harms **[R=A]**

Drug Therapy:

4. **Thiazide-type diuretics** are recommended as first line therapy for drug treatment of hypertension either as monotherapy or in combination with other agents. **[R=A]**
5. The following may be used as alternative or supplementary therapy:
 - a. Angiotensin-Converting Enzyme Inhibitors (ACEIs) **[R=A]**
 - b. Angiotensin II Receptor Blockers (ARBs) **[R=A]**
 - c. Beta-blockers (BBs) **[R=A]**
 - d. Long-acting calcium channel blockers (CCBs)**[R=A]**

Other Supplemental Agents:

6. **Reserpine** can be used as supplemental therapy when other agents are not providing clinical adequate response **[R=A]**

7. Adjust Therapy

- a. If a thiazide-type diuretic is not chosen as the initial drug, it should be used as the second agent, unless contraindicated or not tolerated, because it frequently enhances the effects of the initial agent and has the best cardiovascular outcome data. **[R=A]**
- b. When using combination therapy, select those agents that have been shown to reduce morbidity and mortality. **[R=A]**

Key Points

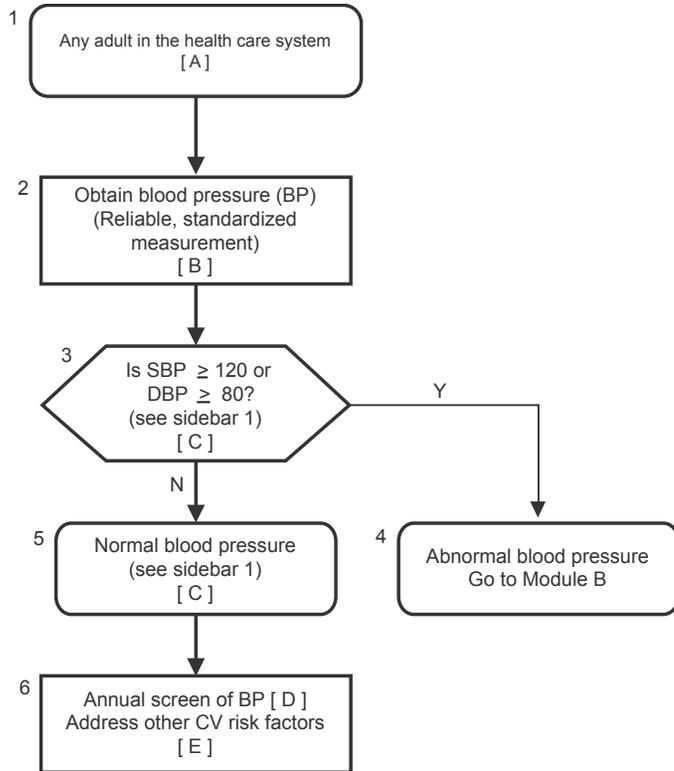
(update 2004)

1. Screen blood pressure (BP) in adults annually since BP rises with increasing age.
2. Encourage patients with prehypertension to engage in lifestyle changes to reduce risk of proceeding to hypertension.
3. Explain to patients that blood pressure control reduces cardiovascular risks over a lifetime.
4. Once hypertension is diagnosed, take aggressive action to reduce blood pressure.
5. Include lifestyle modifications for all patients, as appropriate.
6. Use thiazide-type diuretics, alone or in combination with other agents, as first line therapy.
7. Choose other agents based on evidence for reduction of mortality and morbidity. These agents include (in alphabetical order): angiotensin-converting enzyme inhibitors (ACEIs), angiotensin II receptor blockers (ARBs) beta-blockers, and long-acting calcium channel blockers.
8. Strongly consider starting therapy with a combination of 2 drugs for patients with Stage 2 hypertension.
9. Target blood pressure goals appropriately for each patient and titrate therapy to achieve that goal through:
 - a. Informing patients about their blood pressure (BP) goal
 - b. Following-up closely until goal achieved
 - c. Adjusting medication as necessary at each visit
 - d. Keeping the medication regimen as simple as possible
 - e. Educating and involving patients in their care plan
 - f. Using ancillary staff and available programs to support and help in reaching target goal



VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE DIAGNOSIS AND MANAGEMENT OF HYPERTENSION

Module A: Screening for Elevated Blood Pressure



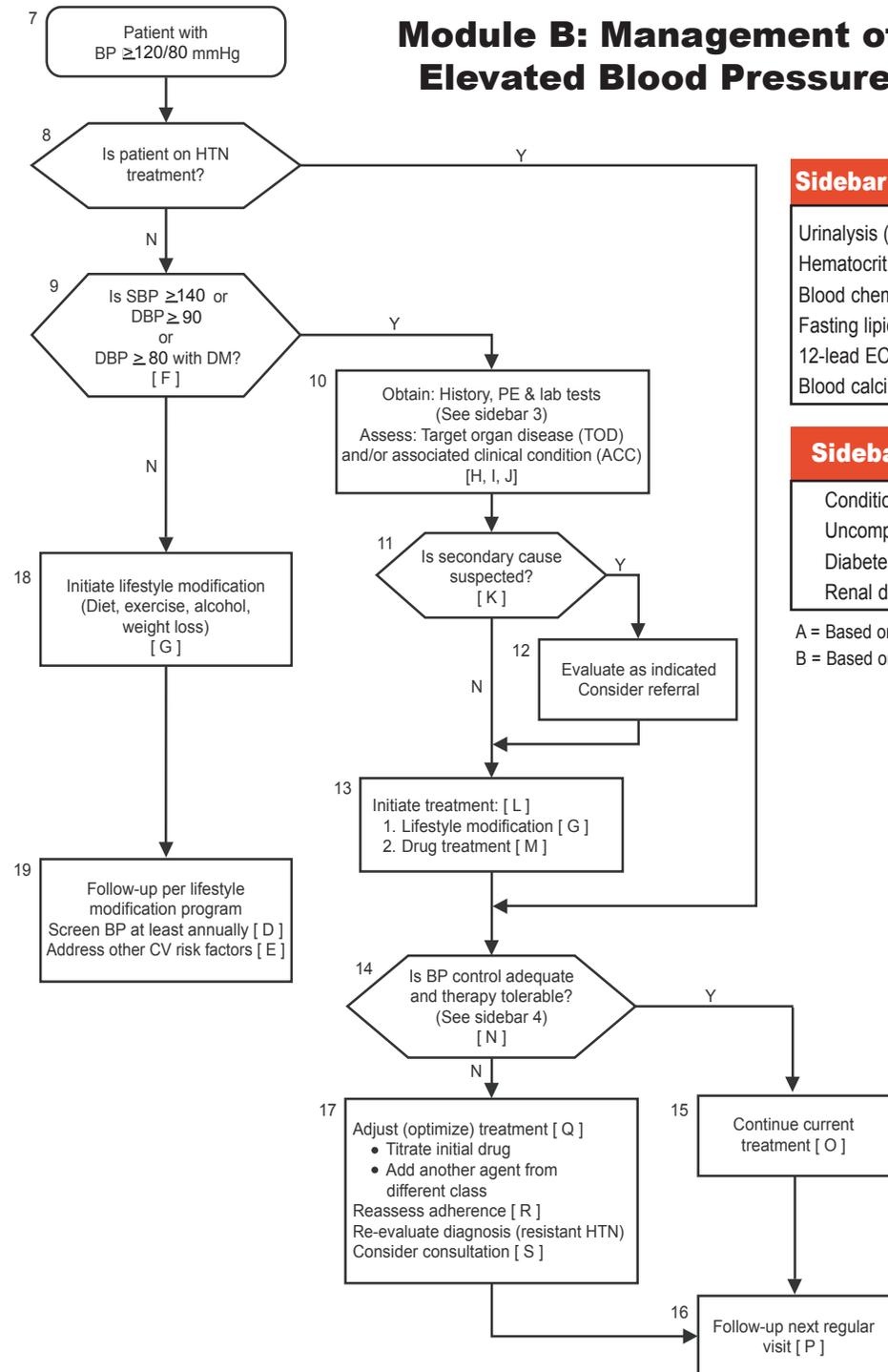
Sidebar 1: Classification

	SBP	and	DBP
Normal	<120		<80
Prehypertension	120-139		80-89
Hypertension			
Stage 1	140-159	or	90-99
Stage 2	≥160	or	≥100

Sidebar 2: Confirmation initial measurement

Stage 1: Confirm within 2 months
Stage 2: Evaluate or refer within 1 month

Module B: Management of Elevated Blood Pressure



Sidebar 3: Recommended Lab Tests

Urinalysis (UA)
Hematocrit (Optional)
Blood chemistry (K, na, BUN, Cr, FBS)
Fasting lipid profile
12-lead ECG
Blood calcium (Optional)

Sidebar 4: Target Values for BP

Condition	Target
Uncomplicated HTN	<140 ^A /90 ^A
Diabetes	<140/80 ^A
Renal disease	<140/90 ^A

A = Based on RCTs

B = Based on epidemiological data

Abbreviations

BUN: Blood urea nitrogen
Cr: Creatinine
DBP: Diastolic blood pressure
FBS: Fasting blood glucose
K: Potassium
na: Sodium
PE: Physical examination
RCTs: Randomized control trials
SBP: Systolic blood pressure

Obtain Accurate Blood Pressure

1. Blood pressure should be measured with a technique using a properly calibrated and validated instrument:

- Patient should be seated quietly for 5 minutes with back supported, feet on the floor and arm bared, unrestricted by clothing, and supported at heart level. Measurement of BP in the standing position may be indicated for patients at risk for postural hypotension or at the discretion of the clinician.
- Smoking, exercise, or caffeine ingestions should not have occurred within 30 minutes prior to the BP measurement.
- The appropriate blood pressure cuff size should be chosen for the patient. The cuff should be wrapped snugly around the arm with the bladder centered over the brachial artery. The bladder should encircle at least 80% of the arm.

For Auscultatory Measurement Only:

- Palpated radial pulse obliteration pressure should be used to estimate the systolic BP (SBP). The cuff should then be inflated 20-30 mm Hg above this level for the auscultatory determinations.
- Position the stethoscope over the brachial artery and rapidly inflate the cuff. Deflate the cuff at a rate of 2 to 3 mm Hg per second, listening for Phase 1 and Phase 5 Korotkoff sounds. The first appearance of sound (Phase 1) is used to record the SBP. Phase 5, at the disappearance of sound is diastolic BP (DBP) in adults. Listen 10 to 20 mm Hg below Phase 5 for any further sound then deflate the cuff completely.
- The BP should be recorded in even numbers with the patient's position, arm used, and cuff size documented.
- BP readings should be repeated in the same arm and averaged, if different. Two minutes should elapse before repeating the BP measurement. If the readings differ by more than 5 mm Hg, additional measurements should be obtained.

2. Measurements can be taken with a mercury sphygmomanometer, but a recently calibrated aneroid manometer or a validated electronic device is an acceptable alternative.



VA/DoD Clinical Practice Guideline for the Management of Ischemic Heart Disease

Core Module Key Points

INITIAL EVALUATION AND TRIAGE

- Triage patient with possible acute myocardial infarction (MI) or unstable angina for evaluation and treatment
- Initiate O₂, intravenous access and continuous electrocardiogram (ECG) monitoring
- Obtain 12-lead ECG
- Institute advanced cardiac life support, if indicated
- Perform expedited history and physical to:
 - R/O alternative catastrophic diagnoses (pericarditis, pericardial tamponade, thoracic aortic dissection, pneumothorax, pancreatitis, and pulmonary embolus)
 - Elicit characteristics of MI
 - Determine contraindications to reperfusion therapy
- Administer the following:
 - Non-coated aspirin (160 to 325 mg)
 - Nitroglycerin (spray or tablet, followed by IV, if symptoms persist)
 - Beta-blockers in the absence of contraindications
- Determine if patient meets criteria for emergent reperfusion therapy:
 - History of discomfort consistent with ischemia or infarction

AND

- ECG finding of ongoing ST-segment elevation in 2 or more leads or left bundle branch block
- Ensure adequate analgesia (morphine, if needed)
- Obtain serum cardiac markers (troponin or CK-MB)
- Identify and treat other conditions that may exacerbate symptoms

RISK STRATIFICATION: NON-INVASIVE EVALUATION (CARDIAC STRESS TEST)

Indications for Non-Invasive Evaluation:

- Establish or confirm a diagnosis of ischemic heart disease
- Estimate prognosis in patients with known or suspected IHD
- Assess the effects of therapy

Patients with contraindications to exercise testing should undergo pharmacologic stress testing with an imaging modality

Establishing diagnoses:

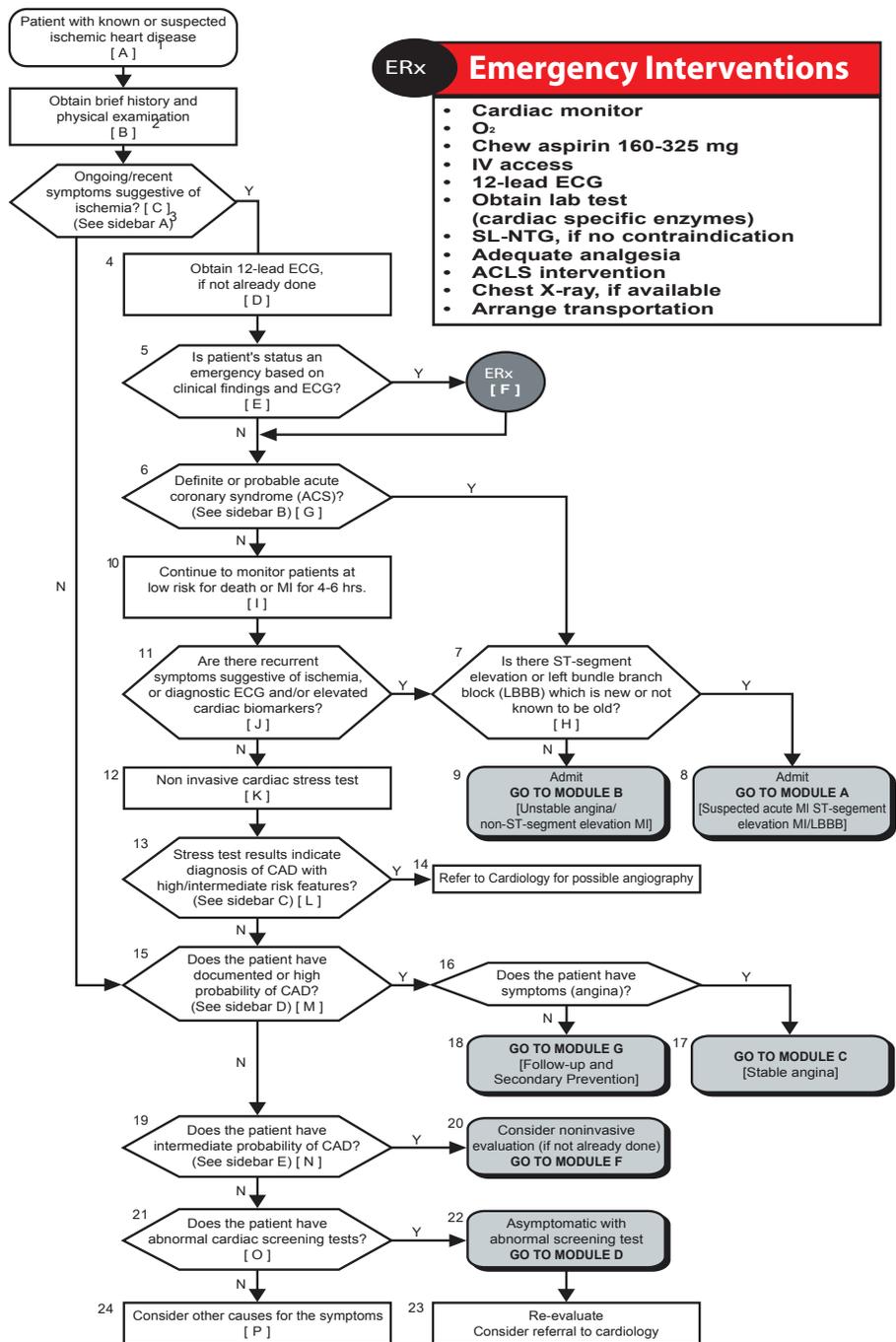
- Is most useful if the pre-test probability of coronary artery disease (CAD) is intermediate (10% to 90%)
- Should generally not be done in patients with very high or very low probabilities of CAD

Variables useful in estimating prognosis include:

- Maximum workload achieved
- Heart rate and blood pressure responses to exercise
- Occurrence, and degree of ST-segment deviation
- Occurrence and duration of ischemic symptoms
- Size and number of stress-induced myocardial perfusion or wall motion abnormalities

MANAGEMENT OF ISCHEMIC HEART DISEASE

Core Module: Initial Evaluation / Triage



ERx

Emergency Interventions

- Cardiac monitor
- O₂
- Chew aspirin 160-325 mg
- IV access
- 12-lead ECG
- Obtain lab test (cardiac specific enzymes)
- SL-NTG, if no contraindication
- Adequate analgesia
- ACLS intervention
- Chest X-ray, if available
- Arrange transportation

Sidebar A (Box 3): Symptoms/Signs Suggesting Ischemia

- Chest pain or severe epigastric pain, nontraumatic in origin, characterized by:
 - Central/substernal compression or crushing chest pain/discomfort
 - Pressure, tightness, heaviness, cramping, burning, aching sensation
 - Unexplained indigestion, belching, epigastric pain
 - Radiating pain in neck, jaw, shoulders, back, or arm(s)
- Associated dyspnea
- Associated nausea and/or vomiting
- Associated diaphoresis

Sidebar B (Box 6): Acute Coronary Syndrome

Any item of LIST A, OR
One item from both LIST B and LIST C

LIST A

- ST-elevation or LBBB and recent (<24 hr) or ongoing angina
- New, or presumably new ST-segment depression (>0.05 mV) or T-wave inversion (>0.2 mV) with rest symptoms
- Elevated biomarkers (i.e., troponin I, troponin T, and CK-MB)

LIST B

- Prolonged (>20 min.) chest, arm, or neck discomfort
- New onset chest, arm, or neck discomfort during minimal exertion or ordinary activity (CCS class III or IV)
- Previously documented chest, arm, or neck discomfort which has become distinctly more frequent, longer in duration, or lower in precipitating threshold (i.e., increased by one CCS class or more to at least CCS class II)

LIST C

- Typical or atypical angina
- Male age >40 or female age >60
- Known CAD
- Heart failure, hypotension, or transient mitral regurgitation by examination
- Diabetes mellitus
- Documented extracardiac vascular disease
- Pathologic Q-waves on ECG
- Abnormal ST-segment or T-wave abnormalities not known to be new

Sidebar C (Box 13): Cardiac Stress Test: High or Intermediate Risk for Cardiac Event

HIGH

- Duke treadmill score ≤-11 (estimated annual mortality >3%)
- Large, stress-induced perfusion defect
- Stress-induced, multiple perfusion defects of moderate size
- Large, fixed perfusion defect with LV dilation or increased lung uptake (thallium-201)
- Stress-induced, moderate perfusion defect with LV dilation or increased lung uptake (thallium-201)
- Echocardiographic wall motion abnormality involving >2 segments at ≤10 mg/kg/min dobutamine or HR <120/min

INTERMEDIATE

- Mild/moderate resting left ventricular dysfunction (LVEF = 0.35 to 0.49)
- Intermediate-risk Duke treadmill score (greater than -11 and less than 5)
- Stress-induced moderate perfusion defect without LV dilation or increased lung uptake (thallium-201)
- Limited stress echocardiographic ischemia with wall motion abnormality only at higher doses of dobutamine involving ≤ two segments

Sidebar D (Box 15): Definite or High Probability of CAD

- Typical angina in males age >50 or females age >60
- Prior myocardial infarction or pathologic Q-waves
- Coronary arteriogram with >50% stenosis in >1 vessel(s)
- Prior coronary revascularization (PCI or CABG)
- Left ventricular segmental wall motion abnormality
- Diagnostic evidence of ischemia or infarction on cardiac stress testing

Sidebar E (Box 19): Intermediate Probability of CAD

- Typical angina in female (age <60) male (age <50)
- Atypical/probable angina in male of any age
- Atypical/probable angina in female age >60
- Noncardiac chest pain in male (age >40) female (age >60)
- Indeterminate finding on cardiac stress testing



Acute Myocardial Infarction (ST-Segment Elevation MI)

For patients who meet criteria for emergent reperfusion therapy

- Admit to an intensive care unit or transfer to facility with interventional cardiology for emergent reperfusion as indicated
- Initiate heparin, low-molecular weight heparin, or coumadin, if indicated
- Initiate IV beta-blocker followed by oral
- Initiate ACE inhibitor therapy in the absence of contraindications

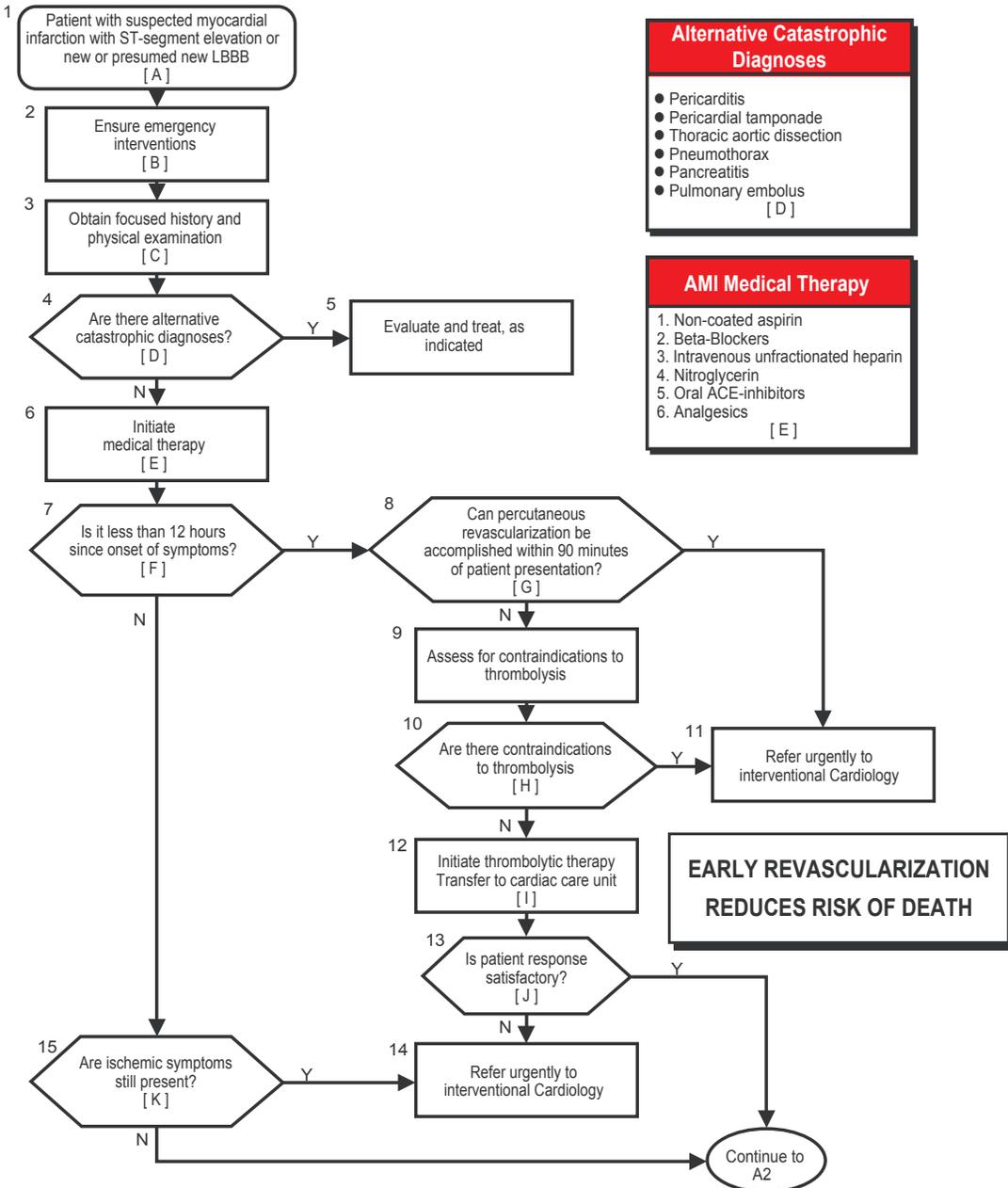
If less than 12 hours from onset of symptoms:

- ◆ **Refer to Percutaneous Coronary Intervention (PCI) if intervention can be performed within 90 minutes of presentation**
- ◆ **Initiate thrombolytic therapy if not contraindicated and not referred for direct PCI**
- ◆ **Refer to PCI if thrombolytic therapy is contraindicated or response to thrombolysis is unsatisfactory**
- Consider non-invasive evaluation (cardiac stress test)
- Refer to cardiology if at high-risk for death or recurrent MI and/or LV dysfunction
- Ensure pharmacological therapy for ischemia, angina, and CHF
- Discharge patient to home with appropriate follow-up

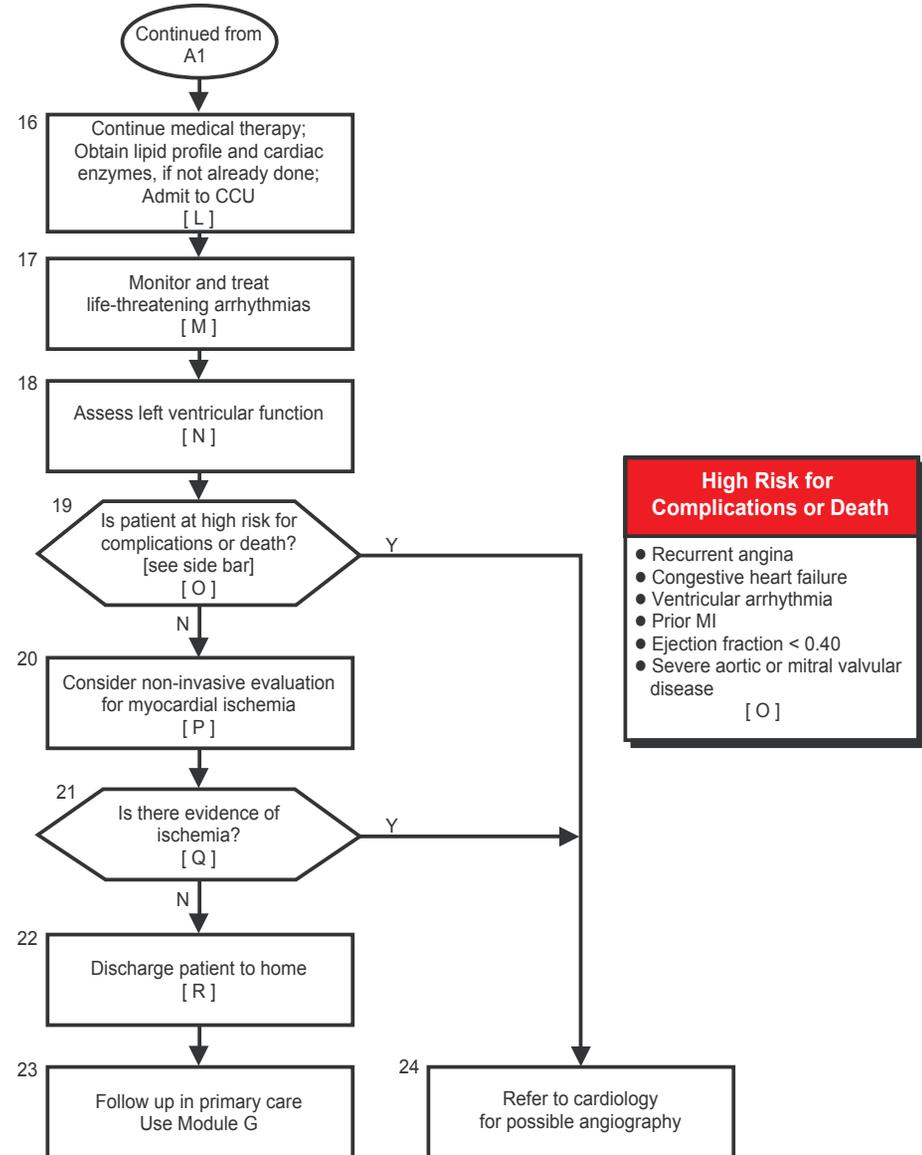
MANAGEMENT OF ISCHEMIC HEART DISEASE

Module A: Suspected Acute Myocardial Infarction (ST-Elevation or LBBB)

A1



A2



VA/DoD Clinical Practice Guideline for the Management of Ischemic Heart Disease

Module B Key Points

Definite/Probably Non-ST-Segment Elevation Acute Coronary Syndrome (ACS) (Unstable Angina/Non-ST-Segment Elevation MI [NSTEMI])

Patients with ACS (UA/NSTEMI) are at high risk for MI or death and are candidates for further aggressive diagnostic and therapeutic interventions that should include:

- Ensure emergency intervention
- Admission to an intensive- or intermediate-care unit
- Immediate cardiac rhythm monitoring
- Therapy directed at stabilizing ischemia (beta-blocker, NTG)
- Risk-stratification to determine prognosis and guide treatment. Assessment for risk of death or MI based on symptoms, level of biomarker (troponin, CK) and ECG
- Antithrombotic therapy tailored to individual risk that should include:
 - ASA
 - Heparin (UFH) or low molecular weight heparin (LMWH)
 - Clopidogrel if intervention is not planned

* **UA/NSTEMI patients should *not* receive reperfusion fibrinolytic therapy**

High-risk patients are candidates for further aggressive diagnostic and therapeutic interventions including:

- Early (i.e., <48 hour) coronary angiography with subsequent revascularization if indicated
- GP IIb/IIIa antagonist in addition to aspirin, heparin and clopidogrel in patients with continuing ischemia or with other high-risk features
- GP IIb/IIIa antagonist may also be used in patients in whom an early invasive strategy is planned
GP IIb/IIIa can be administered just prior to PCI

In patients not undergoing angiography:

Perform non-invasive evaluation (cardiac stress test and left ventricular [LV] function), AND:
If LV function is compromised:

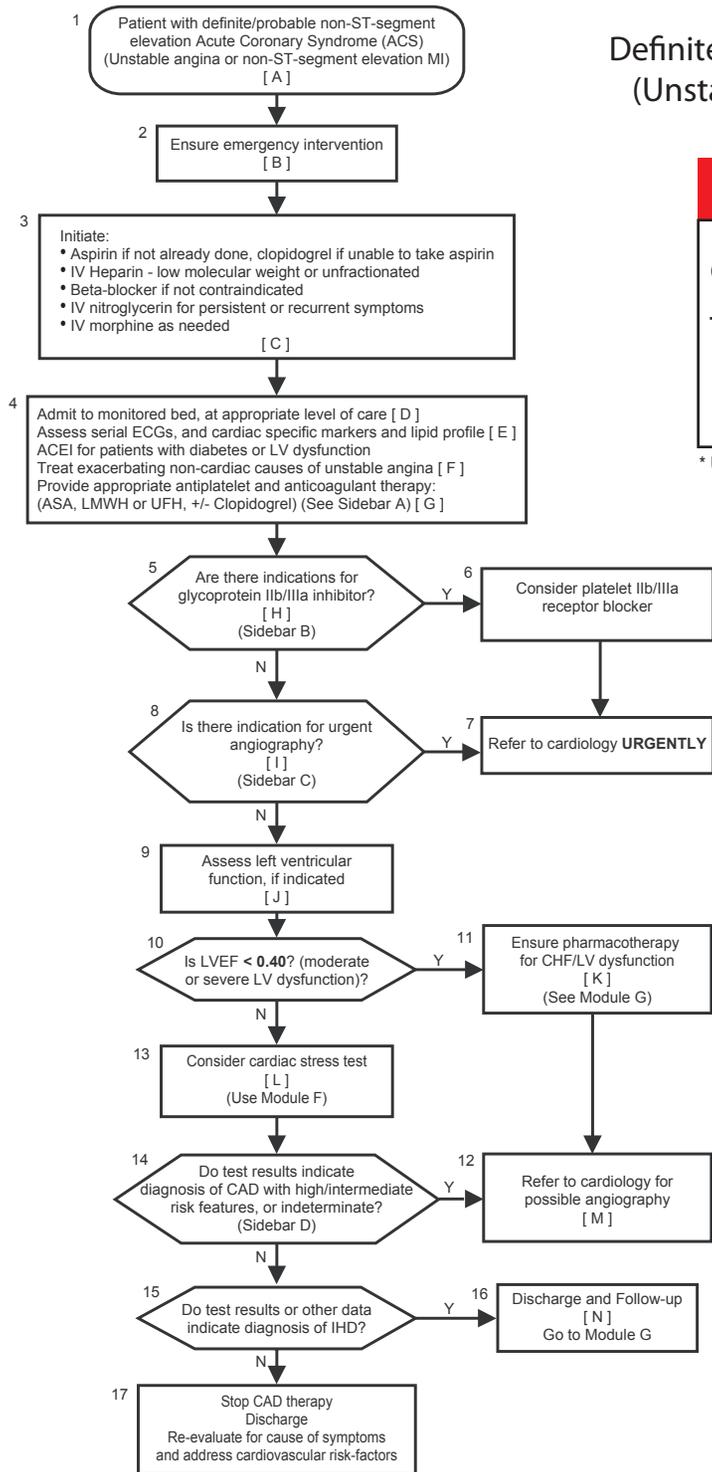
- Ensure pharmacologic therapy for ischemia, angina, and congestive heart failure
- Initiate ACE inhibitor therapy
- Consider referral to cardiology

All patients with suspected, but unproven, unstable angina should have further diagnostic testing to determine the accuracy of the diagnosis. Discharge patient to home with appropriate follow-up.

MANAGEMENT OF ISCHEMIC HEART DISEASE

Module B:

Definite/Probable Acute Coronary Syndrome (Unstable Angina or Non-ST-Elevation MI)



Sidebar A (Box 4) - Antiplatelet and Anticoagulant Therapy

High Risk (Recurrent ischemia or other high risk features)	Moderate Risk (Likely/definite ACS)
Aspirin Clopidogrel* LMWH or UFH GP IIb/IIIa inhibitor	Aspirin Clopidogrel* LMWH or UFH

* Unless angiography is planned

Sidebar B (Box 5) - Indications for IIb/IIIa and Early Invasive Therapy in High Risk Patients

- Recurrent angina/ischemia despite therapy
- Elevated troponin (TnT or TnI)
- New or presumably new ST-segment depression

Sidebar C (Box 8) - Indications for Angiography in Intermediate Risk Patients

- New/recurrent angina/ischemia
- High risk findings on non-invasive testing
- Depressed left ventricular LV systolic function (e.g., ejection fraction (EF) <0.40)
- Hemodynamic instability (e.g., hypotension)
- Sustained ventricular tachycardia
- Previous PCI within 6 months
- Prior CABG

Consider Referral to Cardiology

- Prior myocardial infarction
- New T-wave inversion (>0.2 mV)
- Indeterminate troponin

Sidebar D (Box 14) - Cardiac Stress Test

High-Risk Findings

- Duke treadmill score less than or equal to -11 (estimated annual mortality >3%)
- Large stress-induced perfusion defect
- Stress-induced, multiple perfusion defects of moderate size
- Large fixed perfusion defect with LV dilation or increased lung uptake (thallium 201)
- Stress-induced, moderate perfusion defect with LV dilation or increased lung uptake (thallium-201)
- Echocardiographic wall motion abnormality involving >2 segments at ≤10 mg/kg/min dobutamine or HR <120/min

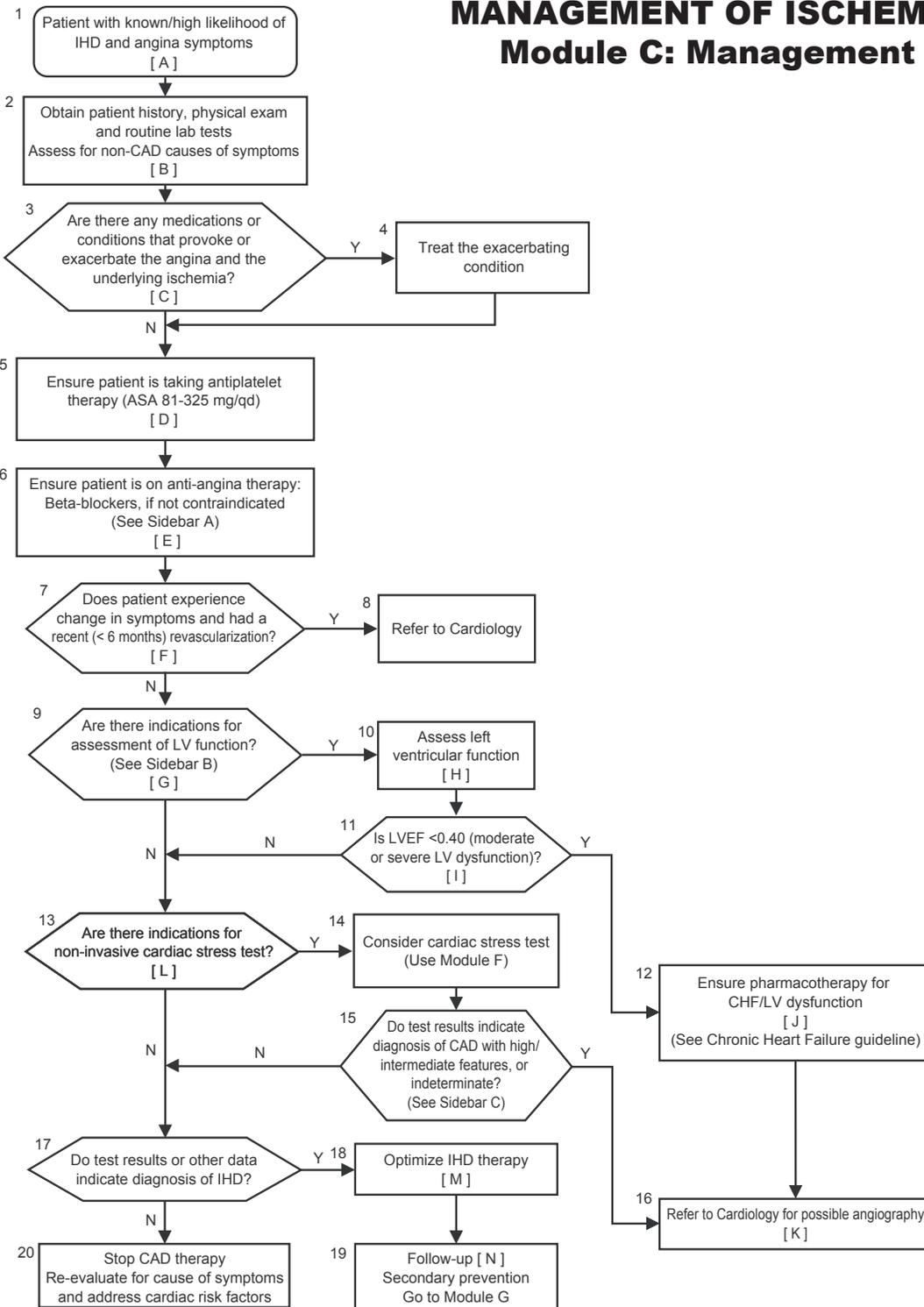
Intermediate-Risk Findings

- Duke treadmill score (greater than -11 and less than 5) (estimated annual mortality 1-3%)
- Moderate stress-induced perfusion defect without LV dilation or increased lung uptake
- Limited stress echocardiographic ischemia with wall motion abnormality involving ≤2 segments at higher doses of dobutamine (>10 mg/kg/min dobutamine)



MANAGEMENT OF ISCHEMIC HEART DISEASE

Module C: Management of Stable Angina



Sidebar A - Anti-Anginal Therapy

Goals of Therapy:

- Perform normal activities
- Maintain symptom level at CCS Class I
- Avoid adverse medication effects
- Maintain blood pressure at <130/85 & pulse <70

Sidebar B - Indication for Assessment of LVF

- Symptoms of CHF (e.g., orthopnea or paroxysmal nocturnal dyspnea)
- Significant impairment or recent decrement in exercise tolerance, due to dyspnea or fatigue
- Physical signs of CHF (e.g., elevated jugular venous pressure, unexplained pulmonary rales, laterally displaced point of maximal impulse, and S3 gallop)
- Cardiomegaly on chest x-ray
- Prior MI

Sidebar C - Cardiac Stress Test

High-Risk Findings

- Duke treadmill score less than or equal to -11 (estimated annual mortality >3%)
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Intermediate-Risk Findings

- Duke treadmill score (greater than -11 and less than 5) (estimated annual mortality 1-3%)
- Moderate stress-induced perfusion defect without LV dilation or increased lung uptake
- Limited stress echocardiographic ischemia with wall motion abnormality involving ≤2 segments at higher doses of dobutamine (>10 mg/kg/min dobutamine)

VA/DoD Clinical Practice Guideline for the Management of Ischemic Heart Disease

Module G Key Points

Management of Medical Follow-up

- Identify and triage IHD patients with a possible acute coronary syndrome (i.e., ST-elevation MI [STEMI], non-ST-elevation MI [NSTEMI], or unstable angina)
- Assess if stable symptoms are due to noncardiac conditions
- Identify and treat other medical conditions that may exacerbate IHD symptoms
- Ensure all patients receive aspirin (or other antiplatelet therapy, as appropriate)
- Titrate pharmacological therapy for ischemia, angina, and congestive heart failure (CHF) to physiologic endpoints, therapeutic doses, or patient tolerance
- Administer a cardiac stress test to assess the risk of future cardiac events, if not previously performed, or if there has been worsening of ischemic symptoms
- Initiate angiotension-converting-enzyme (ACE) inhibitor therapy for patients with significant DM and/or left ventricular (LV) dysfunction (ejection fraction [EF] <0.40). Consider in patients without LV dysfunction
- Identify and provide therapy for patients with heart failure
- Identify patients at high risk for sudden cardiac death or complications for whom cardiology referral is appropriate

Secondary Prevention

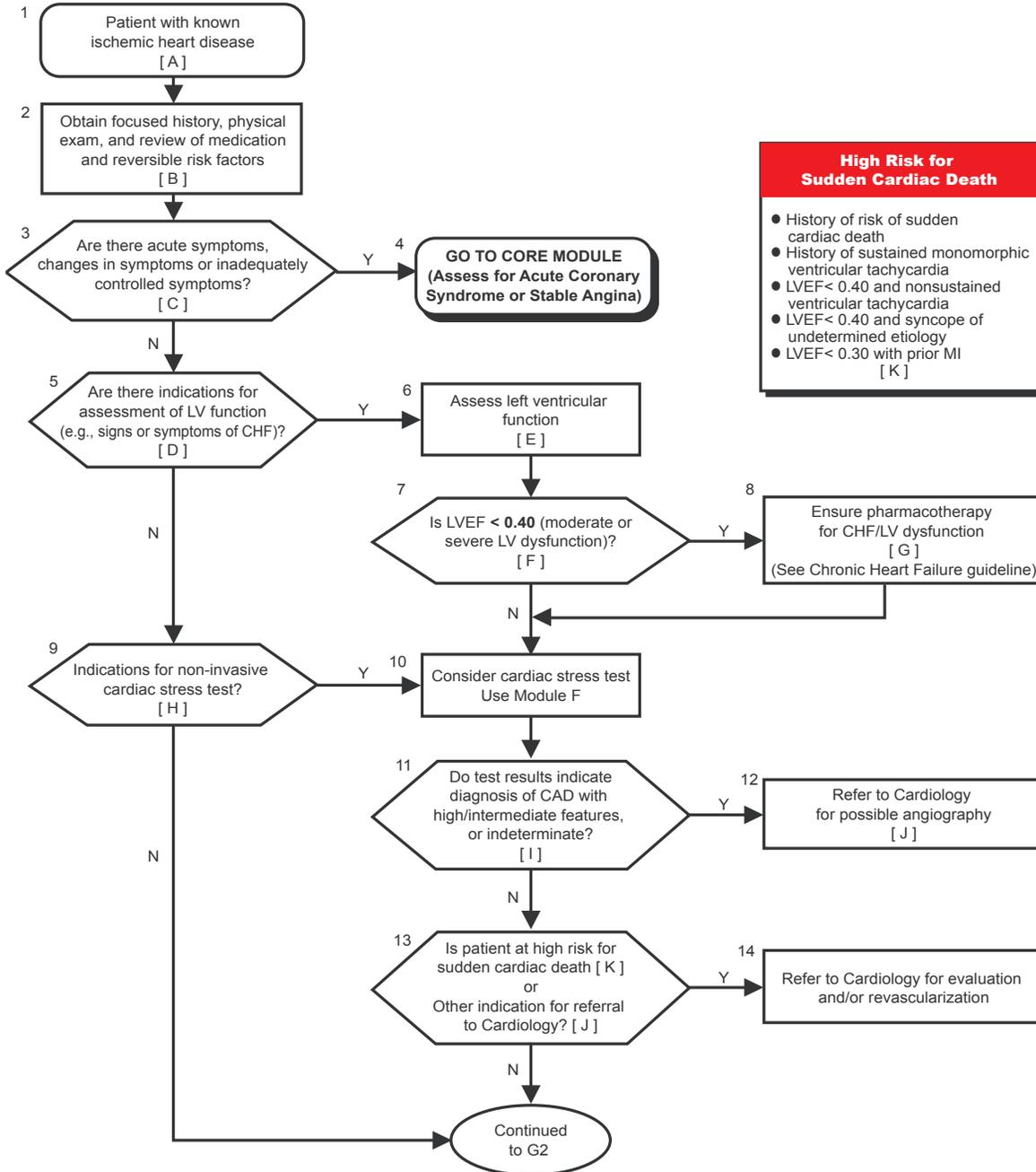
- Assure appropriate treatment with beta-adrenergic blocking agents (beta-blockers) in patients with prior MI
- Identify and treat patients with high low-density-lipoprotein cholesterol (LDL-C)
- Assess and treat high blood pressure
- Reduce cardiac risk with smoking cessation
- Promote cardiac rehabilitation as secondary prevention
- Achieve tight glycemic control in patients with diabetes
- Screen for depression and initiate therapy or refer
- Provide patient education and arrange follow-up



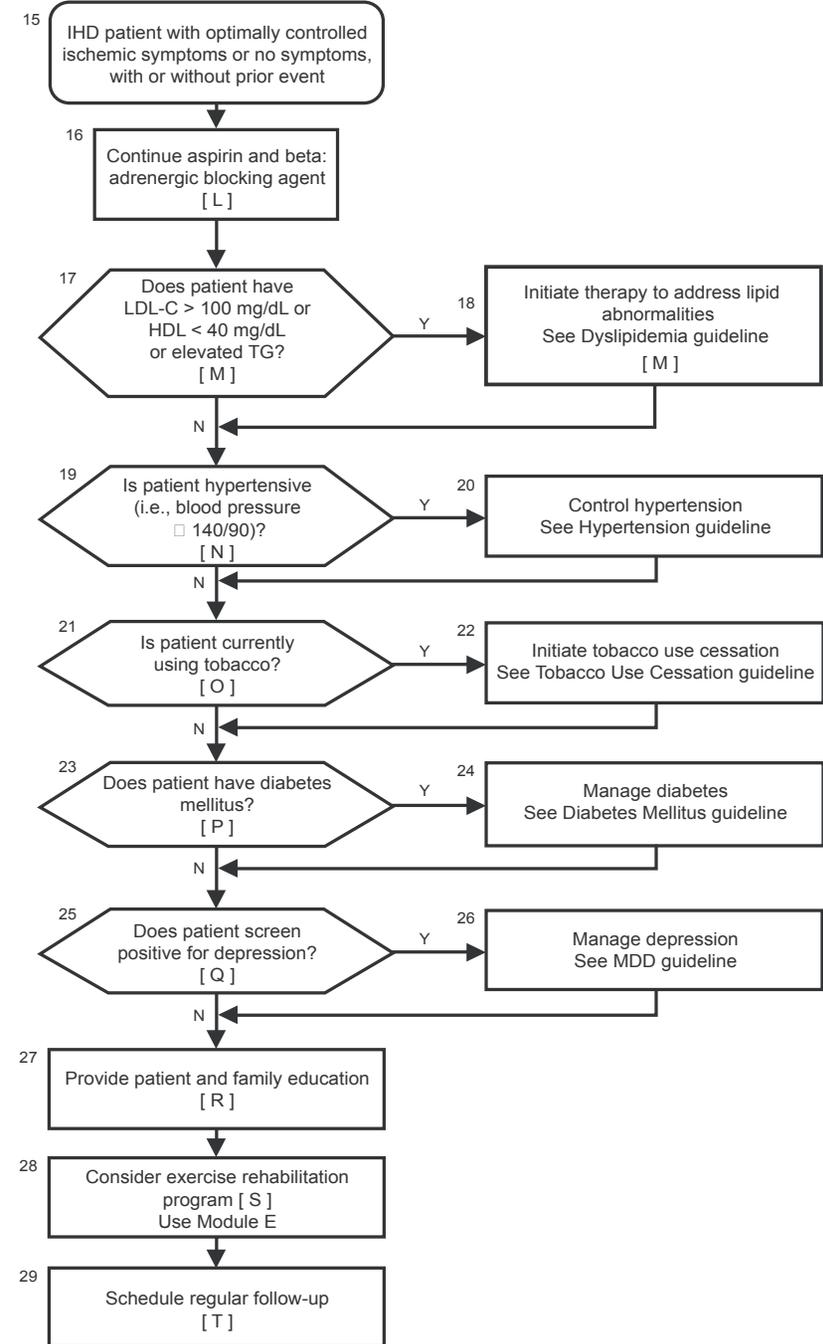
MANAGEMENT OF ISCHEMIC HEART DISEASE

Module G: IHD Follow-Up and Secondary Prevention

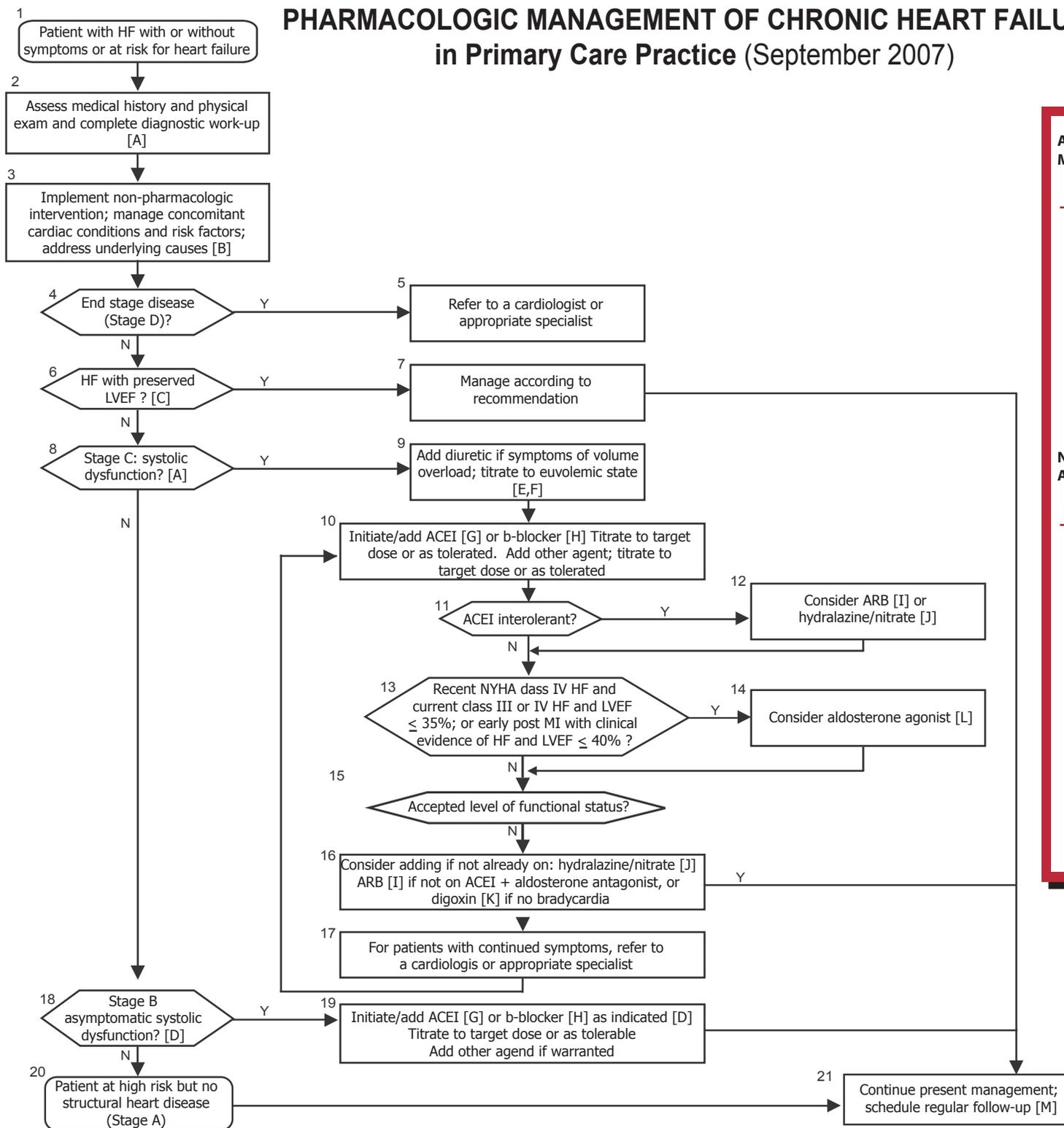
G1



G2



PHARMACOLOGIC MANAGEMENT OF CHRONIC HEART FAILURE in Primary Care Practice (September 2007)



ACC/AHA Guidelines for the Evaluation and Management of HF

Stage Disease Progression

- A** Patients who are high risk for developing HF, but do not have structural heart disease
- B** Patients who have structural damage to the heart, but have not developed symptoms
- C** Patients with past or current HF symptoms and evidence of structural heart damage
- D** Patients with end-stage disease, requiring special interventions

NYHA Functional Classification and Objective Assessment HF

Class Disease Progression

- I** No limitation of physical activity. Ordinary physical activity doesn't cause undue fatigue, palpitation, dyspnea or angina.
- II** Slight limitation of physical activity. Ordinary physical activity results in fatigue, palpitation, dyspnea, or angina.
- III** Marked limitation of physical activity. Comfortable at rest, but less than ordinary physical activity results in fatigue, palpitation, dyspnea, or angina.
- IV** Unable to carry on any physical activity without discomfort. Symptoms are present at rest. With any physical activity, symptoms increase.



VA/DoD Clinical Practice Guideline

The Pharmacologic Management of Chronic Heart Failure Key Points

Executive Summary

1. Treatment of chronic heart failure (HF) is based upon the four-stage classification system developed by the American College of Cardiology/American Heart Association (ACC/AHA) Task Force on Practice Guidelines: Stage A includes patients who are at high risk for developing HF, but do not have structural heart disease; Stage B are patients who do have structural damage to the heart, but have not developed symptoms; Stage C refers to patients with past or current HF symptoms and evidence of structural heart damage; and Stage D includes patients with end-stage disease, requiring special interventions. It is the intent of the ACC/AHA recommendations to be used in conjunction with the New York Heart Association (NYHA) functional classification that estimates the severity of disease based on patient symptoms.
2. Goals of therapy for HF include improving symptoms, increasing functional capacity, improving quality of life, slowing disease progression, decreasing need for hospitalization, and prolonging survival.
3. Nonpharmacologic therapy includes abstaining from alcohol and tobacco, limiting dietary sodium, reducing weight if appropriate, exercising regularly, and influenza and pneumococcal vaccinations. Other nonpharmacologic therapies such as automatic implantable defibrillators or cardiac resynchronization therapy should be considered in appropriate patients but are beyond the scope of this document.
4. Risk factor modification and treatment of concomitant cardiac conditions and underlying causes should be implemented in patients in Stage A to potentially reduce the development of HF.
5. In addition to risk factor modification, patients in Stage B should receive post-myocardial infarction (MI) treatment with an angiotensin-converting enzyme inhibitor (ACEI) and beta-adrenergic blocker, regardless of the presence of left ventricular systolic dysfunction, to prevent future development of HF and improve overall survival (Grade A Recommendation, Good Overall Quality of Evidence). It is also recommended that patients with evidence of left ventricular systolic dysfunction who are without symptoms should be treated with an ACEI (Grade A Recommendation, Good Overall Quality of Evidence) and beta-adrenergic blocker (Grade B Recommendation, Fair Overall Quality of Evidence). An angiotensin II receptor antagonist may be prescribed in patients with a history of MI who have a reduced left ventricular ejection fraction without symptoms of HF if they are ACEI intolerant (Grade A Recommendation, Good Overall Quality of Evidence).

VA/DoD Clinical Practice Guideline

The Pharmacologic Management of Chronic Heart Failure Key Points

Executive Summary (cont.)

6. Patients with HF in Stage C should also be educated on risk factor modification. Pharmacotherapy recommendations for these patients include:

A diuretic should be used in the treatment of patients with signs of fluid overload (Grade B Recommendation, Fair Overall Quality of Evidence).

All patients should be treated with an ACEI unless contraindicated or not tolerated (Grade A Recommendation, Good Overall Quality of Evidence). These agents improve HF symptoms, functional status, and quality of life, while decreasing frequency of hospitalization and mortality. An angiotensin II receptor antagonist may be considered as an alternative to an ACEI (in patients who are on standard therapy for HF) and are unable to tolerate an ACEI (Grade A Recommendation, Good Overall Quality of Evidence).

A beta-adrenergic blocker that has proven to reduce mortality (i.e., bisoprolol, carvedilol, sustained release metoprolol succinate) should be used in conjunction with an ACEI in all patients who are considered stable (i.e., minimal or no signs of fluid overload or volume depletion and not in an intensive care unit), unless contraindicated or not tolerated. These agents have been shown to reduce mortality and decrease the symptoms of HF (Grade A Recommendation, Good Overall Quality of Evidence).

Low dose of an aldosterone antagonist should be considered in patients with recent New York Heart Association (NYHA) Class IV HF and current Class III or IV symptoms and left ventricular ejection fraction (LVEF) < 35%, provided the patient has preserved renal function and normal potassium levels. This therapy improves symptoms (as assessed by change in NYHA functional class), decreases hospitalizations for worsening HF, and decreases mortality (Grade A Recommendation, Good Overall Quality of Evidence). An aldosterone antagonist may also be considered in patients with LVEF < 40% in patients early post-MI on standard therapy for HF.

The combination of hydralazine and a nitrate should be considered, especially in African American patients with NYHA Class III or IV HF, who continue to have symptoms despite therapy with an ACEI and beta-adrenergic blocker (Grade B Recommendation, Good Overall Quality of Evidence). The combination of hydralazine and a nitrate may be considered as an alternative to an ACEI in patients who are unable to tolerate an ACEI (or angiotensin II receptor antagonist) due to hypotension, renal insufficiency, hyperkalemia, or possibly, angioedema (Grade C Recommendation, Fair Overall Quality of Evidence).

Addition of an angiotensin II receptor antagonist to standard therapy (i.e., an ACEI and beta-adrenergic blocker) in patients with systolic HF may be considered to decrease cardiovascular death or HF hospitalizations (Grade B Recommendation, Fair Overall Quality of Evidence); although routine use of an angiotensin II receptor antagonist, ACEI, and aldosterone antagonist is not recommended.

Digoxin can be used in patients whose symptoms persist despite treatment with an ACEI (or an angiotensin II receptor antagonist if an ACEI is not tolerated), a beta-blocker, and a diuretic. Digoxin reduces symptoms associated with HF and decreases the risk for hospitalizations due to HF but does not improve mortality (Grade B Recommendation, Fair Overall Quality of Evidence).

Patients should receive regular follow-up in order to provide the most effective care. At each encounter, an inquiry should be made as to the patient's adherence to the medication regimen, nonpharmacologic measures, and adverse effects to therapy. Patients should be scheduled for routine laboratory monitoring. The patient should also be assessed for any change in functional status or frequency of hospitalizations, and medication therapy should be optimized.

7. Patients with HF in Stage D may require special treatment interventions including mechanical circulatory support, continuous therapy with positive inotropic agents, consideration for cardiac transplantation, or hospice care. In patients where therapeutic interventions may no longer be appropriate, discussions regarding end-of-life care should be considered. Specific recommendations are beyond the scope of this document, and these patients should be referred to a HF management program that includes experts on the management of patients with refractory HF.



VA/DoD Clinical Practice Guidelines for the Management of Cardiovascular Diseases

HEDIS® Measures

Dyslipidemia

- The percentage of members 18-75 years of age who, from January 1 - November 1 of the year prior to the measurement year, were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG) or percutaneous transluminal coronary angioplasty (PTCA), or who had a diagnosis of ischemic vascular disease (IVD), who had each of the following during the measurement year.
 - * LDL - C Screening Performed
 - * LDL - C Control (< 100 mg/dl)

Hypertension

- The percentage of members 18-85 years of age who had a diagnosis of hypertension (HTN) and whose blood pressure (BP) was adequately controlled (<140/90) during the measurement year.

Ischemic Heart Disease

Beta-Blocker Treatment After a Heart Attack:

- The percentage of members 35 years of age and older during the measurement year who were hospitalized and discharged alive from January 1 - December 24 of the measurement year with a diagnosis of acute myocardial infarction (AMI) and who received an ambulatory prescription for beta blockers upon discharge.

Persistence of Beta-Blocker Treatment After a Heart Attack:

- The percentage of members 35 years of age and older during the measurement year who were hospitalized and discharged alive from July 1 of the year prior to the measurement year to June 30 of the measurement year with a diagnosis of acute myocardial infarction (AMI) and who received persistent beta-blocker treatment for six months after discharge.

VA/DoD Clinical Practice Guidelines for the Management of Ischemic Heart Disease Acute Myocardial Infarction (AMI) Joint Commission Core Measures

- The percentage of AMI patients without aspirin contraindications who received aspirin within 24 hours before or after hospital arrival
- The percentage of AMI patients without aspirin contraindications who are prescribed aspirin at hospital discharge
- The percentage of AMI patients with left ventricular systolic dysfunction (LVSD) and without contraindications who are prescribed an ACEI or ARB at hospital discharge
- The percentage of AMI patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during hospital stay
- The percentage of AMI patients without beta blocker contraindications who are prescribed a beta blocker at hospital discharge
- The percentage of AMI patients without beta blocker contraindications who received a beta blocker within 24 hours after hospital arrival
- The percentage of AMI patients receiving fibrinolytic therapy during the hospital stay and having a time from hospital arrival to fibrinolysis of 30 minutes or less
- The percentage of AMI patients receiving percutaneous coronary intervention (PCI) during the hospital stay with a time from hospital arrival to PCI of 90 minutes or less
- The percentage of AMI patients who expired during hospital stay
- The percentage of AMI patients with documentation of low-density lipoprotein cholesterol (LDL-c) level in the hospital record or documentation that LDL-c testing was done during the hospital stay or is planned for after discharge*
- The percentage of AMI patients with elevated low-density lipoprotein cholesterol (LDL-c \geq 130 mg/dL or narrative equivalent) who are prescribed a lipid-lowering medication at hospital discharge*

* CMS Test Measures

Source: Joint Commission 2007, <http://www.jointcommission.org/PerformanceMeasurement/PerformanceMeasurement/>



VA/DoD Clinical Practice Guidelines for the Pharmacologic Management of Chronic Heart Failure Joint Commission Core Measures

Core Measure Set

- The percentage of heart failure patients discharged home with written instructions or educational material given to patient or caregiver at discharge or during the hospital stay addressing all of the following:
 - activity level
 - diet
 - discharge medications
 - follow-up appointment
 - weight monitoring
 - what to do if symptoms worsen
- The percentage of heart failure patients with documentation in the hospital record that left ventricular systolic (LVS) function was evaluated before arrival, during hospitalization, or is planned after discharge.
- The percentage of heart failure patients with left ventricular systolic dysfunction (LVSD) and without both angiotensin converting enzyme inhibitor (ACEI) and angiotensin receptor blocker (ARB) contraindications who are prescribed and ACEI or ARB at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less than 40% or a narrative description of left ventricular systolic (LVS) function consistent with moderate or severe systolic dysfunction.
- The percentage of heart failure patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during hospital stay. For purposes of this measure, a smoker is defined as someone who has smoked cigarettes anytime during the year prior to hospital arrival.

Disease-Specific Care Standardized Heart Failure Measure Set

- Monitor Body Weight
- 90-day return visit to emergency department or admission for heart failure after emergency discharge for heart failure
- Heart Failure patients with documentation that they or their caregivers received written instruction and/or educational materials addressing all of the following:
 - diet
 - weight monitoring
 - activity level
 - medications
 - symptom management
- Number of patients in which current medication drug dose and frequency is documented in the medical record
- Heart Failure patients with documented left ventricular function (LVF) evaluation
- Heart Failure patients who are prescribed Angiotensin Converting Enzyme Inhibitor (ACEI) for left ventricular systolic dysfunction (LVSD)
- The number of heart failure patients screened for or given influenza vaccination
- The number of heart failure patients screened for or given pneumococcal vaccination
- The percentage of enrolled patients with heart failure with blood pressure <140 systolic, <90 diastolic recorded for the reporting period

VA/DoD Cardiovascular Clinical Practice Guideline Provider Reference Card

HYPER TENSION ICD-9-CODES

Malignant Hypertension	401.0
Essential or Benign Hypertension	401.1
Unspecified Hypertension	401.9
Hypertensive Heart Disease w/o CHF*	402.00 / .10/ .90
Hypertensive Heart Disease w CHF*	402.01 / .11/ .91
Hypertensive Renal Disease*	403
Hypertensive Heart and Renal Disease	404

* Hypertension ICD-9-CM Codes:

*4th digit ... 0 = Malignant; 1 = Benign; 9 = Unspecified

403 Hypertensive Renal Disease
*5th digit
0- without mention of renal failure
1 ...with renal failure

404 Hypertensive Heart and Renal
*5th digit
0- without mention of heart or renal failure
1- with heart failure
2- with renal failure
3- with heart failure and renal failure

DYSLIPIDEMIA ICD-9-CODES

Hyperlipidemia	272.4
Hyperlipidemia Carbohydrate Induced	272.1
Hyperlipidemia Combined	272.4
Hyperlipidemia Endogenous	272.1
Hyperlipidemia Exogenous	272.3
Mixed	272.2

CODES TO IDENTIFY AMI, PTCA AND CABG

Description	CPT Codes	ICD-9-Codes	DRGs
AMI (inpatient)		410.x1	121, 122
PTCA	92980-92982, 92984,92995, 92996	36.01, 36.02, 36.05, 36.09	112*
CABG (inpatient)	33510-33514, 33516-33519, 33521-33523, 33533-33536	36.1, 36.2	106, 107, 109

5th digit: 1 = initial episode of care; 0 = unspecified episode of care; 2 = subsequent episode of care

ISCHEMIC HEART DISEASE ICD-9-CODES

Ischemic Heart Disease	414.9
Acute Myocardial Infarct	410
Of Anterolateral wall	410.01*
Other anterolateral wall	410.11*
Inferolateral wall	410.21*
Inferoposterior wall	410.31*
Other inferior wall	410.41*
True posterior wall	410.61*
Subendocardial infarction	410.71*
Of other unspecified site	410.81*
Unspecified site	410.91*
History of PTCA	V45.82
History of CABG	V45.81
History of MI	412

CODES TO IDENTIFY ACUTE MI AND B-BLOCKER TREATMENT

Description	ICD-9-Code	DRG
Acute MI	410.X1*	121, 122, 516

CHRONIC HEART FAILURE ICD-9-CODES

Systolic Heart Failure, Chronic	428.22
Diastolic Heart Failure, Chronic	428.32
Combined Systolic and Diastolic Heart Failure, Chronic	428.42

**Under CABG of ICD-9-CM Codes

36.1 Bypass anastomosis for heart revascularization
4th digit

36.10 - Aortocoronary bypass for heart revascularization, not otherwise specified

36.11 - Aortocoronary bypass of one coronary artery

36.12 - Aortocoronary bypass of two coronary arteries

36.13 - Aortocoronary bypass of three coronary arteries

36.14 - Aortocoronary bypass of four coronary arteries

36.15 - Single internal mammary-coronary artery bypass

36.16 - Double internal mammary-coronary artery bypass

36.17 - Abdominal-coronary artery bypass

36.19 - Other bypass anastomosis for heart revascularization

Source: VA Technical Manuals at VA CPG web site and reviewed by coding help desk:
<https://pasba3.amedd.army.mil> (click on data coding)



Pharmacotherapy for Cardiovascular Diseases in Primary Care

VA/DoD Medications Used in the Management of Cardiovascular Diseases in Primary Care			
DRUG ^a	ORAL DOSE	POTENTIAL SIDE EFFECTS	PRECAUTIONS/CONTRAINDICATIONS/COMMENTS
ANTIPLATELET/ANTICOAGULANT			
Aspirin ^b	UA/MI 160 mg-325 mg (1 st dose) Chronic 81 mg-325 mg qd	<ul style="list-style-type: none"> • GI intolerance: dyspepsia, nausea, GI bleeding, heartburn • Bronchospasm: prominent in patients with a history of asthma and nasal polyps • Tinnitus • Thrombocytopenia 	<ul style="list-style-type: none"> • ASA hypersensitivity: bronchospasm, angioedema, and anaphylaxis • Active, severe bleeding • Clopidogrel should be used in patients who are unable to take ASA
Clopidogrel ^{b,c,d}	NSTE-ACS 300 mg oral load then 75 mg qd for at least 1 month & up to 9 months with elective PCI Post stent 300 mg oral load then 75 mg qd at least 1 month & up to 12 months Non acute conditions 75 mg qd May be given with aspirin (81-325 mg) unless aspirin is contraindicated or not tolerated	<ul style="list-style-type: none"> • Thrombotic thrombocytopenic purpura rarely reported (sometimes after less than 2 weeks exposure) • Bleeding • GI intolerance: diarrhea • Clopidogrel increases risk of major bleeding (i.e., requiring transfusion of ≥ 2 units) when combined with ASA 	<ul style="list-style-type: none"> • History of bleeding diathesis • Chest pain without ECG changes in whom etiology of chest pain is unlikely to be ischemic in origin • Known hypersensitivity to ticlopidine, due to cross reactivity or any component of the product • Known hypersensitivity to clopidogrel or any component of the product • Active pathological bleeding (GI bleeding and intracranial hemorrhage) • Withhold clopidogrel for 5-7 days prior to elective CABG or other major surgical intervention
Warfarin ^{b,c}	Prevent systemic embolization: INR 2-3 Prevent recurrent MI within first 3 months: INR 2.5-3.5	<ul style="list-style-type: none"> • Bleeding (e.g., GU/GI) • Skin necrosis 	<ul style="list-style-type: none"> • Pregnancy • Hemophilia • Cerebrovascular hemorrhage • History of warfarin induced skin necrosis • Vitamin K may decrease anticoagulant response; patient should be instructed on importance of consistent dietary intake of vitamin K
CARDIOVASCULAR			
ACE Inhibitors			
Captopril ^{b,c} Enalapril ^b Fosinopril ^b Lisinopril ^{b,c} Ramipril ^{b,c,d}	12.5–150 mg/day (divided bid-tid) 2.5–20 mg/day (divided qd-bid) 5–40 mg qd 2.5–40 mg qd 2.5–10 mg/day (divided qd-bid; qd for prevention of cardiovascular events)	<ul style="list-style-type: none"> • Hypotension, hyperkalemia, acute renal impairment, angioedema, cough • Monitor K⁺ and renal function 	<ul style="list-style-type: none"> • Avoid in 2nd and 3rd trimesters of pregnancy due to possible fetal and neonatal morbidity and death • Hypersensitivity • Bilateral renal artery stenosis • Renal failure; use ACEI with caution in patients sCr >3.0 mg/dL • Take captopril 1 hr prior to food ingestion • Concomitant therapy with K⁺-sparing diuretics and/or K⁺ supplements may result in hyperkalemia

VA/DoD Medications Used in the Management of Cardiovascular Diseases in Primary Care

DRUG ^a	ORAL DOSE	POTENTIAL SIDE EFFECTS	PRECAUTIONS/CONTRAINDICATIONS/COMMENTS
CARDIOVASCULAR			
Angiotensin II Receptor Blockers^{d,e} Candesartan Eprosartan Irbesartan Losartan Olmesartan Telmisartan Valsartan	4-32 mg/day (divided qd-bid) 400-800 mg/day (divided qd-bid) 75-300 mg qd 25-100 mg/day (divided qd-bid) 5-40 mg qd 20-80 mg qd 80-320 mg qd	<ul style="list-style-type: none"> Hypotension, hyperkalemia, acute renal impairment, angioedema, dyspnea Less incidence of cough than ACEIs Monitor K⁺ and renal function 	<ul style="list-style-type: none"> Avoid in 2nd and 3rd trimesters of pregnancy due to possible fetal and neonatal morbidity and death Hypersensitivity Bilateral renal artery stenosis Renal failure Alternative to ACEIs in patients who cannot tolerate ACEIs Concomitant therapy with K⁺-sparing diuretics and/or K⁺ supplements may result in hyperkalemia Losartan/valsartan reported to ↑ reabsorption of lithium; monitor levels and for signs of toxicity Telmisartan may ↑ peak and trough digoxin levels by 49% and 20%, respectively; monitor trough digoxin levels at steady-state
β-Blockers Propranolol ^b Atenolol ^{b,c} Metoprolol IR ^{b,c} Metoprolol XL ^{b,d} Alpha-beta blocker Carvedilol ^{b,d}	IR: 40-480 mg/day (divided qd-bid) SR: 80-160 mg qd 25mg-100 mg qd (may require 200 mg qd for angina) 50-300 mg/day (divided qd-bid) (6.25-100 mg bid for HF) 50-400 mg qd (12.5-200 mg qd for HF) 3.125-25mg bid (patients ≥ 85kg may be titrated to 50mg bid with caution)	<ul style="list-style-type: none"> Bradycardia, hypotension, fatigue, insomnia, depression, sexual dysfunction, cold extremities, masking of hypoglycemia, nightmares/vivid dreams Wheezing and dyspnea seen with larger doses 	<ul style="list-style-type: none"> Sinus bradycardia SBP < 90mmHg 2nd or 3rd degree heart block Cardiogenic shock Severe bronchospastic disease Sick sinus syndrome Overt, decompensated HF May cause growth retardation in 1st trimester Discontinue with slow taper over 1 wk Verapamil/diltiazem may potentiate pharmacologic effects of β-blockers; additive effects on cardiac conduction Adjust dose of atenolol in chronic kidney disease
Calcium Channel Blockers Diltiazem IR ^{b,c} Diltiazem SR ^{b,c} Verapamil IR ^{b,c} Verapamil SR ^{b,c} Dihydropyridines Amlodipine ^{b,d} Felodipine ^{b,d} Nifedipine SR ^{b,c}	90-360 mg/day (divided tid-qid) 120-540 mg qd 120-360 mg/day (divided bid-tid) 120-480 mg/day (divided qd-bid) 2.5-10 mg qd 2.5-10 mg qd 30-120 mg qd (manufacturer max=90 mg qd)	<ul style="list-style-type: none"> Verapamil may cause constipation DHPs may cause ankle edema, dizziness, flushing, headache 	<ul style="list-style-type: none"> CCBs should be used with caution in patients with HF Diltiazem & verapamil may decrease heart rate, cause heart block and/or are contraindicated in AV node dysfunction (2nd or 3rd degree heart block), systolic HF and decreased LV function Use all CCBs with caution in patients with liver dysfunction; use diltiazem & verapamil with caution in patients with impaired kidney function Verapamil/diltiazem may potentiate pharmacologic effects of β-blockers; additive effects on cardiac conduction Short-acting nifedipine should be avoided due to its potential to precipitate acute and life-threatening hypotension
Diuretics Furosemide ^{b,c} (primarily for HF) Chlorthalidone Hydrochlorothiazide ^{b,c} HCTZ/Triamterene ^{b,c} Spironolactone ^{b,c} (primarily for HF)	20-400 mg/day (consider dividing bid if dose > 160 mg/day) 12.5-25 mg qd (max=50 mg/day) 12.5-25 mg qd (max=50 mg/day) 25/37.5-50 mg/75mg qd 12.5-25 mg qd (max 50 mg qd, use with caution due to hyperkalemia)	<ul style="list-style-type: none"> Hypokalemia, hyperuricemia, hypochloremic alkalosis, dilutional hyponatremia Spironolactone: hyperkalemia, gynecomastia, GI intolerance, hyperchloremic metabolic acidosis 	<ul style="list-style-type: none"> Monitor potassium levels for diuretic induced hypokalemia K⁺-sparing diuretics, K⁺ supplements may cause ↑ K⁺ Diuretic-induced hyperuricemia does not require treatment in the absence of gout or kidney stones Thiazide diuretics may ↑ TC and ↑ TG, although these effects may be transient Thiazide diuretics may ↑ lithium reabsorption; ↓ lithium dose by 50%
Centrally Acting Clonidine Tablet ^{b,c} Clonidine Patch ^b Methylodopa ^b	0.1-0.8 mg/day (divided bid-tid) (max can be up to 2.4 mg/d) 0.1-0.6 mg patch weekly 500 mg-3g/day (divided bid-qid doses)	<ul style="list-style-type: none"> Drowsiness, dry mouth May exacerbate depression 	<ul style="list-style-type: none"> Taper dose to discontinue Clonidine patches are costly but may be useful in selected patients. Full effect of clonidine patch may not be evident until several days after it is first placed

VA/DoD Medications Used in the Management of Cardiovascular Diseases in Primary Care

DRUG ^a	ORAL DOSE	POTENTIAL SIDE EFFECTS	PRECAUTIONS/CONTRAINDICATIONS/COMMENTS
CARDIOVASCULAR			
Peripherally Acting Reserpine ^b	0.05-0.25 mg qd	<ul style="list-style-type: none"> Sedation, nightmares, tremors, nasal congestion, activation of peptic ulcer May exacerbate depression 	<ul style="list-style-type: none"> Active PUD, ulcerative colitis, history gallstones Depression with suicidal tendencies May cause a hypertensive reaction when initiated in patients on a MAOI
Vasodilators Minoxidil ^b Hydralazine ^{b,c}	5-40 mg/day (divided qd-bid) (max=100 mg/day) 30-200 mg/day (divided bid-qid)	<ul style="list-style-type: none"> Hypertrichosis, edema, and pericardial effusions with minoxidil Headache, edema and SLE (dose-related) with hydralazine 	<ul style="list-style-type: none"> Direct-acting vasodilators do not reduce LV hypertrophy Should be used with a diuretic and β-blockers to reduce edema and reflex tachycardia Hydralazine used in combination with ISDN for HF
Alpha-blockers Doxazosin ^{b,d} Prazosin ^{b,d} Terazosin ^{b,d}	1-4 mg qd (max=16 mg/d) 1-15 mg/day (divided bid-tid) (max=20 mg/d) 1-5 mg qd (max=20 mg/d)	<ul style="list-style-type: none"> First-dose syncope, dizziness Tachyphylaxis 	<ul style="list-style-type: none"> Initiate at low doses (1 mg) with 1st dose given at bedtime to avoid syncope
Nitrates Nitroglycerin SL tab ^{b,c} or spray ^c ISDN ^{b,c} ISDN ER ISMN conventional ISMN ER ^b Nitroglycerin patch ^b Nitroglycerin ointment ^b	0.4 mg tab (or 1-2 sprays) SL at time of chest pain (or prophylaxis), q 5 min up to 3 doses 10-120 mg (divided bid-tid) (up to 160 mg used in combination w/hydralazine for HF) 40 mg bid 10-20 mg bid 30-120 mg qd 2.5-20 mg/24 hrs topically qd (remove at hs) 1/2-5 inches topically q 8 hrs	<ul style="list-style-type: none"> Persistent transient headache (may be severe) Postural hypotension, syncope Transient flushing Allergic contact dermatitis is rare with topical preparations 	<ul style="list-style-type: none"> Allow nitrate-free interval of 10-12 hours to prevent tolerance (e.g., dose tid at 7am, 12pm, 5pm) Use with caution in SBP < 90 mmHg Contraindicated in conjunction with sildenafil Contraindicated in severe anemia Use with caution in patients with increased intracranial pressure Avoid nitrates with right ventricular infarction
Digoxin Digoxin ^{b,c}	0.0625-0.375 mg qd (usual dose 0.125-0.25 mg qd to achieve goal of 0.5-1.0 ng/ml)	<ul style="list-style-type: none"> Signs of toxicity include nausea, confusion, abdominal pain, diarrhea, visual disturbances, arrhythmias, bradycardia, fatigue, anorexia, headache 	<ul style="list-style-type: none"> Avoid in hypertrophic obstructive cardiomyopathy Caution with AV block, ventricular arrhythmias Verapamil/diltiazem may \uparrow digoxin levels 20-70% Telmisartan may \uparrow peak and trough digoxin levels by 49% and 20%, respectively; monitor trough digoxin levels at steady-state Diuretics may induce hypokalemia which may \uparrow risk of digitalis toxicity
LIPID-LOWERING			
Statins Atorvastatin ^d Fluvastatin ^{b,d} Lovastatin ^b Pravastatin ^d Simvastatin ^{b,c}	10-80 mg qd 20-80 mg/day (divided qpm-bid) XL 80mg qpm 10-80 mg qpm with food (80 mg given as 40 mg bid) 10-80 mg qpm 5-80 mg qpm	<ul style="list-style-type: none"> Abdominal pain, constipation, diarrhea, dyspepsia, nausea, myopathy (<0.2%; 5% in combination with gemfibrozil; 2% in combination with niacin), rhabdomyolysis Increase in LFTs >3 x the upper limit, and CPKs >10 x the upper limit 	<ul style="list-style-type: none"> Hypersensitivity Caution in hepatic disease LFT monitoring is recommended by drug manufacturers - within 3 months of initiation or changing dose, and then periodically Avoid in pregnant/lactating women Caution in severe renal impairment, use lowest dose in moderate renal impairment Evening/bedtime dosing may improve efficacy Increased risk for myopathy when any statin is combined with fibrates or niacin (≥ 1 gm daily). The risk is also increased if combining atorvastatin, lovastatin or simvastatin with potent inhibitors of CYP 3A4 (azole antifungals, macrolide antibiotics, immunosuppressives, protease inhibitors or delavirdine, grapefruit juice, nefazodone, diltiazem, verapamil, or amiodarone).

VA/DoD Medications Used in the Management of Cardiovascular Diseases in Primary Care

DRUG ^a	DOSE	POTENTIAL SIDE EFFECTS	PRECAUTIONS/CONTRAINDICATIONS/COMMENTS
LIPID-LOWERING			
Bile Acid Resins			
Colestipol powder ^b	5-30 gm/day (divided qd-tid)	<ul style="list-style-type: none"> Nausea, bloating, constipation, flatulence May ↑ TG 	<ul style="list-style-type: none"> Complete biliary obstruction Caution if active PUD due to GI irritation Best tolerated 2-5 gm bid; usual effective dose 8-10 gm/d Take other medications 1 hr prior or 4 hr after resin
Colestipol tablets ^{b,c}	2-16 gm/day (divided qd-tid)		
Fibrates			
Gemfibrozil ^{b,c}	600 mg bid AC	<ul style="list-style-type: none"> GI symptoms, nausea, vomiting, diarrhea, rash, hepatitis, gallstones, and myositis 	<ul style="list-style-type: none"> Gallbladder disease Monitor ALTs throughout therapy; contraindicated in hepatic disease Reduce dose in modest renal insufficiency; contraindicated in severe renal dysfunction Risk of myopathy with statin Monitor INR; may need to adjust warfarin dosage to prevent bleeding complications
Niacin			
Niacin ER ^{b,c}	500 mg-2 gm qd hs (use titration pack)	<ul style="list-style-type: none"> Flushing, blurred vision, GI distress, itching, headache, hepatotoxicity, hyperglycemia, hyperuricemia 	<ul style="list-style-type: none"> Hepatic disease; persistent elevation of LFTs Monitor ALTs at baseline; 6 weeks after start or dosage change; monitor every 6-12 months thereafter Active PUD Arterial bleeding Causes glucose intolerance; caution in established or borderline DM Decreases urinary secretion of uric acid, caution with gout If CrCl is 10-50 ml/min give 50% of dose; if <10 ml/min give 25% Take with food to avoid flushing or GI upset
Niacin IR ^b	1.5-3 gm/day (divided tid) Start IR 50-100 mg bid-tid, ↑ dose by 300 mg/day per week		

ACEI=angiotensin-converting enzyme inhibitors; ACS=acute coronary syndrome; ALT=alanine aminotransferase; ASA=aspirin; AST=aspartate aminotransferase; AV=atrioventricular; BPH=benign prostatic hyperplasia; CCB=calcium channel blocker; CPK=creatine phosphokinase; CrCl=creatinine clearance; CYP 3A4=cytochrome P450 3A4 isoenzyme; DHP=dihydropyridine; DM=diabetes mellitus; ECG=electrocardiogram; ER=extended release; GI=gastrointestinal; GU=genitourinary; HF=heart failure; HTN=hypertension; INR=internal normalized ratio; IR=immediate release; ISDN=isosorbide dinitrate; ISMN=isosorbide mononitrate; K+=potassium; LFT=liver function tests; LV=left ventricular; MAOI=monoamine oxidase inhibitor; MI=myocardial infarction; NNT=number needed to treat; NYHA=New York Heart Association; PUD=peptic ulcer disease; SBP=systolic blood pressure; sCr=serum creatinine; SL=sublingual; SLE=systemic lupus erythematous; SR=sustained-release; TC=total cholesterol; TG=triglycerides; UA/MI=unstable angina/myocardial infarction; XL=extended release

^a Partial list

^b VA National Formulary item

^c DoD Basic Core Formulary item

^d VA criteria for use (refer to www.vapbm.org)

^e DoD Place In Therapy (PIT) guide (www.pec.ha.osd.mil)