

Summary Chart

Cardiovascular Nursing Certification Exam Development Guidelines

Structural Variables			
Examination Length and Format	Approximately 180 objective questions (e.g., multiple-choice)		
Question Presentation	50-60% independent questions 40-50% case-based questions		
The Cognitive Domain	Knowledge/Comprehension	20-30% of questions	
	Application	35-45% of questions	
	Critical Thinking	30-40% of questions	
Competency Categories	Ischemic Heart Disease (22 competencies)	15-25% of questions	
	Health Promotion, Prevention and Rehabilitation (36 competencies)	10-20% of questions	
	Heart Failure (7 competencies)	5-15% of questions	
	Cardiac Surgical Intervention (23 competencies)	5-15% of questions	
	Percutaneous Cardiac Interventions and Procedures: Angiogram, Percutaneous Coronary Intervention (PCI), Electrophysiological Studies/Ablation, Valvuloplasty (16 competencies)	5-15% of questions	
	Cardiac Dysrhythmias (9 competencies)	3-13% of questions	
	Valvular Heart Disease (12 competencies)	1-11% of questions	
	Vascular Diseases (15 competencies)	4-13% of questions	
	Heart Disease Related to Inflammatory/Infectious Processes: Pericarditis, Endocarditis, Myocarditis (11 competencies)	1-10% of questions	
	Psychosocial Needs (6 competencies)	1-9% of questions	
Cardiogenic Shock (6 competencies)	1-8% of questions		
Contextual Variables			
Client Age and Gender	Male	Female	
	16 to 34 years	1-10%	1-10%
	35 to 64 years	30-40%	10-20%
	65+ years	10-20%	30-40%
Client Culture	Questions are included that measure awareness, sensitivity and respect for different cultural values, beliefs and practices, without introducing stereotypes.		
Client Health Situation	In the development of the Cardiovascular Examination, the client is viewed holistically. The client health situations presented also reflect a cross-section of health situations encountered by cardiovascular nurses.		
Health-Care Environment	It is recognized that cardiovascular nursing is practised primarily in the hospital setting. However, cardiovascular nursing can also be practised in other settings. Therefore, for the purposes of the Cardiovascular Examination, the health-care environment is only specified where it is required for clarity or in order to provide guidance to the examinee.		

The Cardiovascular Nursing Certification Exam List of Competencies

The competencies are divided into categories that are in no particular order of priority but represent broad categories addressing cardiovascular health encountered in current cardiovascular nursing practice.

1. The Care of the Person with Ischemic Heart Disease (22 competencies)

The cardiovascular nurse:

- 1.1 interprets the following data related to ischemic heart disease including the following pathophysiology: atherosclerosis, stable angina, acute coronary syndromes.
 - 1.1a History taking:
 - presenting symptoms (e.g., typical/atypical chest pain, syncope, shortness of breath, fatigue, nausea, vomiting, diaphoresis);
 - past and current medical history (e.g., diabetes, myocardial infarction, stroke, coronary artery disease, peripheral vascular disease, pulmonary disease, thyroid disorders, renal disease, recent cardiac and other diagnostic tests, previous surgeries);
 - cardiac risk factors (e.g., age, gender, family history, smoking, hypertension, diabetes, dyslipidemia, obesity, stress, depression, physical inactivity);
 - discharge planning (e.g., evaluation of social and family support, activities of daily living assessment);
 - medications and alternative therapies (e.g., prescription and non-prescription, herbals, potential interactions [e.g., Viagra]; and
 - psychosocial history (e.g., substance use, occupation).
 - 1.1b pain assessment (e.g., location, duration, radiation, intensity, quality, precipitating/aggravating/alleviating factors, associated symptoms, onset, frequency and changing patterns).
 - 1.1c Physical/System assessment:
 - functional assessment (e.g., activities of daily living, exercise capacity);
 - inspection (e.g., skin colour, diaphoresis, jugular venous distention, peripheral and central cyanosis, shortness of breath, edema);
 - auscultation (e.g., lung sounds, heart sounds, blood pressure, bruits); and
 - palpation (e.g., pulses, thrills).

Diagnostic assessment:

- 1.1d Laboratory investigations (e.g., cardiac biomarkers [troponins and CK], liver function tests [LFT], serum electrolytes, renal function, complete blood count [CBC], coagulation studies [PTT and INR], lipid profile, glucose, thyroid studies, hemoglobin A1c).
 - 1.1e Cardiac and other diagnostic tests (e.g., 12- and 15-lead ECG, exercise test, chemical/nuclear stress test, coronary angiogram, pulse oximetry, echocardiograms, chest x-ray, Holter monitoring, CT, MRI).
- 1.2 selects appropriate nursing interventions to improve coronary blood flow and/or reduce myocardial demand for oxygen related to:
- 1.2a stable angina;
 - 1.2b unstable angina;
 - 1.2c ST elevation myocardial infarction (STEMI);
 - 1.2d non-STEMI; and
 - 1.2e coronary artery spasm.

Example

The following are potential nursing interventions used to improve coronary blood flow and/or reduce myocardial demand for oxygen related to ischemic heart disease.

- Manage chest pain (e.g., pharmacological and non-pharmacological interventions).
- Monitor oxygenation (e.g., pulse oximetry).
- Monitor hemodynamic status (e.g., fluid balance, blood pressures, heart rate, peripheral perfusion).
- Monitor pharmacological effects/side-effects (e.g., vasodilators, beta blockers, diuretics, calcium channel blockers, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, anticoagulants, antiplatelets, thrombolytics, nitroglycerin).
- Tailor client teaching to individual and family needs (e.g., chest pain/symptom management, activities, risk factor modification, coping with chronic and acute illness).
- Tailor client teaching to optimize self-management skills.
- Prepare for diagnostic testing, potential treatment options (e.g., thrombolytics) and other potential complications (e.g., bleeding).

- 1.3 selects appropriate nursing interventions for the following potential complications of ischemic heart disease:
 - 1.3a dysrhythmias;
 - 1.3b heart failure;
 - 1.3c cardiogenic shock;
 - 1.3d renal failure;
 - 1.3e systemic embolism;
 - 1.3f pericarditis;
 - 1.3g aneurysms;
 - 1.3h papillary muscle dysfunction;
 - 1.3i ventricular septal defect;
 - 1.3j ventricular rupture;
 - 1.3k stroke;
 - 1.3l myocardial infarction/re-occlusion; and
 - 1.3m post myocardial infarction angina.

2. Core Concepts Related to Health Promotion, Prevention and Rehabilitation (36 competencies)

The cardiovascular nurse:

- 2.1 identifies populations that are at risk of developing cardiovascular disease (e.g., elderly, smokers and those exposed to second-hand smoke, ethnicity, gender, metabolic syndrome, obesity, physical inactivity, diabetes, hypertensive, dyslipidemic, stress, depression).
- 2.2 selects the appropriate nursing interventions to reduce current and potential cardiovascular risks at the following three levels of intervention: primary, secondary and tertiary.

Example

The following are potential nursing interventions to reduce current and potential cardiovascular risks.

- Promote awareness of signs and symptoms of cardiovascular disease.
- Manage the signs and symptoms of cardiovascular disease.
- Identify modifiable risk factors (e.g., diabetes, hypertension, obesity, stress).
- Identify stages of change (e.g., pre-contemplation, contemplation, preparation, action, maintenance).
- Implement/identify programs related to lifestyle such as smoking cessation, weight control, stress management and physical activity programs.
- Promote lifestyle modification strategies.
- Tailor client teaching to optimize self-management skills.
- Encourage discussion of current therapies using evidence-based practice (e.g., antiplatelet agents, lipid management).
- Monitor client progress and compare results to expected time frames for rehabilitation.
- Encourage client to maintain and surpass rehabilitation goals.

- 2.3 interprets the impact of the interdependent and cumulative effects of the following risk factors on the primary and secondary prevention of cardiovascular disease: tobacco products, hypertension, dyslipidemia, physical inactivity, diabetes, obesity, psychosocial factors, substance abuse, stress, depression.
- 2.4 interprets the effects of the following risk factors on the primary and secondary prevention of cardiovascular disease:
- 2.4a tobacco products (e.g., relationship with high-density lipoprotein [HDL]);
 - 2.4b hypertension (e.g., sodium intake, alcohol intake, effects of exercise and weight management);
 - 2.4c dyslipidemia (e.g., results of lipid profile, liver function tests);
 - 2.4d physical inactivity (e.g., effect on lipids, BP, body mass index [BMI]);
 - 2.4e diabetes (e.g., blood sugar control);
 - 2.4f obesity (e.g., waist:hip ratio, body mass index [BMI]);
 - 2.4g psychosocial factors (e.g., stress, anger, lack of social support);
 - 2.4h socio-economic status (e.g., income, drug costs);
 - 2.4i substance abuse (e.g., alcohol, intravenous drug use, inhalants, steroids); and
 - 2.4j depression (e.g., post-cardiac event).

- 2.5 selects appropriate primary or secondary prevention interventions for the following risk factors based on practice guidelines and the client's needs, goals and readiness for change:
- 2.5a tobacco products (e.g., refer to cessation programs, pharmaceutical products);
 - 2.5b hypertension (e.g., identifying signs and symptoms, regular visits to health care provider, non-pharmacological and pharmacological interventions);
 - 2.5c dyslipidemia (e.g., pharmacological and non-pharmacological interventions, reduced alcohol consumption, regular follow-up);
 - 2.5d physical inactivity (e.g., provide basic exercise guidelines, refer to rehabilitation program, identify community resources);
 - 2.5e diabetes (e.g., self-monitoring, refer to available resources, nutrition);
 - 2.5f obesity (e.g., identify realistic goals, refer to dietitian, weight loss programs);
 - 2.5g psychosocial factors (e.g., social support, individual family counselling, stress management programs, anger management programs);
 - 2.5h socio-economic status (e.g., appropriate referral, discharge planning);
 - 2.5i substance abuse (e.g., appropriate referral);
 - 2.5j depression (e.g., appropriate referral); and
 - 2.5k non-modifiable health risk factors (e.g., information related to age, gender, ethnicity and genetics/family history).
- 2.6 interprets collected data and information related to functional capacity, psychosocial well-being and perceived quality of life (Question should include four of the nine areas):
- exercise/activity tolerance, activities of daily living, and rest and sleep;
 - occupational and leisure activities (e.g., resuming previous employment, and household and leisure activities);
 - sexuality (e.g., fear, sexual dysfunction, libido, self-concept, expression of sexuality);
 - family and community relationship / support (e.g., impact on family, cultural influences);
 - socio-economic status (e.g., barrier to accessibility of therapeutic interventions);
 - emotional status (e.g., depression, coping strategies);
 - maladaptive behaviours (e.g., substance abuse, anger);
 - spirituality (e.g., religious/philosophical influence); and
 - treatment regimens (e.g., functional capacity).

- 2.7 interprets objective assessment data related to functional capacity:
- 2.7a laboratory investigations (e.g., thyroid function tests, glucose, complete blood count [CBC], Hg A1c); and
 - 2.7b cardiac and other diagnostic tests (e.g., exercise stress test, pulmonary function tests, echocardiogram, ventricular scan, pulse oximetry, Holter monitoring, vocational assessments, quality of life indicators).
- 2.8 selects appropriate nursing interventions to optimize functional capacity and enhance psychosocial well-being:
- 2.8a exercise/activity tolerance, activities of daily living, rest and sleep;
 - 2.8b occupational and leisure activities (e.g., resuming previous employment, and household and leisure activities);
 - 2.8c sexuality (e.g., fear, sexual dysfunction, libido, self-concept, expression of sexuality);
 - 2.8d family and community relationship/support (e.g., impact on family, cultural influences);
 - 2.8e socio-economic status (e.g., barrier to accessibility of therapeutic interventions);
 - 2.8f emotional status (e.g., coping strategies);
 - 2.8g maladaptive behaviours (e.g., substance abuse, anger);
 - 2.8h spirituality (e.g., spiritual counsellor); and
 - 2.8i treatment regimens (e.g., non-adherence and barriers to adherence, functional capacity).

Example

The following are potential nursing interventions to optimize functional capacity and enhance psychosocial well-being.

- Teach and counsel client/family (e.g., education materials).
- Monitor, plan, coordinate and set goals with client.
- Promote health behaviours and wellness.
- Refer to appropriate resources.

3. The Care of the Person with Heart Failure (7 competencies)

The cardiovascular nurse:

- 3.1 interprets the following data related to the following pathophysiology: ischemic heart disease, valvular heart disease, hypertensive heart disease, cardiomyopathies, congenital heart defects.
 - 3.1a History taking:
 - manifestations (e.g., shortness of breath, dizziness, paroxysmal nocturnal dyspnea, orthopnea, cough, activity intolerance, fatigue, weight changes, edema, changes in mental status, anorexia, cachexia, palpitations, pain);
 - precipitating factors (e.g., fluid and sodium indiscretion, medication non-adherence, thyroid dysfunction, use of NSAIDs, dysrhythmias, substance use, recent cytotoxic medication);
 - medical history (e.g., acute coronary syndrome, recent pregnancies, exposure to toxic substances, viral/bacterial illnesses, surgical history, sleep-related disorders, cancer);
 - family history (e.g., decision making, coping, travel history); and
 - medications (e.g., prescription and non-prescription, herbals).
 - 3.1b Physical/System assessment:
 - inspection (e.g., skin colour, diaphoresis, jugular venous distention, ascites, edema);
 - auscultation (e.g., lung sounds, heart sounds, murmurs, blood pressure); and
 - palpation (e.g., pulses, apical displacement, organomegaly, edema, hepatojugular reflux).
- Diagnostic assessment:
 - 3.1c Laboratory investigations (e.g., serum electrolytes, renal and liver function, complete blood count [CBC], brain natriuretic peptide [BNP/NT-pro BNP], coagulation studies [PTT and INR], thyroid function, blood cultures).
 - 3.1d Cardiac and other diagnostic tests (e.g., 12-lead ECG, coronary angiogram, echocardiograms, chest x-ray, nuclear scan, Holter monitoring, pulse oximetry, cardiac biopsy).
- 3.2 selects appropriate nursing interventions to optimize heart failure management.

Example

The following are potential nursing interventions to optimize heart failure management.

- Monitor oxygenation.
- Monitor pharmacological effects (e.g., angiotensin-converting enzyme inhibitors [ACE-I], angiotensin II receptor blockers [ARB], diuretics, beta blockers, digitalis, vasodilators, inotropes, antibiotics, antiviral agents).
- Monitor and maintain hemodynamic stability (e.g., fluid balance, inotropes).
- Prepare for diagnostic testing (e.g., angiogram, echocardiogram) and potential treatment options (e.g., angioplasty, cardiac surgery options, BiPAP, cardiac resynchronization therapy, ventricular assist devices, transplant assessment).
- Tailor client teaching to optimize self-management skills (e.g., exercise and rest, salt and fluid restriction, daily weight, medication management, symptom management).

3.3 selects appropriate nursing interventions to optimize functional capacity and enhance psychosocial well-being.

Example

The following are potential nursing interventions to optimize functional capacity and enhance psycho-social well-being.

- Teach and counsel client/family.
- Monitor, plan, coordinate and set goals with client/family.
- Promote healthy behaviours to prevent exacerbations.
- Refer to outpatient heart function clinic for education and follow-up programs.
- Support the client and family through chronic illness/end of life.
- Tailor client teaching to optimize self-management skills (e.g., exercise and rest, salt and fluid restriction, daily weight, medication management, symptom management).

3.4 selects appropriate nursing interventions to address the palliative needs of the client with end-stage heart failure (e.g., advance directives, palliative comfort measures, community and home care services, family and caregiver support, spiritual support).

4. The Care of the Person who Needs Cardiac Surgical Intervention (23 competencies)

The cardiovascular nurse:

- 4.1 interprets the data in preparation for surgery (e.g., coronary artery bypass, valve repair replacement, congenital heart, heart transplant, ventricular assist devices, ventricular remodelling) for the following disorders: coronary artery disease, vascular disease, cardiac tumours, congenital heart defects, valvular disease, heart failure, trauma.
- 4.1a History taking:
- presenting symptoms/medical diagnosis;
 - cardiac risk factors (e.g., family history, smoking, diabetes, hypertension, dyslipidemia);
 - past and current medical history (e.g., comorbidities, malignant hyperthermia, blood transfusion reaction, dental history, other surgeries, heparin sensitivity, cognitive assessment, thromboembolic disease, cancer, radiation therapy);
 - medications (e.g., prescription and non-prescription, herbals);
 - psychosocial history (e.g., substance use); and
 - discharge planning (e.g., evaluation of social and family support, activities of daily living assessment).
- 4.1b Pain assessment (e.g., ischemic, chronic).
- 4.1c Physical/System assessment:
- inspection (e.g., general appearance, height and weight, signs of infection, jugular venous distention, edema, varicosities);
 - auscultation (e.g., lung sounds, heart sounds, murmurs, blood pressure(s), bruits); and
 - palpation (e.g., pulses, Allen's test).
- Diagnostic assessment:
- 4.1d Laboratory investigations (e.g., serum electrolytes, liver enzymes, renal function, complete blood count [CBC], coagulation studies [PTT and INR], type and cross match, transplant investigations, lipid profile, Hg A1c, urinalysis).
- 4.1e Cardiac and other diagnostic tests (e.g., coronary angiogram, chest x-ray, 12-lead ECG, echocardiograms, pulse oximetry, pulmonary function test, CT scan, carotid Dopplers).
- 4.2 selects appropriate preoperative nursing interventions to enhance recovery and manage potential complications of cardiac surgery.

Example

The following are potential nursing interventions to enhance recovery and manage potential complications of cardiac surgery.

- Prepare for diagnostic testing.
- Tailor teaching to the individual needs of the client requiring surgery, such as coronary artery bypass, valve repair/replacement, congenital heart, heart transplant, ventricular assist devices, ventricular remodelling (e.g., preparation for surgery, immediate postoperative recovery, monitoring pain, mobilization, chest physiotherapy, respiratory care).
- Prepare client for discharge (e.g., medications, self-care, potential complications, follow-up care).

- 4.3 selects appropriate postoperative nursing interventions to detect, monitor and manage the following early and late potential complications:
- 4.3a bleeding (e.g., chest tube management, anticoagulation, GI);
 - 4.3b hemodynamic instability (e.g., fluid balance, inotropes, vasodilators);
 - 4.3c pulmonary disorders (e.g., effusions, pneumothorax, pulmonary embolism, pneumonia, pulmonary hypertension);
 - 4.3d renal insufficiency/failure;
 - 4.3e pain (e.g., postoperative, pleural, pericardial, ischemic);
 - 4.3f dysrhythmias (e.g., atrial fibrillation);
 - 4.3g GI dysfunction (e.g., nausea, constipation, ileus, ischemia);
 - 4.3h cerebral vascular events (e.g., ischemic or hemorrhagic);
 - 4.3i delirium (e.g., confusion);
 - 4.3j brachial plexus injury/ulnar nerve injury;
 - 4.3k infection (e.g., sepsis, wound infections);
 - 4.3l loss of skin integrity (e.g., pressure ulcers);
 - 4.3m sternal instability;
 - 4.3n peripheral vascular complications (e.g., DVT, ischemic limb);
 - 4.3o hematological disorders (e.g., anemia, heparin-induced thrombocytopenia);
 - 4.3p cardiac (e.g., heart failure, myocardial infarction, rejection, post pericardiotomy syndrome, tamponade, pericarditis); and
 - 4.3q depression (e.g., insomnia, anxiety).

5. The Care of the Person Requiring Percutaneous Cardiac Interventions and Procedures: Angiogram, Percutaneous Coronary Intervention (PCI), Electrophysiological Studies/Ablation, Valvuloplasty (16 competencies)

The cardiovascular nurse:

- 5.1 interprets the following pre-procedure data related to potential complications for the following pathophysiology: ischemic and valvular heart disease, congenital heart defects, dysrhythmias.
 - 5.1a History taking:
 - medical diagnosis/ presenting symptoms;
 - cardiac risk factors (e.g., family history, smoking, diabetes, hypertension, dyslipidemia, obesity, physical inactivity, stress, depression);
 - past and current medical history (e.g., comorbidities, previous vascular and cardiac surgeries, renal function);
 - medications (e.g., prescription and non-prescription, herbals, contrast sensitivity); and
 - discharge planning (e.g., evaluation of social and family support, activities of daily living assessment).
 - 5.1b Pain assessment (e.g., ischemic, chronic).
 - 5.1c Physical/System assessment:
 - inspection (e.g., general appearance, weight and height);
 - auscultation (e.g., lung sounds, heart sounds, bruits, blood pressure(s)); and
 - palpation (e.g., peripheral pulses, Allen's test).

Diagnostic assessment:

 - 5.1d Laboratory investigations (e.g., serum electrolytes, renal function, complete blood count [CBC], blood glucose, coagulation studies [PTT and INR], lipid profile).
 - 5.1e Cardiac and other diagnostic tests (e.g., chest x-ray, 12-lead ECG, exercise stress test, echocardiograms, nuclear stress test).
- 5.2 selects appropriate pre- and post-procedure nursing interventions to enhance recovery and manage potential complications.

Example

The following are potential nursing interventions to enhance recovery and manage potential complications.

- Prepare for planned procedure and potential treatment options.
- Tailor client teaching to individual needs (e.g., pain and symptom management, activity restrictions and ambulation, medication adherence, planning discharge and evaluation of social support, risk factor counselling, self-management).
- Prepare client for discharge (e.g., medications, self-care, potential complications, follow-up care).

- 5.3 selects appropriate post-procedure nursing interventions to prevent, detect, monitor and manage the following early and late potential complications:
- 5.3a bleeding (e.g., hematoma, tamponade, retroperitoneal);
 - 5.3b embolic/thrombotic (e.g., peripheral, central, cerebral);
 - 5.3c hemodynamic instability (e.g., vasovagal response, reocclusion);
 - 5.3d allergic reaction or anaphylaxis (e.g., contrast media);
 - 5.3e renal dysfunction/failure;
 - 5.3f pain (e.g., ischemic vs. other);
 - 5.3g dysrhythmias;
 - 5.3h hematological disorders;
 - 5.3i vascular (e.g., pseudoaneurysms); and
 - 5.3j infection.

6. Core Concepts Related to Cardiac Dysrhythmias (9 competencies)

The cardiovascular nurse:

- 6.1 interprets data related to dysrhythmias including the following disorders: sudden cardiac death, ventricular tachycardia, ventricular fibrillation, ventricular standstill, asystole, atrial fibrillation/flutter, tachycardia, heart blocks, bradycardia.
- 6.1a History taking:
- presenting symptoms (e.g. dizziness, pre-syncope, syncope, dyspnea, palpitations);
 - current and past medical history (e.g., pulmonary disease, renal disease, myocardial infarction, stroke, cardiomyopathy, hematological disorders, infection, peripheral vascular disease, thyroid dysfunction, caffeine intake, congenital heart disease);
 - family history of sudden cardiac death;

- cardiac risk factors (e.g., family history, smoking, diabetes, hypertension, dyslipidemia, stress, depression, obesity, physical activity);
- medications (e.g., prescription and non-prescription, herbals);
- psychosocial history (e.g., substance use); and
- discharge planning (e.g., evaluation of social and family support, activities of daily living assessment, driving restrictions, occupation).

6.1b Physical/System assessment:

- inspection (e.g., airway, breathing and circulation, diaphoresis, level of consciousness, capillary refill);
- auscultation (e.g., heart sounds, blood pressure(s)); and
- palpation (e.g., carotid/peripheral pulses).

Diagnostic assessment:

- 6.1c Laboratory investigations (e.g., serum electrolytes, serum magnesium, renal function, blood gases, thyroid function studies, digoxin level, complete blood count [CBC], calcium, drug screen).
- 6.1d Cardiac and other diagnostic tests (e.g., 12-lead ECG, chest x-ray, Holter monitoring, electrophysiological studies, pulse oximetry, echocardiograms, stress testing, loop recorder, tilt table).

- 6.2 selects appropriate nursing interventions related to non-life threatening and/or stable dysrhythmias.

Example

The following are potential nursing interventions to manage non-life threatening and/or stable dysrhythmias.

- Assess vital signs (e.g., blood pressure, heart rate).
- Recognize and treat associated symptoms (e.g., anxiety, other symptoms).
- Evaluate laboratory and other diagnostic tests.
- Continuous ECG monitoring.
- Correct underlying causes once identified (e.g., hypoxia, electrolyte imbalance).
- Administer appropriate pharmacological agents and evaluate client response.
- Prepare for electrical cardioversion and evaluate client response.
- Prepare client for further diagnostic testing/procedure to identify cause and/or treatment for abnormalities (e.g., ICD, ablation, electrophysiology studies).

6.3 selects appropriate nursing interventions related to life-threatening dysrhythmias.

Example

The following are potential nursing interventions related to life-threatening dysrhythmias.

- Assess and maintain airway, breathing, circulation.
- Assess level of consciousness.
- Initiate call for appropriate emergency medical personnel if required.
- Prepare for emergent interventions (e.g., defibrillation, intubation, pacing).
- Evaluate laboratory and other diagnostic tests.
- Continuous ECG monitoring.
- Correct underlying causes once identified (e.g., hypoxia, electrolyte imbalance).
- Administer appropriate pharmacological agents and evaluate client response.
- Support family during and after critical situation (e.g., family access, privacy, social work, spiritual counsellor).

6.4 selects appropriate nursing interventions for potential complications related to dysrhythmias (e.g., embolic stroke related to atrial fibrillation/flutter, hemodynamic instability arising from non-sustained VT and other conduction abnormalities).

Example

The following are examples of nursing interventions for potential complications related to dysrhythmias.

- Administer appropriate pharmacological agents (e.g., anticoagulants, antiarrhythmics, beta-blockers).
- Prepare for treatment (e.g., beta blockers/synchronous cardioversion, temporary external pacemaker, transthoracic pacemaker, permanent pacemaker or ICD, ablation).
- Monitor client status and outcome of interventions.
- Tailor client teaching to individual needs (e.g., medication and symptom management, activity restrictions and ambulation, medication adherence, planning discharge and evaluation of social support).

6.5 selects appropriate nursing interventions for the client with an electronic device (e.g., ICD, pacemakers).

Example

The following are potential nursing interventions for the client with an electronic device.

- Promote self-care and independence in clients with electronic devices (e.g., pacemaker, ICD).
- Facilitate optimal level of functioning.
- Monitoring device functioning (e.g., post-procedure functioning and care).
- Tailor client teaching to individual needs (e.g., medication and symptom management, activity restrictions and ambulation, medication adherence, planning discharge and evaluation of social support).
- Prepare client for follow-up requirements and problems relating to technology (e.g., shocks, infection).
- Acknowledge fear, anxiety, and concern from client and family with respect to living with technological devices (e.g., depression, sexuality).

7. The Care of the Person with Valvular Heart Disease (12 competencies)

The cardiovascular nurse:

7.1 interprets the following data related to valvular heart disease including the following pathophysiology: congenital (e.g., bicuspid valve, Ebstein's anomaly, Marfan's syndrome); acquired (e.g., rheumatic fever, endocarditis, degenerative, papillary muscle dysfunction).

7.1a History taking:

- presenting symptoms (e.g., dyspnea, chest pain, dizziness, fatigue, pre-syncope, syncope, manifestations of heart failure, activity intolerance, palpitations);
- current and past medical history (e.g., rheumatic heart disease, pulmonary disease, renal disease, myocardial infarction, stroke, cardiomyopathy, hematological disorders, endocarditis, peripheral vascular disease, surgical history);
- dental assessment/intervention;
- cardiac risk factors (e.g., family history, smoking, diabetes, hypertension, dyslipidemia, physical inactivity, stress, depression);
- medications (e.g., prescription and non-prescription, herbals);
- psychosocial history (e.g., substance abuse); and
- discharge planning (e.g., evaluation of social and family support, activities of daily living assessment, addiction counselling).

7.1b Physical/System assessment:

- inspection (e.g., skin colour, diaphoresis, clubbing, jugular venous distention, petechiae, splinter hemorrhages, Janeway lesions);
- auscultation (e.g., lung sounds, heart sounds/murmurs, blood pressure(s)); and
- palpation (e.g., differentiation of peripheral pulses, thrills, heaves/lifts).

Diagnostic assessment:

7.1c Laboratory investigations (e.g., serum electrolytes, renal function, complete blood count [CBC], coagulation studies [PTT and INR], blood cultures).

7.1d Cardiac and other diagnostic tests (e.g., 12-lead ECG, coronary angiogram, echocardiograms, chest x-ray, pulse oximetry, CT, MRI).

7.2 selects appropriate nursing interventions to manage clients with the following potential complications of valvular heart disease:

7.2a infection;

7.2b heart failure;

7.2c embolization;

7.2d dysrhythmia;

7.2e cerebral vascular accident;

7.2f rupture (e.g., valve, aorta); and

7.2g valvular thrombosis.

Example

The following are examples of nursing interventions to manage clients with potential complications from valvular heart disease.

- Prepare for diagnostic testing and potential treatment options.
- Monitor pharmacological effects (e.g., beta blockers, anticoagulants, diuretics, vasodilators).
- Monitor hemodynamic status.
- Monitor neurological status for possible stroke (e.g., aphasia, ataxia, facial droop, visual disturbances, weakness/dizziness, gag reflex).
- Tailor client teaching to individual needs (e.g., heart failure management, surgical repair options, anticoagulation management, prophylactic antibiotics).
- Manage dysrhythmias.
- Promote preventive measures (e.g., prophylactic antibiotics, dental care, early treatment of infections, addiction counselling).

8. The Care of the Person with Vascular Diseases (15 competencies)

The cardiovascular nurse:

- 8.1 interprets the following data related to peripheral vascular diseases including the pathophysiology of arterial and venous vascular disease.
- 8.1a History taking:
- presenting symptoms of arterial occlusion (e.g., resting limb pain, limb numbness, tingling and coldness, claudication, tight shiny skin);
 - presenting symptoms of venous occlusion (e.g., lower extremity aching and fatigue, alteration in skin integrity, warmth, mottling, swelling);
 - current and past medical history (e.g., ischemic heart disease, pulmonary disease, renal disease, stroke/transient ischemic attack [TIA], hematological disorders, deep vein thrombosis, surgical history);
 - cardiovascular risk factors (e.g., age, family history, smoking, diabetes, hypertension, dyslipidemia, obesity, physical inactivity);
 - medications (e.g., prescription and non-prescription, herbals);
 - psychosocial history (e.g., substance use, travel history); and
 - discharge planning (e.g., evaluation of social and family support, activities of daily living assessment, occupation).
- 8.1b Pain assessment (e.g., location, duration, radiation, intensity, quality, precipitating/aggravating/alleviating factors, associated symptoms, onset, frequency and changing patterns).
- 8.1c Physical/System assessment to identify arterial and/or venous occlusion:
- inspection (e.g., skin changes, skin colour, hair loss, nail bed alterations, clubbing, shiny skin, tissue necrosis, bilateral limb comparisons, presence of varicosities, edema);
 - auscultation (e.g., diminished or absent peripheral pulses, bilateral limb blood pressure assessment, bruits); and
 - palpation (e.g., diminished or absent peripheral pulses, skin temperature changes, edema, capillary refill, Allen's test, bilateral limb circumference).
- Diagnostic assessment:
- 8.1d Laboratory investigations (e.g., coagulation studies [INR and PTT], lipid profile, complete blood count [CBC], D-dimer, inflammatory markers).
- 8.1e Cardiovascular and other diagnostic tests (e.g., ankle-brachial index, chest x-rays, 12-lead ECG, Doppler ultrasounds, venogram, angiogram, CT, MRI).

- 8.2 selects appropriate nursing interventions to improve peripheral blood flow and prevent complications of peripheral vascular diseases including:
- 8.2a arterial occlusion; and
 - 8.2b venous occlusion.

Example

The following are potential nursing interventions to improve peripheral blood flow and prevent complications of peripheral vascular diseases.

- Prepare for diagnostic testing and potential treatment options (e.g., surgery).
- Monitor pharmacological effects (e.g., antiplatelets, anticoagulants, analgesics).
- Promote rest and limb repositioning and use of supporting devices (e.g., support stockings and sequential pneumatic compression device used for venous disease).
- Tailor client teaching to individual needs (e.g., self-management, modifying risk factors, exercise, medication management, symptom management, activities of daily living, infection and progression of disease, sexual issues).

- 8.3 interprets data related to aortic aneurysms or aortic dissection including the following.
- 8.3a History taking:
 - presenting symptoms of thoracic aneurysm (e.g., dyspnea, cough, hoarseness, dysphasia, hemoptysis);
 - presenting symptoms of abdominal aneurysm (e.g., often asymptomatic, GI symptoms, oliguria, hematuria, anuria);
 - presenting symptoms of aortic dissection (e.g., acute back, abdomen and chest pain, syncope, diaphoresis, cold limb(s));
 - current and past medical history (e.g., hypertension, trauma injuries, coarctation of the aorta, Marfan's syndrome, ischemic heart disease, pulmonary disease, renal disease, stroke/transient ischemic attack [TIA], hematological disorders);
 - cardiovascular risk factors (e.g., gender, smoking, age, family history, diabetes, hypertension, dyslipidemia, obesity);
 - medications (e.g., prescription and non-prescription, herbals);
 - psychosocial history (e.g., recent accidents, falls, substance use); and
 - discharge planning (e.g., evaluation of social and family support, activities of daily living assessment, occupation).
 - 8.3b Pain assessment (e.g., location, duration, radiation, intensity, quality, precipitating/aggravating/alleviating factors, associated symptoms, onset, frequency and changing patterns).

- 8.3c Physical/System assessment to identify location of aneurysm or aortic dissection:
- inspection (e.g., pulsatile mass, abdominal distention, skin colour changes (mottling), jugular venous distention, level of consciousness);
 - auscultation (e.g., diminished or absent peripheral pulses, bilateral limb blood pressures(s), bruits, lung sounds, changes in heart rate, bilateral pulse comparisons, pulsus paradoxus); and
 - palpation (e.g., diminished or absent peripheral pulses, skin temperature changes, edema, capillary refill, pulsatile mass).

Diagnostic assessment:

- 8.3d Laboratory investigations (e.g., complete blood count [CBC], coagulation studies [INR and PTT], type and crossmatch, electrolytes, renal function, lipid profile, blood gases, cardiac biomarkers).
- 8.3e Cardiovascular and other diagnostic tests (e.g., chest and abdominal x-rays, echocardiograms, computerized tomography [CT] scan, magnetic resonance imaging [MRI], 12-lead ECG, angiograms, Doppler ultrasound, pulse oximetry, abdominal ultrasound).
- 8.4 selects appropriate nursing interventions to maintain client's condition with:
- 8.4a aortic dissection/rupture;
- 8.4b abdominal aneurysm; and
- 8.4c thoracic aneurysm.

Example

The following are potential nursing interventions to maintain a client's condition with an aortic dissection or an aneurysm.

- Prepare for diagnostic testing and potential treatment options.
- Monitor oxygenation.
- Monitor and maintain blood pressure within parameters.
- Monitor pharmacological effects (e.g., antihypertensives, beta blockers, diuretics, analgesics).
- Monitor peripheral pulses.
- Monitor lab values (e.g., CBC, creatinine, BUN).
- Monitor levels of consciousness.
- Monitor fluid balance.
- Tailor client teaching to individual needs (e.g., modifying risk factors, medication regimen management, symptom management, activities of daily living, exercise).

9. The Care of the Person with Heart Disease Related to Inflammatory/Infectious Processes: Pericarditis, Endocarditis, Myocarditis (11 competencies)

The cardiovascular nurse:

- 9.1 interprets the following data related to the impact of the inflammatory/infectious process in the heart including the following disorders: pericarditis, endocarditis, myocarditis.
- 9.1a History taking:
- presenting symptoms (e.g., dyspnea, fatigue, activity intolerance, malaise and unexplained fever, night sweats, recent symptoms of viral illness, joint pain, weight loss, chest pain, manifestations of heart failure);
 - current and past medical history (e.g., past history of valvular heart disease or endocarditis or presence of a prosthetic valve, childhood murmurs, congenital heart disease, recent dental and other invasive procedures, recent cardiac surgery, renal disease, recent myocardial infarction, viral illness, autoimmune syndromes, chest trauma, radiation therapy, pregnancy);
 - cardiovascular risk factors (e.g., gender, smoking, age, family history, diabetes, hypertension, dyslipidemia, obesity);
 - medications (e.g., prescription and non-prescription, herbals);
 - psychosocial history (e.g., intravenous drug use); and
 - discharge planning (e.g., evaluation of social and family support, activities of daily living assessment, occupation).
- 9.1b Pain assessment (e.g., pleuritic-type pain, pain on inspiration, increased pain in supine position, location, duration, radiation, intensity, quality, precipitating/aggravating/alleviating factors, associated symptoms, onset, frequency and changing patterns).
- 9.1c Physical/System assessment:
- inspection (e.g., lethargy, joints, petechiae, splinter hemorrhages, temperature);
 - auscultation (e.g., heart sounds, pericardial friction rub, murmurs, lung sounds, blood pressure(s)); and
 - Palpation (e.g., pulses).
- Diagnostic assessment:
- 9.1d Laboratory investigations (e.g., blood cultures, complete blood count, sedimentation rate, electrolytes, coagulation studies [PTT and INR], renal function, creatine kinase [CK], C-reactive protein, viral titres, MRI).
- 9.1e Cardiac and other diagnostic tests (e.g., 12-lead ECG, echocardiograms, chest x-ray, CT scan, cardiac biopsy).

- 9.2 interprets the following data related to endocarditis assessment including:
- 9.2a embolic sequelae:
- cerebral (e.g., changes in level of consciousness, visual disturbances, headaches);
 - splenic embolization (e.g., upper left abdominal pain);
 - renal embolization (e.g., hematuria and oliguria, renal function);
 - peripheral embolization (e.g., change in peripheral pulses and joint tenderness); and
 - cardiac embolization (e.g., heart block, dysrhythmias, myocardial infarction).
- 9.3 interprets the following data related to pericarditis/pericardial effusion assessment including:
- 9.3a manifestations of tamponade (e.g., dyspnea, hemodynamic instability, jugular venous distention, pulsus paradoxus).
- 9.4 interprets the following data related to myocarditis assessment including:
- 9.4a manifestations of acute heart failure.
- 9.5 selects appropriate nursing interventions for the following inflammatory/infectious diseases of the heart including:
- 9.5a pericarditis;
- 9.5b endocarditis; and
- 9.5c myocarditis.

Example

The following are potential nursing interventions for managing inflammatory/infectious diseases of the heart.

- Manage pain (e.g., cardiac, pleuritic, joint).
- Maintain hemodynamic stability (e.g., fluids and inotropic agents).
- Monitor temperature and ECG.
- Arrange for appropriate venous access if long-term antibiotics are required.
- Assess for manifestations of heart failure.
- Assess nutritional status.
- Refer for dental assessment.
- Prepare for diagnostic testing and potential treatment options (e.g., cardiac biopsy, ventricular assist device, transplant).
- Tailor client teaching to individual needs (e.g., antibiotic prophylaxis, social support, steroids, addiction counselling, self-management).

10. Core Concepts Related to Psychosocial Needs (6 competencies)

The cardiovascular nurse:

- 10.1 Interprets data related to the psychosocial needs based on the client's:
 - emotional response to the cardiovascular illness (e.g., denial, anger, depression, anxiety, coping skills, vulnerability, sexuality);
 - perceived experience with the health-care system (e.g., waiting times, complications);
 - perceived current and past experiences (e.g., similar illness in a family member or friend);
 - perceived/actual support (e.g., family, social and occupational support, caregiver support);
 - treatment adherence (e.g., medications, appointments, treatments);
 - cultural and spiritual values/beliefs; and
 - financial situation (e.g., lack of insurance, sick benefits).
- 10.2 selects appropriate interventions to promote holistic care:
 - 10.2a assisting clients and their families to make informed choices about their care;
 - 10.2b providing appropriate support for the client and family members based upon their perceived needs and goals for treatment, recovery, rehabilitation, palliation and end of life (e.g., autonomy, disability, advance directives, organ donation); and
 - 10.2c providing crisis intervention as needed (e.g., social worker, spiritual counsellor, crisis intervener, mental health professional).
- 10.3 selects appropriate interventions to promote comfort including:
 - 10.3a implementing non-pharmacological methods to manage the manifestations of pain, anxiety, stress, disruption in sleep patterns, depression and fear (e.g., therapeutic communication, complementary therapies, noise control, music therapy, visualization, relaxation techniques, family involvement); and
 - 10.3b implementing pharmacological agents to manage the manifestations of pain, anxiety, stress, disruption in sleep patterns, depression and fear (e.g., analgesics, sedatives, anxiolytics).

11. Cardiogenic Shock (6 competencies)

The cardiovascular nurse:

- 11.1 interprets the following data related to cardiogenic shock.
- 11.1a History taking:
- presenting symptoms (e.g., chest pain, respiratory distress, low cardiac output state, cardiac arrest, poor hemodynamic status, decreased level of consciousness);
 - past and current medical history (e.g., recent cardiac event(s), trauma, failed reperfusion strategies, late presentation for treatment, valvular heart disease, travel history);
 - cardiac risk factors (e.g., age, gender, family history, smoking, hypertension, diabetes, dyslipidemia, obesity);
 - medications and alternative therapies (e.g., prescription and non-prescription, herbals); and
 - psychosocial history (e.g., substance abuse).
- 11.1b Physical/System assessment:
- inspection (e.g., skin colour [mottling], diaphoresis, jugular venous distention, level of consciousness);
 - auscultation (e.g., lung sounds, heart sounds, new murmurs, blood pressure(s)); and
 - palpation (e.g., peripheral pulses, skin temperature, capillary refill).
- 11.1c associated findings (e.g., reduced urinary output, oliguria/anuria, altered level of consciousness, absence of peristalsis).
- Diagnostic assessment:
- 11.1d Laboratory investigations (e.g., serum electrolytes, renal and liver function, lactate, complete blood count [CBC], coagulation studies [PTT and INR], blood gases, biomarkers, such as troponins, CK, brain natriuretic peptide [BNP]).
- 11.1e Cardiac and other diagnostic tests (e.g., 12-lead ECG/continuous cardiac monitoring, echocardiograms, chest x-ray, pulse oximetry, coronary angiogram, pulmonary artery pressure assessments).
- 11.2 selects appropriate nursing interventions related to cardiogenic shock to re-establish hemodynamic stability.

Example

The following are potential nursing interventions related to cardiogenic shock to re-establish hemodynamic stability.

- Maintain airway, breathing, circulation.
- Optimize oxygenation and hemodynamic status (e.g., fluids, titrate inotropes, intra-aortic counter pulsation).
- Continuous ECG monitoring.
- Monitor pharmacological effects of vasopressors and inotropes.
- Prepare for diagnostic testing and potential treatment options (e.g., temporary pacemaker, ventilation, intra-aortic counter pulsation, angiogram, PCI, cardiac surgery options, ventricular assist device, transplant).
- Support family in crisis (e.g., social work, spiritual counsellor, family access to client).

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