

Cardiac Rehabilitation Standard Program for Acute Myocardial Infarction (2013) from the Japanese Association of Cardiac Rehabilitation

— In the Recovery Phase of Myocardial Infarction —

Japanese Association of Cardiac Rehabilitation
Standard Cardiac Rehabilitation Program Writing Committee

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Introduction

There is evidence that appropriate exercise therapy improves exercise tolerance and serves the useful function of secondary prevention in patients with ischemic heart disease. Recent studies indicate that this therapy may also improve the prognosis of patients with cardiac failure. In western countries, guidelines recommend that exercise therapy and drug therapy should be provided to patients with cardiovascular disease, and cardiac rehabilitation is widely used. Since percutaneous transluminal coronary angioplasty has not improved life expectancy in patients with ischemic heart disease, comprehensive cardiac rehabilitation centered on exercise therapy is an area of growing interest in Japan. However, cardiac rehabilitation in Japan is still relatively new, and increased use of this approach requires establishment of a standard cardiac rehabilitation program that is consistent with conditions in Japan.

The standard cardiac rehabilitation program is planned based on two principles: essential aspects of the program that should be available in most institutions; and desirable elements that will require promotion of cardiac rehabilitation and establishment of human resources, education, devices, and facilities in each institution. Both principles include a guarantee of quality and smooth adoption of the cardiac rehabilitation program based on current conditions in Japan.

Comprehensive cardiac rehabilitation should be performed as a multidisciplinary and multifaceted approach to improve exercise capacity and quality of life and to achieve secondary prevention in patients with cardiovascular disease. The standard cardiac rehabilitation program focuses on acute- to recovery-phase myocardial infarction, which is the most common cardiovascular disease in all medical institutions. The program consists of essential and desirable elements for operation of the program, including clinical assessment, assessment of exercise capacity, nutritional management, guidance on sodium reduction, weight control, blood pressure management, lipid management, diabetes management, smoking cessation, psychosocial management, instructions on activities of daily living, preparation of exercise training programs, and a system for emergency and abnormal situations.

The standard cardiac rehabilitation program planning committee consists of board members of the Japanese Association of Cardiac Rehabilitation, including multidisciplinary specialists in cardiac rehabilitation, in order to make the program practical in clinical settings in Japan. The standard program also adheres to “Guidelines for Rehabilitation in Patients with Cardiovascular Disease (JCS 2012)”, which was jointly prepared by the Japanese Circulation Society and other related academic societies. The program will be updated to correspond with the realities of clinical settings.

The hospital stay in patients with acute myocardial infarction has been shortened, which makes it more difficult to offer sufficient in-hospital cardiac rehabilitation. However, comprehensive cardiac

rehabilitation for secondary prevention should be continued after discharge and return to society. Thus, medical institutions should consider their cardiac rehabilitation programs for acute- to recovery-phase myocardial infarction and provide high-quality accessible programs based on the standard program.

Components of the standard cardiac rehabilitation program

1. Operation of the program
2. Clinical assessment
3. Assessment of exercise capacity
4. Nutritional management
5. Guidance on sodium reduction
6. Weight control
7. Blood pressure management
8. Lipid management
9. Diabetes management
10. Smoking cessation
11. Psychosocial Management
12. Instructions on activities of daily living
13. Preparation of exercise training programs
14. System for emergency and abnormal situations

Explanation of the elements

Essential Elements
Essential elements of the cardiac rehabilitation program
Desirable Elements
Goals for development of cardiac rehabilitation and establishment of human resources, education, devices, and facilities in each medical institution

1. Operation of the program

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Establish a patient-centered multidisciplinary cardiac rehabilitation team.2. Perform case conferences among multidisciplinary team members routinely.3. The program consists of exercise prescription, exercise therapy, patient education, and counseling.
Desirable Elements
<ol style="list-style-type: none">1. Consolidate an intra-hospital ordering system and a clinical pathway of cardiac rehabilitation to start cardiac rehabilitation program smoothly.2. Establish a closely collaborated system to other institutions specialized in cardiac rehabilitation intervention.
Intervention
Essential Elements
<ol style="list-style-type: none">1. Appoint a person in charge of operating the program in the cardiac rehabilitation team.2. Check whether the rehabilitation program is patient's specific intervention or not.3. Review the program on a regular basis in terms of continuity and effects of interventions.
Desirable Elements
<ol style="list-style-type: none">1. Assign an expert physician on exercise test and/or exercise intervention to the cardiac rehabilitation intervention team.
Goals
Essential Elements
<ol style="list-style-type: none">1. Form a cardiac rehabilitation team with multidisciplinary medical professionals.2. Encourage all medical professionals to attend training courses and academic congress on a regular basis to improve the quality of the cardiac rehabilitation intervention.
Desirable Elements
<ol style="list-style-type: none">1. Publish a regular summary of the intervention outcomes.2. Improve the environment for outpatient cardiac rehabilitation program (facilities such as a dressing room, scheduling of the program).

2. Clinical assessment

Evaluation
<p>Essential Elements</p> <p>Evaluate the following items before starting the cardiac rehabilitation program to clarify the goals, objectives and risk factors when the program is in place.</p> <ol style="list-style-type: none">1. Obtain information on medical history from patients.<ol style="list-style-type: none">a) Identify present illness and history of diagnosis and treatment of cardiovascular diseases and results of heart function tests.b) Identify complications (peripheral arterial disease, cerebrovascular disease, lung disease, renal disease, diabetes, orthopedic diseases, psychiatric/nervous system disease).c) Identify cardiac symptoms: precordial symptoms, palpitation, shortness of breath, dyspea, NYHA classification.d) Identify the drugs being used (including type, dosage, frequency, and medication status compliance). In particular, check the medication status of antiplatelet agents such as aspirin and clopidogrel, anticoagulant agents such as warfarin, β blockers, antihyperlipidemic agents, and angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs).e) Identify coronary risk factors: hypertension, dyslipidemia, diabetes, smoking, obesity, physical inactivity, family history.2. Examination of physical findings.<ol style="list-style-type: none">a) Examine circulation/respiratory status: pulse, blood pressure, heart sound/cardiac murmur, respiratory sound, respiratory status, palpation of lower limbs and pretibial edema, extremity/carotid pulse extremity.b) Killip classification3. Analyze laboratory test findings.<ol style="list-style-type: none">a) Resting 12-lead electrocardiograms: presence of Q wave and arrhythmiab) Chest X-ray images: CTR, pulmonary congestionc) Blood biochemistry: peak CK (CK-MB), BNP or NT-ProBNP, liver/renal function tests, coronary risk factors (diabetes, dyslipidemia)d) Echocardiography: left ventricular ejection fraction (LVEF), left ventricular end-diastolic diameter (LVEDD), left ventricular wall motion.e) Exercise tolerance test: Perform a 200-300 m walking test before starting machine exercise in the cardiac rehabilitation room and a submaximal or symptom limited exercise tolerance test after the patient is accustomed to the exercise.f) Coronary angiography or coronary CT angiography: check for residual stenosis/occlusion4. Review the treatment policy.

<ul style="list-style-type: none"> a) Schedule of future revascularization for treatment of residual stenosis/occlusion b) Schedule of future device treatment such as ICD and CRT
Desirable Elements
<p>Check the following test results (if available).</p> <ul style="list-style-type: none"> 1. Radioisotope examination: exercise tolerance or pharmacologic stress testing with myocardial perfusion imaging 2. Cardiopulmonary exercise 3. Intracardiac pressure measurement/ hemodynamics: pulmonary artery wedge pressure, cardiac output, pulmonary arterial pressure, right atrial pressure
Intervention
Essential Elements
<ul style="list-style-type: none"> 1. Prepare a clinical assessment to be given to the patient or kept in the medical record.
Desirable Elements
None
Goals
Essential Elements
<ul style="list-style-type: none"> 1. Summarize short-term treatment goals and strategy.
Desirable Elements
<ul style="list-style-type: none"> 1. Prepare a discharge plan containing a summary of long-term treatment goals and strategy that can be given to the patient or kept in the medical record.

3. Assessment of exercise capacity

Evaluation
Essential Elements
<ol style="list-style-type: none"> 1. Interview patients on amount of physical activity currently and before hospitalization. 2. Evaluate appropriate activity level. 3. Obtain information on prescribed medications.
Desirable Elements
None
Intervention
Essential Elements
<ol style="list-style-type: none"> 1. In recovery phase (Phase 2), a symptom-limited exercise test using a bicycle ergometer or treadmill should be performed to evaluate heart rate, blood pressure, 12-lead electrocardiograms and Borg scale during exercise. 2. Evaluate the 6-minute walk test in patients who cannot perform a symptom-limited exercise test due to low physical or cardiac function. 3. Evaluate the lower extremity muscle strength in patients with very low functional reserve.
Desirable Elements
<ol style="list-style-type: none"> 1. Evaluate exercise capacity in detail based on the results of cardiopulmonary exercise testing (respiratory gas analysis). 2. Evaluate exercise related factors including respiratory function, depression and anxiety.
Goals
Essential Elements
<ol style="list-style-type: none"> 1. Reassess exercise capacity regularly and revise the exercise program and acceptable physical activity level. 2. Evaluate exercise capacity and clinical status at the same time. 3. Include exercise capacity data in explanation of clinical condition to patients.
Desirable Elements
<ol style="list-style-type: none"> 1. Use the exercise capacity data for establishment of other treatment plans, such as medications.

4. Nutritional management

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Obtain information on eating habits before hospitalization (meal times, food preferences, unbalanced diet, frequency of eating out).2. Check who cooks meals at home.3. Obtain information on history of alcohol intake and current alcohol consumption.4. Check for obesity, hypertension, diabetes, and dyslipidemia.
Desirable Elements
<ol style="list-style-type: none">1. Assessment of intake energy and nutrient balance by a registered dietitian before hospitalization.2. Evaluation of food intake at home for 3 to 5 days after discharge.
Intervention
Essential Elements
<ol style="list-style-type: none">1. Instruction by a registered dietitian if there are problems with nutritional status and/or eating habits.2. Explain the importance of nutrient balance and the adverse influence of excessive food intake and alcohol consumption.
Desirable Elements
<ol style="list-style-type: none">1. Provide instructions on diet and nutrition on a regular basis to family members (in particular, to persons in charge of cooking).2. Provide advice on use of a food-composition table.3. Evaluate food intake on a regular basis after discharge to promote improvement of eating behavior.
Goals
Essential Elements
<ol style="list-style-type: none">1. Establish an appropriate dietary habit to correct coronary risk factors of obesity, hypertension, diabetes, and dyslipidemia.
Desirable Elements
None

5. Guidance on sodium reduction

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Perform an interview to obtain information on dietary habits and food preferences before hospitalization, and evaluate behaviors related to sodium intake.
Desirable Elements
<ol style="list-style-type: none">1. Evaluate intension of spouses or housemates regarding sodium reduction.2. Evaluate sodium intake before hospitalization in an interview, using a list of sodium contents of food.3. Assessment of sodium intake using a simple sodium intake measurement device or other approaches.
Intervention
Essential Elements
<ol style="list-style-type: none">1. Explain the importance of sodium reduction to prevent recurrence of coronary artery disease.2. Promote self-control to reduce sodium intake using a list of sodium contents of food.3. Set goals of gradual sodium reduction at 1-2g per 3 months to achieve 8g/day sodium intake.
Desirable Elements
<ol style="list-style-type: none">1. Establish a specific diet plan to achieve sodium intake of 6g/day or less.2. Explain the importance of sodium reduction and caution regarding cooking with less sodium to patients and family members (mainly spouses and persons in charge of cooking), and construct a social support for sodium reduction.
Goals
Essential Elements
<ol style="list-style-type: none">1. Understand the importance of sodium reduction to prevent onset or recurrence of coronary artery disease.
Desirable Elements
<ol style="list-style-type: none">1. Establish conditions that maintain the sodium reduction behavior after discharge.2. Establish conditions that maintain the prescribed diet behavior and sodium intake.

6. Weight control

Evaluation
Essential Elements
1. Measure body weight, abdominal circumference, and body mass index (BMI).
Desirable Elements
1. Measure percent body fat (body composition).
Intervention
Essential Elements
<u>Indication: patients with BMI $\geq 25\text{kg/m}^2$ or waist circumference ≥ 85 cm in males and ≥ 90 cm in females (Japanese waist circumference criteria of Metabolic Syndrome)</u>
<ol style="list-style-type: none"> 1. Explanation to patient that obesity is a risk factor for recurrence of coronary artery disease. 2. Establishment of a habit to measure body weight during hospitalization through giving an example, such as a measurement time after urination in the morning. 3. Prescribe lifestyle behavior to manage weight loss including dietary habit or exercise (physical activity), and set an appropriate goal by identification of modifiable factors. 4. Target BMI < 25 kg/m² and waist circumference < 85 cm in male and < 90 cm in female. 5. Set a desired value as a first target level especially in patients with anxiety or depression and perform a step-by-step approach. DO NOT set strict goals at first.
Desirable Elements
<ol style="list-style-type: none"> 1. Set a daily calorie intake and prescribe the dietary behavior and exercise program to achieve the goal. 2. Explain the importance of calorie balance of protein, lipid and carbohydrate to elderly patients, in order to avoid loss of muscle mass due to excessive weight loss.
Goals
Essential Elements
<ol style="list-style-type: none"> 1. Maintain and improve the lifestyle of patients in terms of body weight control by diet and exercise. 2. Decrease body weight, waist circumference and BMI, and maintain after discharge.
Desirable Elements
1. Improve body composition, including a decrease in body fat mass and an increase in skeletal muscle mass.

7. Blood pressure management

Evaluation
Essential Elements
<ol style="list-style-type: none"> 1. Measure blood pressure twice or more in a sitting position at rest for more than 5 minutes, if possible. 2. Measure blood pressure in both arms at the initial measurement. 3. Measure blood pressure lying, sitting, and standing immediately after stopping bed rest, in order to exclude orthostatic hypotension.
Desirable Elements
<ol style="list-style-type: none"> 1. Check whether the blood pressure measurement is performed at home after discharge.
Intervention
Essential Elements
<p><u>Start drug therapy to follow-up blood pressure, if meeting the following criteria.</u></p> <ol style="list-style-type: none"> 1. For patients with systolic blood pressure (SBP) 120-139 mmHg or diastolic blood pressure (DBP) 80-89 mmHg, give instructions on improvement of lifestyle, including daily physical activities, exercise, and weight control; sodium intake and intake of fresh fruit, vegetables, and low-fat food; appropriate alcohol consumption; and smoking cessation. 2. For patients with chronic kidney disease, cardiac failure, and/or diabetes with SBP \geq130 mmHg and DBP $>$ 80 mmHg, start drug therapy and give instructions on improvement of lifestyle. 3. For patients with SBP \geq 140 mmHg or DBP \geq 90 mmHg, start drug therapy and improvement of lifestyle.
Desirable Elements
<ol style="list-style-type: none"> 1. Patients with hypertension complicated with myocardial infarction should receive a β blocker, ACE inhibitor (ACEi), or ARB as first line therapy. However, a definite and sufficient antihypertensive effect should be obtained, with possible concurrent use of a diuretic and/or Ca antagonist. 2. For elderly patients (diuretic, ACEi, ARB, Ca antagonist) or those who develop cardiac failure (diuretic, β blocker, ACEi, ARB), metabolic syndrome (ACEi, ARB), diabetes (ACEi, ARB), atrial fibrillation (ACEi, ARB, β blocker), or renal failure (ACEi, ARB, loop diuretic) regardless of age, select each drug based on guidelines such as the Guidelines for Management of Hypertension.
Goals
Essential Elements
<ol style="list-style-type: none"> 1. Provide appropriate interventions for patients with prehypertension until blood pressure returns to normal; for hypertension patients until blood pressure decreases to $<$ 130/85

mmHg; for elderly hypertension patients until blood pressure decreases to < 140/90 mmHg; and for patients with diabetes, cardiac failure, and/or chronic renal disease until blood pressure decreases to < 130/80 mmHg.

2. Maintain the target blood pressure for as long as possible.

Desirable Elements

1. Control risk factors other than blood pressure to prevent recurrence of cardiovascular diseases.

8. Lipid management

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Measure fasting LDL cholesterol, HDL cholesterol, and triglyceride.2. Perform an interview on the history of drug or diet therapy to determine possible effects on blood lipids.3. Perform an interview on drug compliance.4. Reevaluate the lipid profile within 8 weeks after starting lipid-lowering treatment.5. Determine creatine kinase (CK) and hepatic function on a regular basis to evaluate adverse reactions to lipid-lowering drug therapy.
Desirable Elements
<ol style="list-style-type: none">1. Evaluate the lipid profile every 4-6 weeks after starting lipid-lowering treatment.
Intervention
Essential Elements
<p>Encourage consultation on the following items with a registered dietitian.</p> <ol style="list-style-type: none">1. Advice on appropriate total amount of energy (standard body weight \times 25-30 kcal) and a balanced diet (carbohydrate:protein:lipid = 60:15-20:20-25%).2. For patients with high LDL cholesterol, advice on maintenance of a strict fat-restricted diet (fat energy ratio: \leq 20%) and a cholesterol-restricted diet.3. For patients with a high triglyceride level, advice on restriction of alcohol consumption, intake of energy from carbohydrates, body weight control, and exercise counseling.4. For patients with low HDL cholesterol, advice on exercise counseling and smoking cessation.5. Start drug therapy if sufficient improvement is not obtained by lifestyle guidance.
Desirable Elements
<ol style="list-style-type: none">1. Patients with high LDL cholesterol should consume food containing high amounts of unsaturated fatty acids (abundant in oil extracted from sardines and mackerel, vegetable oil). The intake ratio of saturated:monounsaturated:polyunsaturated fatty acids should be maintained at about 3:4:3.
Goals
Essential Elements
<ol style="list-style-type: none">1. Patients should understand and take more interest in the significance of lipid management in coronary artery disease.
Desirable Elements
<ol style="list-style-type: none">1. The levels of LDL cholesterol, HDL cholesterol, and triglyceride should quickly reach \leq 100 mg/dl, \geq 40 mg/dl, and \leq 150 mg/dl, so that atherosclerotic plaque will be reduced and cardiovascular events will decrease.

9. Diabetes management

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Determine if diabetes is present in all patients and describe the results in the medical record.2. Describe the history of complications of cardiovascular disease and systemic complications in the medical record.3. Check the history of and compliance with diet therapy for hyperglycemia and hypoglycemic episodes at the initial counseling.4. Check recent fasting blood glucose levels and HbA1c before starting exercise.
Desirable Elements
None
Intervention
Essential Elements
<ol style="list-style-type: none">1. Instruct patients and medical staff on appropriate examinations and treatment in accordance with warnings and guidelines when hyperglycemia or hypoglycemia occurs.2. <u>For patients with diabetes who are receiving treatment with insulin injection or insulin secretagogues</u><ol style="list-style-type: none">a) Always pay attention to onset of hypoglycemia.b) Encourage the patient to take a sufficient amount of water to avoid an increase in blood glucose.c) Monitor closely if plasma glucose levels continuously decrease within 24-48 hours after exercise.
Desirable Elements
<ol style="list-style-type: none">1. For patients with diabetes who have recently had hypoglycemic episodes, evaluate blood glucose levels before and after exercise and until the level stabilizes. Patients who develop hypoglycemia should take 15 g of carbohydrate before exercise. Patients who develop hyperglycemia should drink an appropriate amount of water if they have no subjective symptoms. The doctor or medical staff in charge should be asked whether treatment is needed, as required.2. Instruct patients to take responsibility for self-care during exercise without supervision.3. Patients should receive nutritional advice as therapy from a diabetes dietician.4. Discuss acquisition of knowledge and measures against diabetes, patient compliance, and referral to a diabetologist.
Goals
Essential Elements
<ol style="list-style-type: none">1. The patient should be able to understand the signs and symptoms of impaired glucose

tolerance and should communicate with medical staff.

2. Establish that the patient can undertake self-care, including self-measurement of blood glucose levels and self-judgment of activity levels.

Desirable Elements

1. Control the blood glucose level at 90-130 mg/dL or HbA1c < 6.9 (NGSP).
2. Decrease the incidence of systemic complications and maintain prevention of hyperglycemia or hypoglycemia at rest and during exercise.

10. Smoking cessation

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Check smoking habits (including snuff, etc.) and smoking history to identify non-smokers, former smokers, and current smokers.2. Evaluate the past smoking status of former smokers and current smokers, and dependency if there is a history of smoking cessation. Check the risk of passive smoking at home or in the workplace.3. Ask smokers about their intention to start smoking cessation.4. Obtain information on the smoking cessation status of former smokers and smokers before and after introduction of cardiac rehabilitation to check physical and psychosocial changes associated with smoking cessation.
Desirable Elements
<ol style="list-style-type: none">1. Ask smokers and former smokers about their current status and intention to continue smoking cessation, and determine physical and psychosocial changes caused by smoking cessation.2. Continue to evaluate behavior modification phases of smoking cessation in smokers and former smokers (precontemplation, contemplation, preparation, action, maintenance).3. Determine cigarette dependence and nicotine addiction of smokers. If smokers are still smoking, reevaluate this information.
Intervention
Essential Elements
<p><u>Perform the following procedures in the 5A approach (Ask, Advice, Assess, Assist, Arrange).</u></p> <ol style="list-style-type: none">1. Ask smokers about their current intention to stop smoking (at introduction of cardiac rehabilitation).2. Communicate with smokers clearly and individually about the significance of smoking cessation.3. Hold an education session to promote understanding of the significance of smoking cessation (including passive smoking). Teach smokers using the 5R's (Relevance, Risks, Rewards, Roadblocks, Repetition). Explain the relevance and risks of health problems and the effects of smoking cessation; ask about individual factors that interfere with smoking cessation; and hold sessions to repeat the conversation, in order to motivate smoking cessation.4. Instruct nonsmokers and former smokers about the effects of smoking and how to avoid passive smoking.5. Conduct an interview for quitters about their physical and psychosocial status (body weight gain, stress, sleep deficit, etc.) to predict increased risks for smoking and the environment and behaviors that promote smoking, and give advice on how to handle or

solve these problems.

6. Support family members of patients to obtain assistance with smoking cessation. Inform family members who are smokers about the significance of smoking cessation.

Desirable Elements

Add “Assist and Arrange” to the Essential Elements in the 5A approach and enhance support.

1. Encourage patients to make a plan for smoking cessation: for example, establishing a starting day for smoking cessation.
2. Provide educational materials for smoking cessation and establish continuing opportunities to promote understanding of smoking cessation (including avoidance of passive smoking). Provide continuing personal counseling or group guidance using the 5R’s (Relevance, Risks, Rewards, Roadblocks, Repetition) to smokers and former smokers who started smoking cessation within the previous 6 months.
3. Explain drug therapy to smokers and consider using this therapy when necessary.
4. Introduce a smoking cessation clinic that patients may attend if they wish.
5. Conduct an interview for former smokers and quitters about their physical and psychosocial status (body weight gain, stress, sleep deficit, etc.) to predict increased risks for smoking and the environment and behaviors that promote smoking, give advice on how to handle or solve these problems, and continue to provide advice after the interview.
6. Support patients in obtaining social support for smoking cessation and avoidance of passive smoking, such as cooperation in the workplace.

Goals

Essential Elements

1. Encourage patients and their family members to understand the ill effects of smoking, including passive smoking, and the significance of smoking cessation.
2. Encourage smokers to be motivated to start smoking cessation. Instruct former smokers on continuation of smoking cessation.
3. Avoid physical and psychological damage to smokers that may be associated with smoking cessation.

Desirable Elements

1. Encourage smokers to continue smoking cessation for 1 year or more. DO NOT allow a restart of smoking in former smokers.
2. Improve the physical and mental status of smokers due to smoking cessation.
3. Obtain social support at home and in the workplace to avoid the ill effects of passive smoking.

11. Psychosocial Management

Evaluation

Essential Elements

<ol style="list-style-type: none"> 1. Identify an interview to obtain psychological information. <ol style="list-style-type: none"> a) Anxiety and concerns b) Motivation and adherence for cardiac rehabilitation c) Presence and degree of drug/alcohol use d) History of psychiatric disorder e) Use of drugs that may have psychological effects (e.g., β blocker, antidepressant, hypnotic, psychotropic drugs) 2. Identify an interview to obtain social information. <ol style="list-style-type: none"> a) Social support (marital status, family, partner, key person) b) Use of social resources (certification of required care insurance/long-term care service, care manager) c) Economic situation (e.g., insurance, pension, public assistance) d) Availability of a primary care doctor after discharge (for follow-up) e) Concrete method for continuation of cardiac rehabilitation (e.g., distance, time, commuting) 2. Identify an interview on lifestyle (e.g., exercise, diet, sleep, work, how to spend their spare time). 3. Build rapport between patients and medical staff and consider patients concerns when identifying an interview on psychological and social information, life style.
Desirable Elements
<ol style="list-style-type: none"> 1. Evaluate anxiety, depression, and social isolation using a reliable and validated method *¹ 2. Evaluate QOL (quality of life) using a reliable and validated method *². 3. Evaluate cognitive functions using a reliable and validated method *³. 4. Identify an interview on stress in spouse and family members. 5. Obtain information on sexual dysfunction/ adjustment.
Intervention
Essential Elements
<ol style="list-style-type: none"> 1. Ask and talk about psychosocial problems with patients, family members, domestic partners, and/or significant others. 2. Provide information on cardiac diseases and psychiatric symptoms. 3. Hold patient education sessions and conferences hosted by a multidisciplinary team. 4. Enhance social support. 5. Use the social support system inside or outside the hospital. (e.g., maximum copayment for high medical care costs, assistance by public medical expenses for disease/treatment, sickness and injury allowance/disability pension, long-term care insurance system).
Desirable Elements
<ol style="list-style-type: none"> 1. Encourage family members, partners, and key persons to participate in patient education

<p>sessions.</p> <ol style="list-style-type: none"> 2. Provide stress management and relaxation methods. 3. Provide professional counseling and treatment. 4. Use clinical pathways for acute-phase diseases 5. Use region clinical pathways.
Goals
Essential Elements
<ol style="list-style-type: none"> 1. Patients can solve or reduce psychosocial problems. <ol style="list-style-type: none"> a) Attempt to correct lifestyle for health maintenance. b) Obtain suitable social support and resources. c) Obtain further treatment/control if there are serious psychological problems
Desirable Elements
<ol style="list-style-type: none"> 1. The QOL of the patient is improved. 2. Patients continue to participate in the cardiac rehabilitation program. 3. Depression and anxiety symptoms of patients are reduced. 4. Allow patients and family members to acquire relaxation and stress management skills. 5. Patients can avoid excessive alcohol consumption. 6. Patients can achieve smoking cessation.

*1 e.g., Hospital Anxiety and Depression Scale

*2 e.g., SF-36

*3 e.g., Mini mental state examination (MMSE)

12. Instructions on activities of daily living

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Perform an interview on household duties, work, and recreation before hospitalization.2. Evaluate current physical activity levels using a questionnaire.3. Quantitatively evaluate physical activities in daily living based on the results of various tests, such as an exercise tolerance test.
Desirable Elements
<ol style="list-style-type: none">1. Evaluate behavior modification, inhibition of increase of physical activities, and social support.
Intervention
Essential Elements
<ol style="list-style-type: none">1. Provide advice, support, and counseling for physical activities.2. Establish an exercise program necessary for individual daily living.3. Plan routines to increase physical activities based on current routines.4. Advise elderly patients on low intensity aerobic activity to minimize musculoskeletal injury.5. Provide advice on slowly increasing physical activities if a patient wants to do this.6. Suggest a method of enhancing physical activities in daily living (e.g., commuting, leisure activities)7. Advise the patient to avoid performing unaccustomed vigorous physical activity.
Desirable Elements
<ol style="list-style-type: none">1. Encourage moderate intensity exercise for 20-60 minutes per day for 5 or more days per week.2. Provide educational materials as part of advice, support, and counseling.3. Reevaluate activities of patients who participate in the exercise training program.
Goals
Essential Elements
<ol style="list-style-type: none">1. Greater participation in household duties, work, and recreation activities.2. Improved psychosocial health and reduced stress.3. Support opportunities for functional independence to prevent disability.4. Increase opportunities for independence to achieve recommended goals.
Desirable Elements
<ol style="list-style-type: none">1. Improve aerobic exercise performance and body composition to reduce the risk of coronary artery diseases.2. Introduce regular physical activities into lifestyle.

13. Preparation of exercise training programs

Evaluation
Essential Elements
<ol style="list-style-type: none">1. Obtain a medical history for the patient to determine items that may affect exercise training.<ol style="list-style-type: none">a) Orthopedic disease, peripheral arterial disease, cerebrovascular disease, lung disease, renal disease, psychiatric disorder, nervous system disease, etc.2. Observe abnormal reactions during an exercise tolerance test or exercise training.<ol style="list-style-type: none">a) Perform a symptom-limited exercise tolerance test using a cycle ergometer or treadmill in the recovery phase to evaluate heart rate, blood pressure, 12-lead electrocardiograms, and the rating of perceived exertion (RPE) scale during the test.b) Reevaluate the above items on a regular basis.
Desirable Elements
<ol style="list-style-type: none">1. Perform cardiopulmonary exercise to evaluate the maximal oxygen uptake and anaerobic threshold.2. Observe abnormalities in heart rate and ventilation responses in cardiopulmonary exercise.3. Determine muscle strength such as grip strength and knee extension muscle strength.4. Check full body flexibility.5. Check balance ability.6. Monitor mental/psychological characteristics such as depression and anxiety.7. Evaluate health related QOL.
Intervention
Essential Elements
<ol style="list-style-type: none">1. Confirm approval of an indication for exercise training by a primary care physician and rehabilitation physician.2. Explain the objectives, individual goals, and contents of the exercise training program to patients and obtain their informed consent.3. Make an individual program of aerobic exercise and resistance training and provide this to patients.4. Perform warm-up before starting each exercise session, and cool-down and stretching movements after each session.5. Perform continuous ECG monitoring during training sessions at least in early phase after starting the program (if the exercise training session is performed at the outpatient department, necessity of continuous ECG monitoring depends on the risk severity).6. Measure blood pressure before and after exercise. Measure blood pressure during some training sessions immediately after starting.7. Provide advice to patients on the risk of onset of serious symptoms and on safety

management during the exercise training sessions.

8. Modify the exercise prescription according to the condition of each patient.

Desirable Elements

1. Define the frequency, intensity, duration, and mode of aerobic exercise.
 - a) Frequency: 3-7 days/week, every day if possible
 - b) Intensity: 40-60% of maximal oxygen uptake, 55-69% of maximal heart rate, 40-60% of heart rate reserve (Karvonen: $k = 0.4-0.6$), heart rate of the anaerobic threshold or intensity 1 minute before the anaerobic threshold
 - c) Duration: 20-60 minutes
 - d) Mode: Walking, aerobics, cycling, jogging, light swimming, etc.
2. Define the frequency, intensity, duration, and mode of resistance training.
 - a) Frequency: 2-3 times/week
 - b) Intensity: Upper limb exercise: 30-40% of 1RM, lower limb exercise: 50-60% of 1RM, 1 set consists of 10 to 15 times
Repeatable load, moderate fatigue, Borg Scale: 11-13, Upper limit is set at "a little hard"
 - c) Duration: 1 to 3 sets of 8-10 kinds of exercises involving upper and lower limbs
 - d) Mode: rubber band, weights on ankles and wrists, dumbbell, free weights, pulley, weight machine, etc.
3. Start the exercise program during hospitalization, and participate in the program at the outpatient department for approximately 3 months (2 to 5 months) after discharge.
4. Receive supervised exercise training for 30 to 90 days after onset according to the degree of risk, and subsequently receive non-supervised exercise therapy. Finally, patients will be able to manage the exercise program by themselves.

Goals

Essential Elements

1. Patients should understand safe and effective ways to do exercise training.
2. Maintain and improve exercise tolerance (maximal oxygen uptake, anaerobic threshold), flexibility, muscle endurance, and muscle strength.
3. Decrease ventilation, heart rate, cardiac work (rate-pressure product) at the same level of exertion, and increase the myocardial ischemia threshold and alleviate cardiac failure.
4. Remove anxiety about exercise and improve activity.
5. Decrease coronary risk factors.
6. Improve health-related QOL and obtain mental and psychological effects.

Desirable Elements

1. Inhibit progression of coronary stenosis.
2. Decrease the incidence of coronary events.
3. Decrease hospitalization caused by exacerbation of cardiac failure.

4. Improve life expectancy (reduce risk of all-cause mortality, decrease cardiac death).

14. System for emergency and abnormal situations

Evaluation
Essential Elements
<ol style="list-style-type: none"> 1. Place oxyecoa supply equipment, cardioverter (manual defibrillator or AED), a cardiac monitor, sphygmomanometer, and a crash cart in a training room for functional exercises. 2. Train medical staff who are responsible for cardiac rehabilitation to perform basic life support (BLS) while waiting for doctors who can provide advanced cardiovascular life support (ACLS), in case of sudden changes in a patient's condition.
Desirable Elements
<ol style="list-style-type: none"> 1. Provide necessary tests and procedures, such as ECG, biochemical tests, echocardiography, and radiography. 2. Provide emergency internal/surgical therapy for onset of complications or recurrence, and have the potential to transfer patients to a partner hospital rapidly if they need emergency surgery. 3. Arrange for availability of cardiac rehabilitation specialists certified by the Japanese Association of Cardiac Rehabilitation.
Intervention
Essential Elements
<ol style="list-style-type: none"> 1. Perform simulation of measures to be taken in emergency/abnormal cases on a regular basis. 2. Inspect drugs and equipment for use in emergencies (e.g., a cardioverter) in a crash cart every day.
Desirable Elements
<ol style="list-style-type: none"> 1. Simulate a response to an emergency/abnormal case at least once each year and involve all staff in charge of cardiac rehabilitation. The simulation should consist of measurement of timing from onset to procedures, a check of skills for BLS, and discussion of problems after the simulation.
Goals
Essential Elements
<ol style="list-style-type: none"> 1. Provide prompt life support through establishment of equipment and systems for an emergency.
Desirable Elements
<ol style="list-style-type: none"> 1. Improve the lifesaving rate in emergency/abnormal cases.