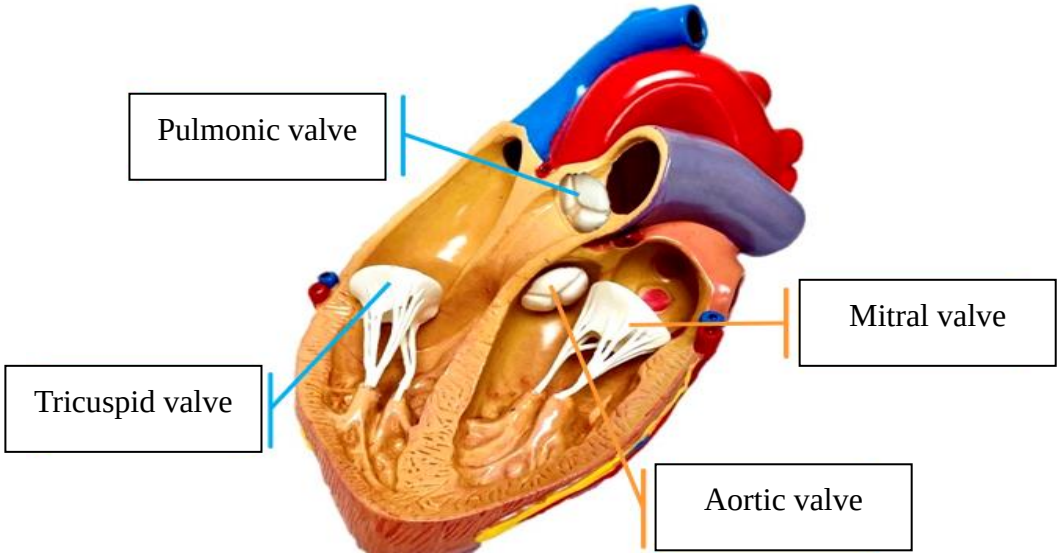
Cheng Hsin General Hospital

TAVR (Transcatheter Aortic Valve Replacement) Surgical Care Guidelines

1. Aortic Valve Position

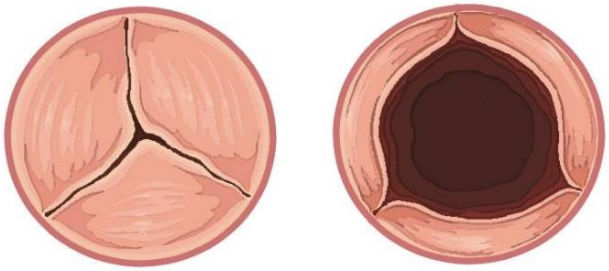
The normal heart has four valves: the tricuspid valve, pulmonary valve, mitral valve, and aortic valve. When the heart beats, these valves open to keep the blood flowing in one direction and close quickly between heartbeats to keep the blood from flowing backward. When the valves are loose or stuck, the direction of flow is abnormal, and the heart has difficulty efficiently delivering oxygenated blood to where it is needed throughout the body. The aortic valve is located between the left ventricle and the aorta and is responsible for diverting blood from the left ventricle to the aorta, which then delivers it to the major blood vessels throughout the body.



2. Description of Heart Valve Damage

A change in the direction of one-way flow can occur if a valve becomes loose due to disease or aging, resulting in backflow. A calcified or sticky valve may not open smoothly, or the valve may not be able to close completely due to the

resistance caused by the stenosis, allowing blood to flow back and forth between the atria and ventricles, all of which increases the workload on the heart and leads to symptoms of heart failure.



Normal valve opening

Stenotic valve

3. Treatment for Valve Disease

3.1 Medication

The damage to valves cannot be cured with medications, but they can improve and reduce heart symptoms. In severe cases, surgical repair is often necessary.

3.2 Valve Surgery

Surgical treatment is mainly based on replacement surgery.

3.2.1 Types of Valves

3.2.1.1 Mechanical Valves

Mechanical valves have the advantage of lasting longer than

tissue valves due to their robustness, but have the potential for clot formation, resulting in the risk of valve malfunction or vessel occlusion. Patients must take a lifelong anticoagulant (warfarin) and undergo regular blood tests to monitor their international normalized ratio (INR) levels, which determine the effectiveness of the therapy. Changes in diet, medications, and physical condition can lead to low coagulation indices, which can result in thrombosis, or high coagulation indices, which can lead to bleeding.

3.2.1.2 Tissue Valves

Biological tissue valves are made from the pericardium of animals, such as pigs and cows. They are less likely to cause blood clots, so patients do not need to take life-long anticoagulants. However, these valves can degenerate in the body over time, which may lead to problems and require further surgery.

4. Surgical Methods

4.1 Traditional Open-Heart Surgery

Traditionally, the procedure is performed through a median sternotomy, which offers an unparalleled view of the heart's intricate structure and its surroundings. However, the surgical wound is approximately 15-20 cm and there is post-operative wound pain and healing issues. Intraoperative and postoperative bleeding may also be increased, particularly in cases where a patient requires reoperation.

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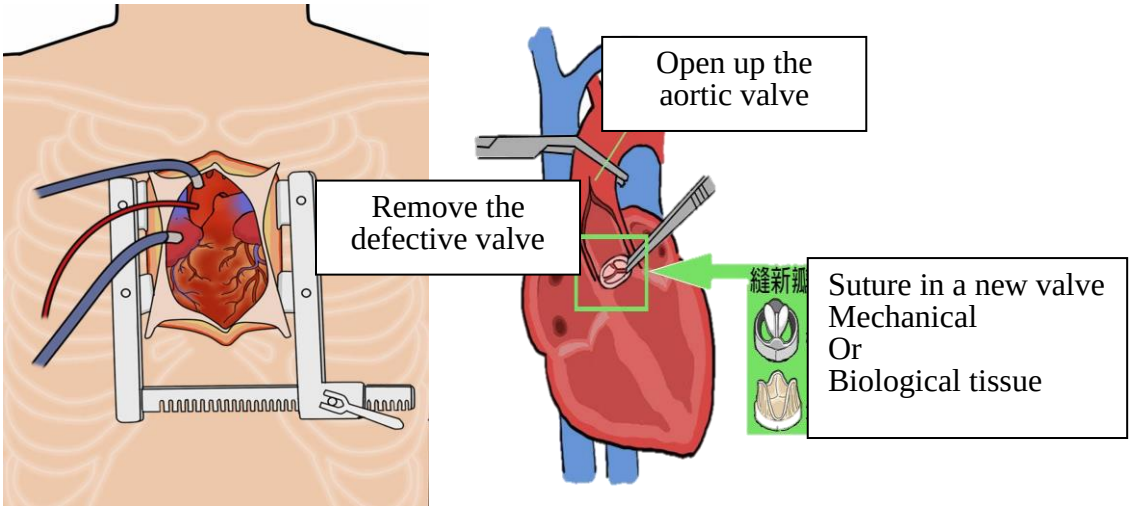

4.2 Balloon Valvuloplasty

For patients with mitral or aortic stenosis, the transcatheter placement of a small balloon to dilate the stenotic valve can offer temporary relief. However, this procedure is typically employed as a transitional treatment before valve replacement.

4.3 Transcatheter Aortic Valve Replacement

It utilizes valves made from the pericardium of animals (pigs and cows), which is a type of biological tissue that is less likely to cause blood clots, eliminating the need for long-term anticoagulant therapy in patients. Transcatheter aortic valve replacement (TAVR) is an effective alternative treatment option for patients who are ineligible for traditional open-heart surgery for valve replacement. The procedure involves using a catheter containing a specially designed heart valve that is threaded along the arterial blood vessels to the aortic valve position, where the valve is deployed and secured. Due to the lower risk associated with transcatheter aortic valve implantation, it can significantly shorten recovery time and allow patients to return to their daily routine more quickly.

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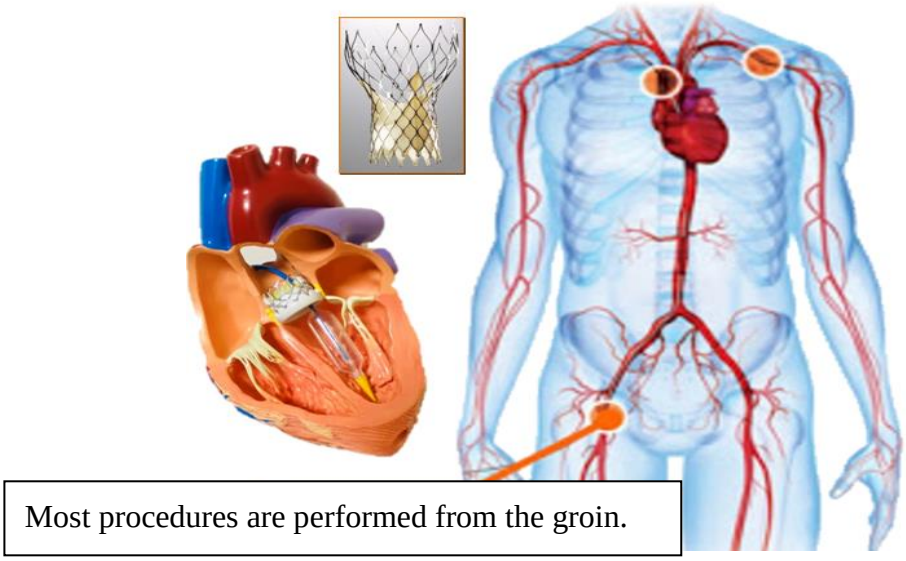

Most procedures are performed from the groin.

5. Preoperative Preparation

5.1 Prior to the procedure, you may need to undergo tests to evaluate your heart function such as cardiac catheterization, echocardiogram, high-speed CT scan, and various blood tests. It is important to stop smoking, stop drinking, and maintain a normal daily routine to ensure that your body is in the optimal condition for the procedure.

5.2 The attending physician will schedule a preoperative risk counseling session. Please arrive on time with your family. The nurse will ask you and your family to complete a consent form, and you will receive an enema the night before surgery and have to fast starting at midnight.

6. Important Notice While in the Cardiac Intensive Care Unit

6.1 Upon awakening from surgery, you will find yourself in the CCU with several tubes such as endotracheal tubes, Swan-Ganz or central venous catheters, arterial catheters, urinary catheters, and intravenous lines in place, and your hands restrained. You may also notice that your hands are

restrained, but there's no need for alarm as is done to ensure that you don't accidentally dislodge any tubes while you sleep. Once you are fully alert and your vital signs, including heart rate, blood pressure, and oxygen levels, are stable, your hands will be released as soon as the endotracheal tube is removed.

6.1.1 Endotracheal Tubes

6.1.1.1 During the procedure, you will be under general anesthesia and connected to a ventilator via a endotracheal tube to help you breathe.

6.1.1.2 The nurse will suction your sputum, so please do not be nervous and do not bite the breathing tube while this is being done.

6.1.1.3 You may experience difficult talking or eating for a period of time after this procedure. If needed, you may communicate with medical staff by nodding, shaking your head, or using a whiteboard.

6.1.1.4 Then, the medical team will carefully monitor your vital signs, and a respiratory therapist will assist you with breathing exercises to ensure a smooth extubation process. It's normal to feel nervous or uncomfortable during this time, but please try to relax and avoid biting the breathing tube while it's being removed.

6.1.1.5 You may experience some temporary hoarseness or soreness in your throat after the tube is removed, but rest assured that your medical team will provide you with appropriate care and support during your recovery.

6.1.2 Nasogastric tube

As a result of the anesthesia and ventilation used during surgery, it is common to experience abdominal bloating which can impact the

function of the heart and lungs. To alleviate this issue, a nasogastric tube will be placed, but it will be removed shortly after the breathing tube is taken out.

6.1.3 Swan-Ganz or Central Venous Catheters

They are placed on your neck or collarbone to test and evaluate your heart function. Please do not pull on them. Usually, these devices are removed on the same day that patients are discharged from the CCU.

6.1.4 Arterial Catheters

They are placed on the lateral side of the wrist or the medial of the elbow to monitor blood pressure changes continuously and for blood sampling purposes. These devices will be removed on the same day that patients are discharged from the CCU.

6.1.5 Urinary Catheters

The use of urinary catheters is necessary after heart surgery to accurately measure the body's fluid balance and monitor urine output. Some individuals may experience discomfort or a sensation of needing to urinate due to irritation caused by the catheter, even though urine is already being collected through it.

6.2 Pain

After the surgery, a few people may still experience pain from the 2 to 3-cm surgical wound. Please rest assured that the medical staff will assess your condition and provide you with suitable pain medication and sedation to ensure your comfort.

6.3 Diet

After the removal of breathing tube, there is no need to wait for flatulence before you can drink a small amount of water. You may feel thirsty in the first two days after surgery, but it's important not to drink

too much water to avoid putting an extra burden on your heart. Once you've had some water, you can start with a soft diet. If you prepare your own food, it should be light and easy to digest.

6.4 Defecation

Due to the reduced level of activity in the CCU, it is common to experience constipation or bloating. Please inform your nurse and we will promptly provide assistance to alleviate any discomfort.

6.5 Upon transfer to the CCU, we kindly ask you to have a washbasin, toothbrush, toothpaste, mouthwash cup, graduated water cup, interfolded toilet paper, wet wipes, spoons and chopsticks, bendable straws, comb, shower gel, body lotion, shoes, NHI card, and mouthwash prepared. If the patient wears dentures, please hand them to the nurse.

6.6 Visiting hours at the Cardiac Intensive Care Center:

On the second day following surgery, when your condition is deemed stable, your doctor typically arranges for your transfer to a general ward at around 10:30~11:00 a.m.

6.7 We understand that it's natural to feel uncomfortable after surgery and in the sometimes noisy environment of the CCU. If you feel experience any discomfort, please don't hesitate to inform your nurse. We kindly ask that you work closely with our doctors and nurses, as they are here to provide the best care possible.

7. Notes on General Ward Care

After stabilization, your doctor will transfer you to a general ward for further treatment. Your nurse will provide you with the following care instructions and precautions:

7.1 Please keep track of your daily fluid intake and output, and monitor your weight regularly.

7.2 X-ray and blood tests will be conducted every other morning to monitor your progress.

7.3 A nurse specialist will assist you with dressing changes every two days to ensure proper healing and comfort.

7.4 Please take your time and move slowly when you getting up, transitioning from lying to sitting, and from sitting to standing, to prevent dizziness caused be sudden changes in position.

8. Preparation before Returning Home

8.1 Wound care

8.1.1 The surgical wound is about 2~3cm and covered with cosmetic tape, so there is no need for stitch removal. It's important to keep the wound dry and avoid contact with water for 10 days following surgery. If the tape falls off naturally during this period, it does not need to be reapplied. After 10 days, you may take a shower and can use shower gel.

8.1.2 It is normal to experience numbness, itchiness, soreness, and tightness around the wound, but these sensations usually subside within six months. Please avoid scratching the wound with your hands as it may lead to infection.

8.2 Notes on Medication

Once you are discharged, you will be prescribed medication for 7 to 10 days. After your first follow-up visit, your doctor may prescribe 30 days of medication based on your assessment. It is important to understand the effects and sides effects of the medications you are taking and to take them as directed. Do not stop taking your medicine without consulting your doctor. If you experience flushing, palpitations, headache, dizziness, cough, shortness of breath, constipation, or upset stomach after taking

your medicine, seek immediate medical attention.

8.2.1 Taking Digoxin (Lanoxin)

Please take your pulse for one minute before taking this medicine. If your pulse is less than 60, do not take the medicine and notify your doctor. If you experience any nausea, vomiting, or other gastrointestinal symptoms, please stop taking the medicine and visit the clinic for evaluation.

8.2.2 Anticoagulant (warfarin)

To prevent blood clots in patients who have undergone a tissue or mechanical heart valve replacement, it is necessary to take this medication.

8.2.2.1 While taking this medication, it is important to avoid unnecessary bruising of the extremities, self-administered herbal remedies, or excessive consumption of dark green vegetables.

8.2.2.2 If you require tooth extraction or surgery, be sure to return to the clinic to discuss discontinuation of the medication.

8.2.2.3 If you experience abnormal bleeding, such as bruising, black or bloody stools, or hematuria, contact your doctor immediately.

9. Notes for Daily Activities

9.1 Showering

For your safety, we recommend having a family member assist you during your first shower. The water temperature should not be too hot or too cold to prevent dizziness.

9.2 Body Weight

It is important to measure your weight at regular times of the day to monitor your health after surgery. Your weight should not vary more than 2kg in a week. If you notice a weight change exceeding 2kg, it may be

necessary to take action.

9.2.1 If you have gained more than 2kg, it is recommended to restrict water intake and check for any signs of edema. You can also increase your diuretic medication as prescribed by your doctor or schedule a follow-up visit at the clinic.

9.2.2 If you have lost more than 2kg, monitor any excessive urination and reduce your diuretic medication as prescribed by your doctor or schedule a follow-up visit at the clinic.

9.3 Smoking

Your health is our top priority, and we want to ensure a smooth and successful recovery from your heart bypass surgery. Nicotine, found in cigarettes, can have negative effects on your cardiac and respiratory systems, including high blood pressure and impaired lung function. To prevent these problems and promote a healthy recovery, we kindly urge you to avoid smoking and exposure to secondhand smoke. Your commitment to this important step will make a significant difference in your health and well-being.

9.4 We recommend increasing your intake of high-fiber foods to keep your bowel movements regular and smooth. Remember to avoid holding your breath or straining during bowel movements to prevent unnecessary strain on your body.

9.5 To ensure optimal health, control your diabetes and high blood pressure. Follow your doctor's recommendations and take prescribed medications as directed.

9.6 To promote a healthy heart, it is important to maintain a positive and happy mood. Avoid situations that may cause excitement, tension, or anger, as these can lead to sudden increases in heart load.

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10.Return Visit

Upon your first return visit, typically 7-10 days after hospital discharge, your doctor will review your medication regimen and assess your heart function. If you are taking any special medications, your doctor may recommend a blood test to check the concentration of these medications in your blood.

If you have any questions about your condition, please feel free to call our 24-hour cardiac surgeon helpline at 0975359614.