SAWA UNIVERSITY

جامعة ساوة الاهلية
كلية التقنيات الصحية والطبية
قسم التخدير - اللجنة العلمية

ANESTHETIC MANAGEMENT OF PATIENT WITH CARDIOMYOPATHY

Sawa University — جامعـــــة ســـــــاوة الاهلية

College of health and medical techniques — كليـــــة التقنيـــات الصحيـة والطبيـة

Department of Anesthesia — قسم تقنيـــات التخديـــــر

4th Stage — المرحلـــــــــــة الرابعه

محاضرة رقم نظـــــــري

Lecture No. 7 Theoretical

استاذ المادة :د.زهراء زهير تركي

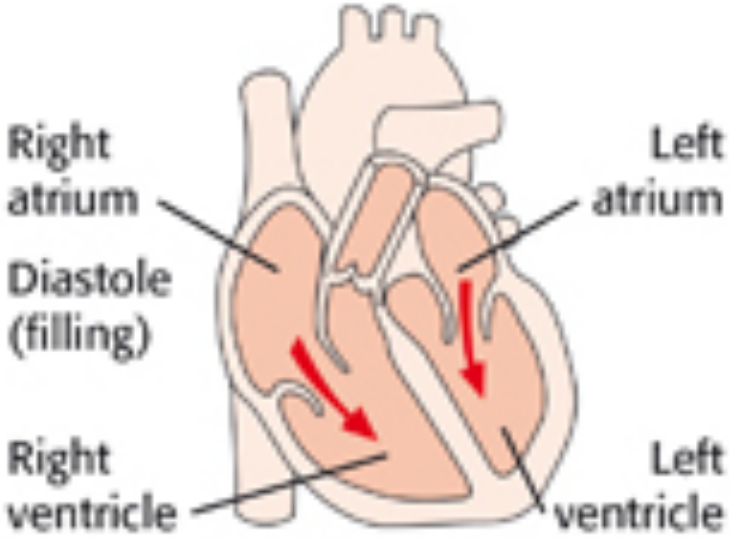
Cardiomyopathy

A myocardial disorder in which the heart muscle is structurally and functionally abnormal, in the absence of coronary artery disease (CAD), hypertension, valvular disease and congenital heart disease sufficient to cause the observed myocardial abnormality"

- 3 main identified types of cardiomyopathy a/c to pathophysiology:

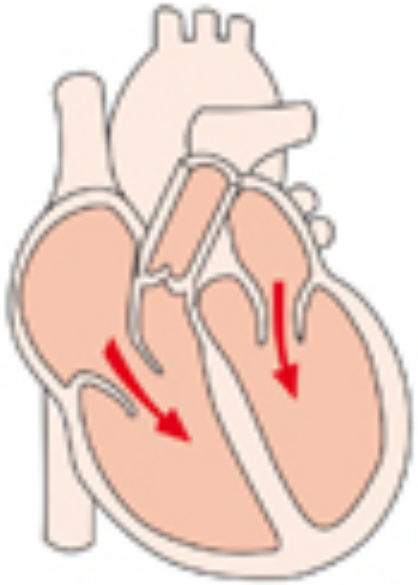
SYSTOLIC DYSFUNCTION	DIASTOLIC DYSFUNCTION
1. DILATED CARDIOMOPATHY	1. HYPERTROPHIC CARDIOMYOPATHY
	2. RESTRICTIVE CARDIOMYOPATHY

NORMAL



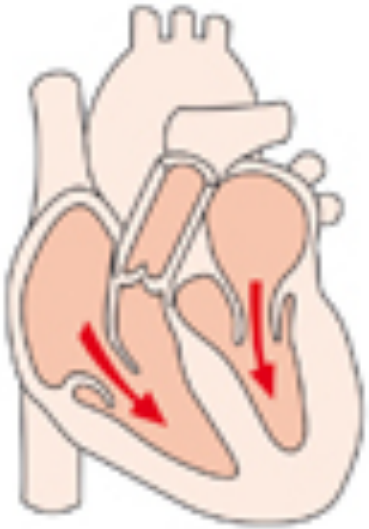
The ventricles fill normally with blood

SYSTOLIC DYSFUNCTION



The enlarged ventricles fill with blood

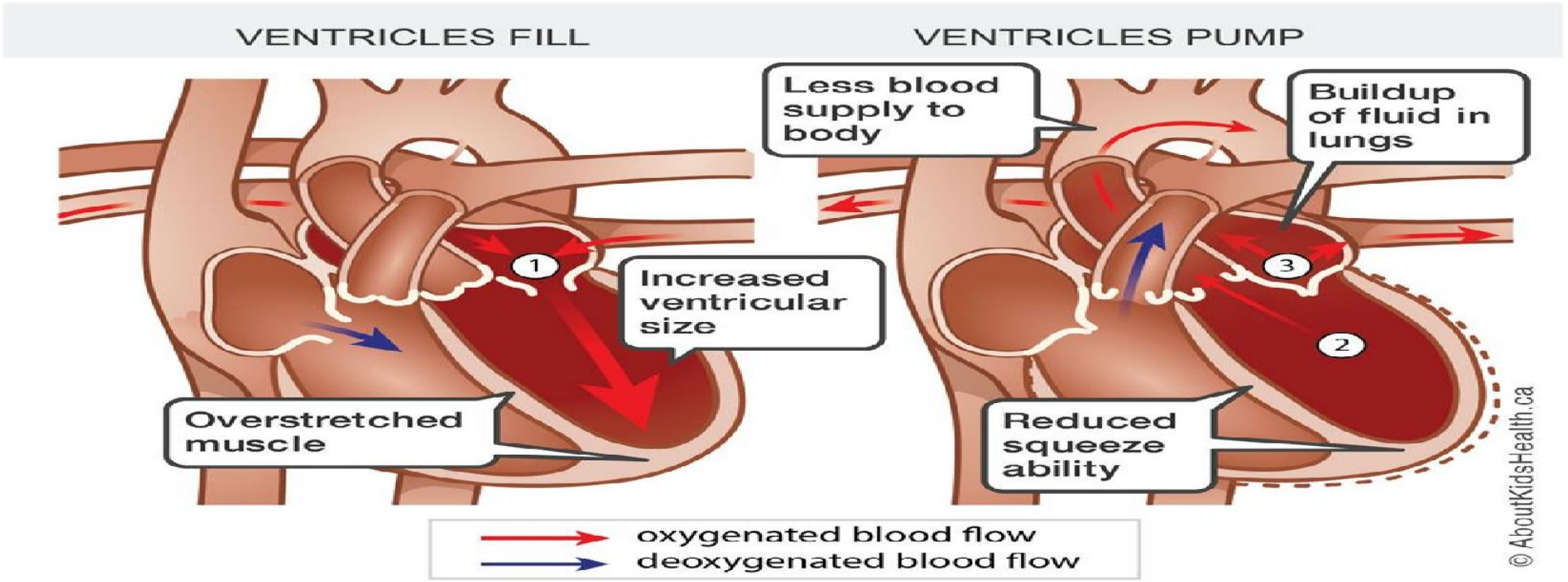
DIASTOLIC DYSFUNCTION



The stiff ventricles fill with less blood than normal

DILATED CARDIOMYOPATHY

- **(DCM) is a disease of the myocardium characterized by impaired systolic function and dilatation of the left and right ventricles It is a major cause of heart failure and arrhythmia in young adults.**
- **The clinical manifestations of DCM**
- dyspnoea,fatigue, ascites, peripheral oedema, and arrhythmias.
- Embolic events and sudden death may also occur at a later stage in the disease process



Pathophysiology

1-In dilated cardiomyopathy, the heart muscle is overstretched, increasing the size of the ventricular chambers.

2) The overstretched muscle cannot pump properly resulting in less blood flow to the rest of the body..

DCM MANAGEMENT

Medical management

The main aim of the medical management is to control the symptoms and prevent further progression of the disease and resulting complications.

Perioperative care.

Patients with DCM present a huge challenge for anaesthetists. In addition to the high risk of postoperative mortality, these patients are at risk of developing heart failure, arrhythmias, and embolic events

Preoperative management:

1. Medical therapy: Regular medications should be continued in all patients and optimized in patients with symptoms of heart failure.
2. Arrhythmias should be appropriately treated before operation via drug therapy and/or implantation of devices to achieve rate and rhythm control.
3. Echocardiography is vital to assess the extent of ventricular dysfunction and the presence of valvular abnormality.

Anaesthesia management:

1. The goals of anesthesia management in patients with DCM are:

- Avoid myocardial depression.
- Maintain adequate preload and prevent increases in afterload.
- Avoid tachycardia.
- Prevent sudden hypotension by careful titration of anaesthetic agents.

2. Local and regional anaesthesia techniques:

- Peripheral nerve blocks offer minimal haemodynamic changes.
- Central neuraxial blockade reduces afterload and improves cardiac output.

The accompanying hypotension resulting in myocardial hypoperfusion must be prevented.

3. General anaesthesia:

Avoid overdose of induction agents since the circulation time is impaired

Etomidate causes least haemodynamic changes.

- Ketamine should be avoided, as it increases the systemic vascular resistance (SVR).
- All volatile anaesthetic agents cause myocardial depression in high concentration.
- Opioids based anesthesia is preferred due to minimal cardiovascular effect

4. Monitoring:

- Arterial and central venous catheters should be used.
- Transoesophageal echocardiography (TOE)
- Esophageal Doppler.
- Bispectral index monitoring

5. Cardiovascular support:

• Inotropic support can be provided by a variety of agents such ,dobutamine, and dopamine.

• Noradrenaline can be used to treat hypotension

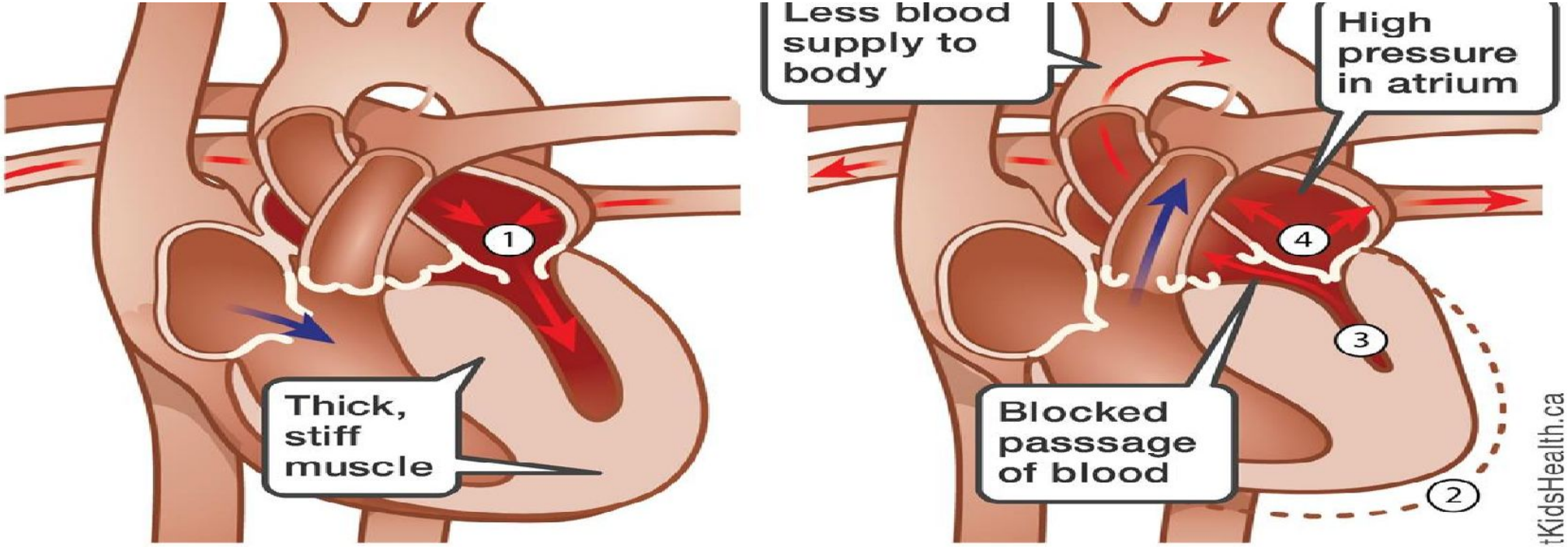
6. Postoperative care:

• Patients should be transferred to an intensive care unit to allow invasive monitoring and optimization of postoperative haemodynamics and fluid therapy.

• Adequate analgesia

HYPERTROPHIC CARDIOMYOPATHY

- Hypertrophic cardiomyopathy (HCM) is defined as a primary cardiac muscle hypertrophy of the left ventricle
- **Clinical manifestation**
- dyspnoea, chest pain, syncope, and arrhythmia.
- Mortality associated with HCM is about 1% attributable to heart failure or cerebral vascular accident (CVA) in adults or sudden death in adolescents.



pathophysiology

1-In hypertrophic cardiomyopathy, the muscle in the heart is unusually thick. This can reduce the size of the left ventricle or make the walls of the ventricle stiffer.

2) The left ventricle is unable to fill with as much blood as it normally would.

3) The thick heart muscle can block the blood from leaving the heart.

4) This may result in higher pressure in the left atrium and less blood flow to the rest of the body

HCM MANAGEMENT

- Medical therapy.
- Beta-blockade & calcium channel blocker can help to relieve symptoms and prevent syncopal attack
- • Amiodarone is used to treat arrhythmia
- An implantable cardioverter defibrillator (ICD) for patient with risk of sudden death
- • septal ablation and myectomy.

PERIOPERATIVE CARE

General anaesthesia:

an invasive blood pressure monitoring is essential to recognize and prevent hypotension.

• • Inotropes should be used with extreme caution in the presence of high pulmonary capillary wedge pressure (PCWP), as they can worsen pulmonary oedema and cardiovascular collapse

The aims of perioperative care are:

- Adequate preload and afterload
- Maintain SVR
- Avoid sympathetic activation
- Reduce contractility
- Avoid tachycardia and maintain sinus rhythm
- alpha-adrenergic agonist (phenylephrine) are the preferred first line of treatment for hypotension in patients

Regional anaesthesia should be used with caution:
general anaesthesia is considered safer in obstructive HCM, as spinal anaesthesia-related sympathetic blockade and decreased preload and afterload are dangerous in these patients

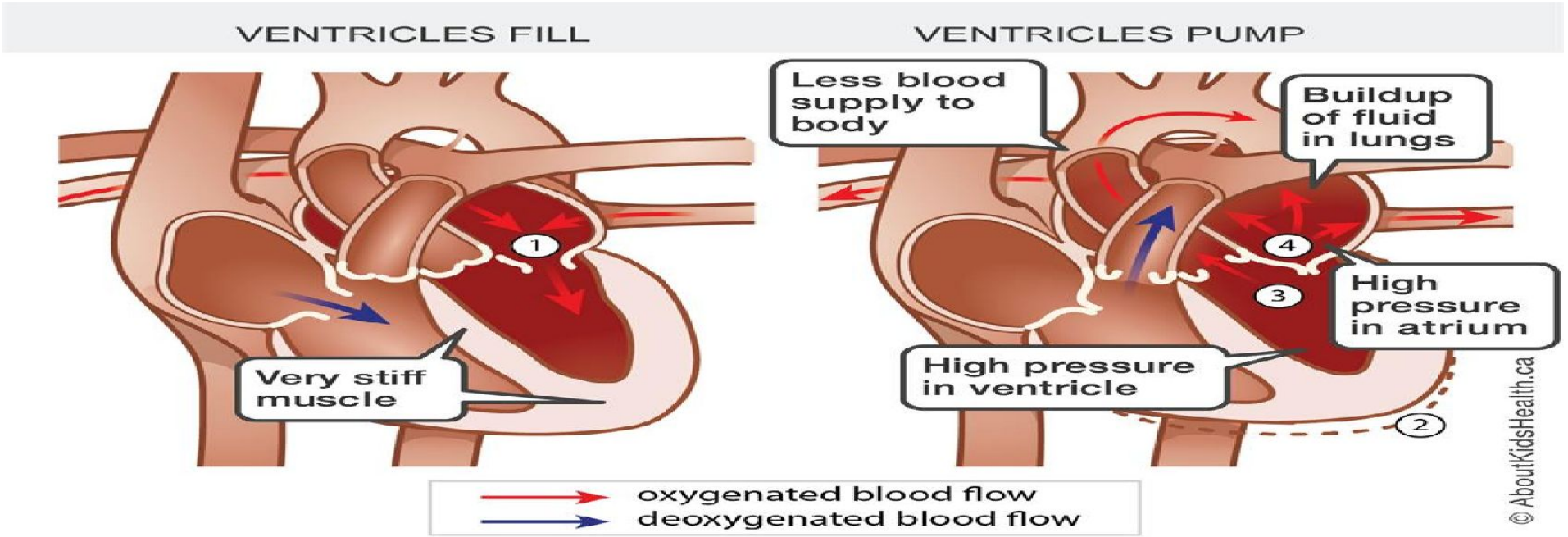
PR

RESTRICTIVE CARDIOMYOPATHY

- Restrictive cardiomyopathy (RCM) is the impairment of ventricular diastolic function due to fibrotic or infiltrative changes in the myocardium and or subendocardium. These changes reduce diastolic ventricular compliance and elevate ventricular end-diastolic pressure. Patients with RCM can have normal or near-normal systolic function in the early stages of the disease

• Clinical manifestation

- Patients usually present with signs and symptoms of biventricular failure such as dyspnoea, orthopnoea, fatigue, palpitation, oedema, and chest pain.



Pathophysiology

1-The heart muscle becomes very stiff and does not stretch to allow the ventricles to fill .As a result, the left ventricle cannot handle the amount of blood being pumped in from the left atrium.

2) The stiff heart muscle causes higher pressure in the ventricle.

3) Higher pressure causes blood to back up in the atrium.

4) This results in increased pressure in the atrium which can cause a buildup of pressure and fluid in the lungs

RCM MANAGEMENT

- Medical therapy. The aim of the treatment is to reduce and control the symptoms of heart failure. Beta-blockers and calcium channel blockers can be used to prolong ventricular filling time and improve ventricular relaxation. Diuretics may be used for symptomatic relief of heart failure. Maintaining sinus rhythm is essential
- Amiodarone, digoxin, and beta-blockers are frequently used.
- • Permanent pacemakers and ICDs are indicated in patients with advanced conducting system dysfunction.

PERIOPERATIVE CARE

- RCM presents high risk of morbidity and mortality.
- General anaesthesia causes vasodilation, suppresses the myocardium, and reduces venous return.
- The latter can be worsened by intermittent positive ventilation resulting in cardiac arrest.
- Invasive arterial blood pressure monitoring and TOE are useful
- **The perioperative anaesthetic management should**
- **aim to:**
- • maintain adequate preload;
- • maintain SVR;
- • maintain sinus rhythm; and use anaesthetic agent with minimal cardiovascular effect (etomidate).

Any questions?