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AD-COR Program inovativ de formare in domeniul cardiologiei pediatrice
POSDRU/179/3.2/S/152012

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MODUL TEORETIC

Hypoxia in Congenital Heart Disease

Imputernicit: Prof. Dr. Tammam Youssef

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Beneficiar: Universitatea de Medicină și Farmacie „Carol Davila” București

Hypoxia in Congenital Heart Disease

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Epidemiology

congenital heart disease is considered to be the most common form of major birth defects .

The prevalence is between

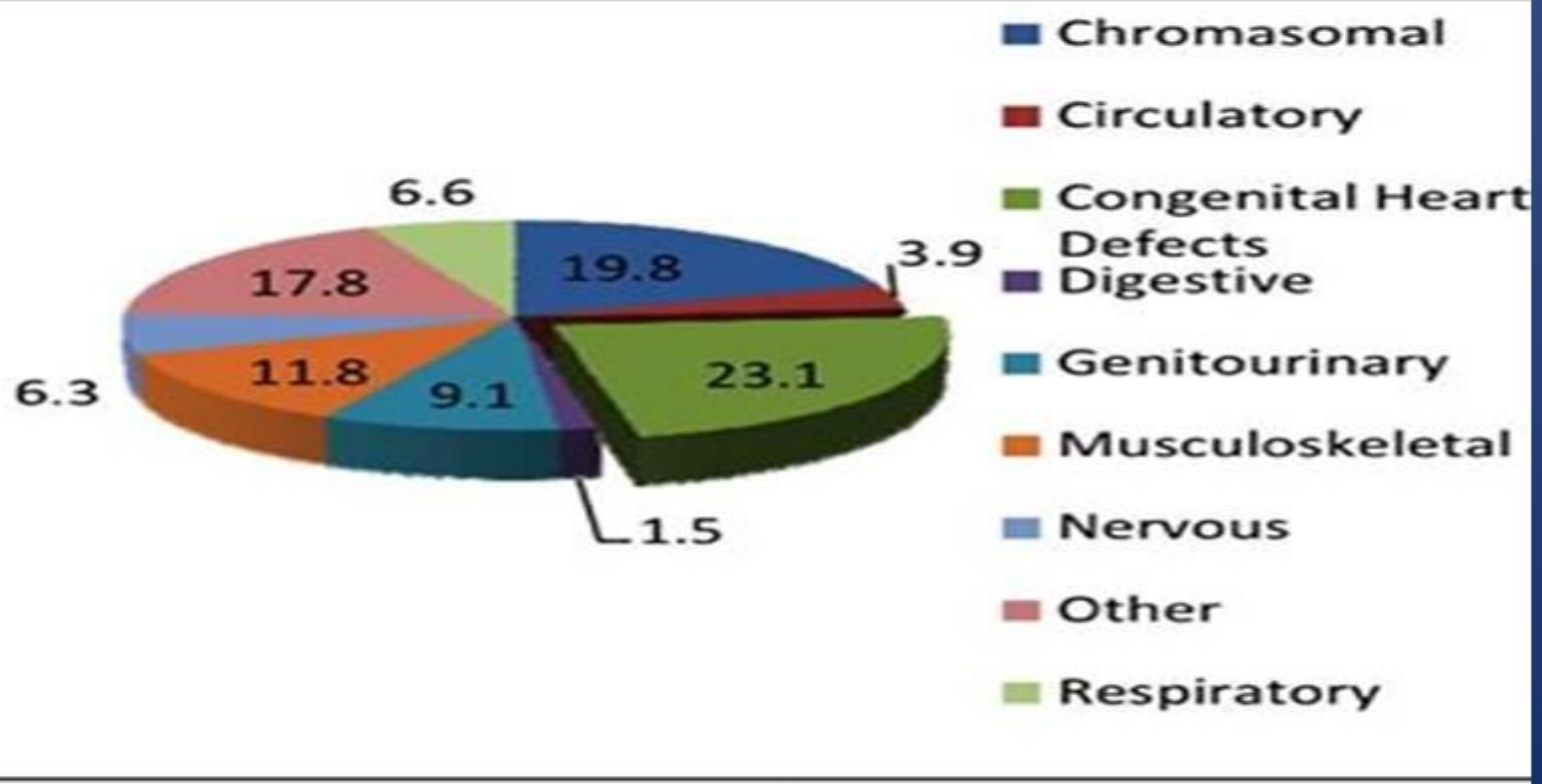
4-10 / 1000 of birth

leukemia, prostate cancer and Alzheimer's diseas combined.[3]

INFANT DEATHS FROM BIRTH DEFECTS, BY CAUSE

United States, 2008

Source: National Center for Health Statistics. Calculations by the American Heart Association 2012.



REDUCING RISK FACTORS & EARLY DETECTION

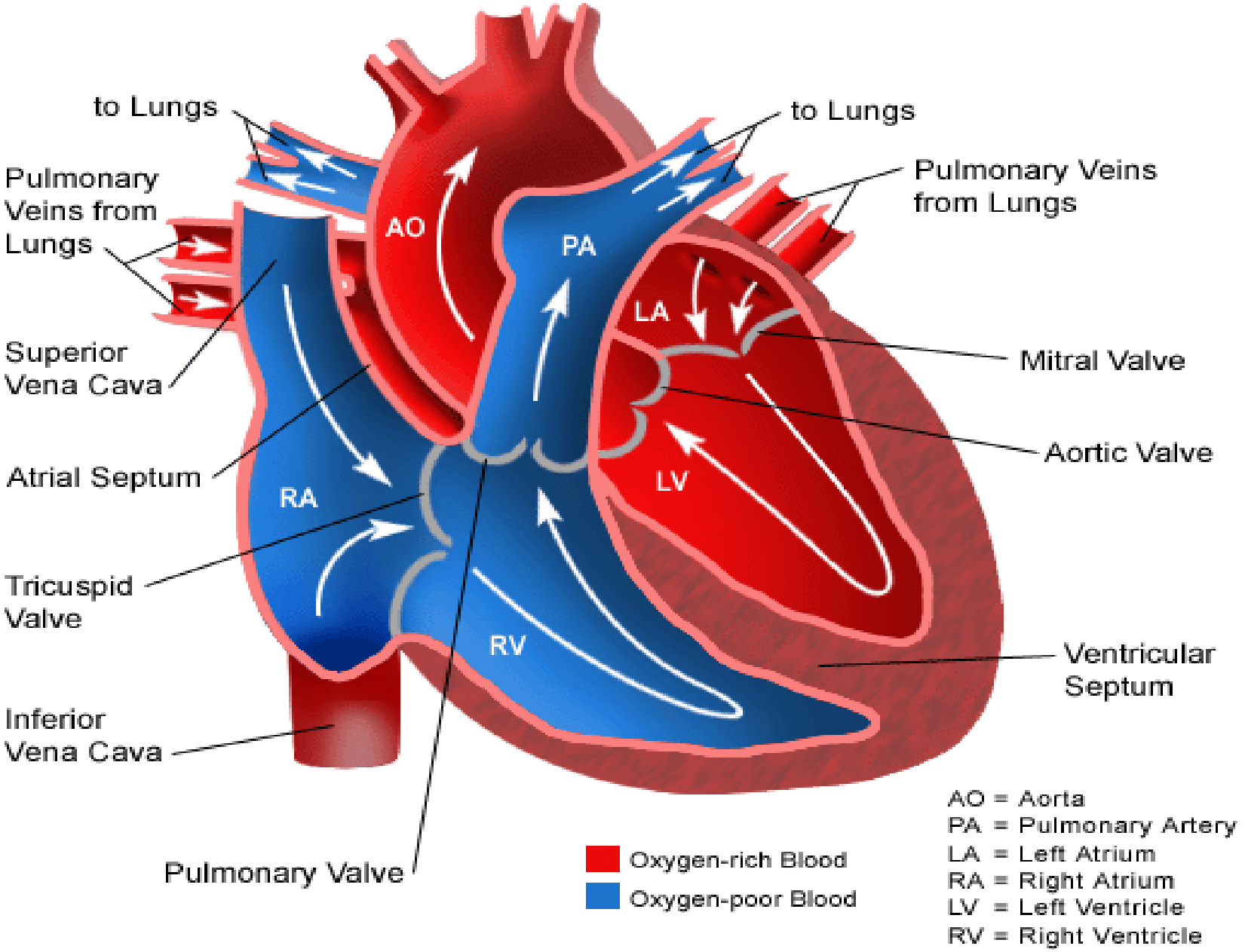
The American Heart Association guidelines to help prospective mothers lower the risk of CHD in their babies urges them to: [7]

Physiopathology of congenital heart disease

To understand the hemodynamic changes we must know the fact of having two circulation pulmonary and aortic

- separate
- without obstruction
- each has good ventricular bump

Normal Heart



Lacking of on or more define the physiopathology of cardiac defect

- congenital heart disease with hypoxia
- congenital heart disease with left to right shunt
- congenital heart disease with obstruction or cardiac Insufficiency

Hypoxia in congenital heart disease

The principal symptom is lack of oxygen into the arterial blood

It is pathophisiologically divided in 3 types :

- cardiac disease with low pulmonary flow
- cardiac disease with baralle circulation
- single cavity

Congenital heart disease with low pulmonary flow

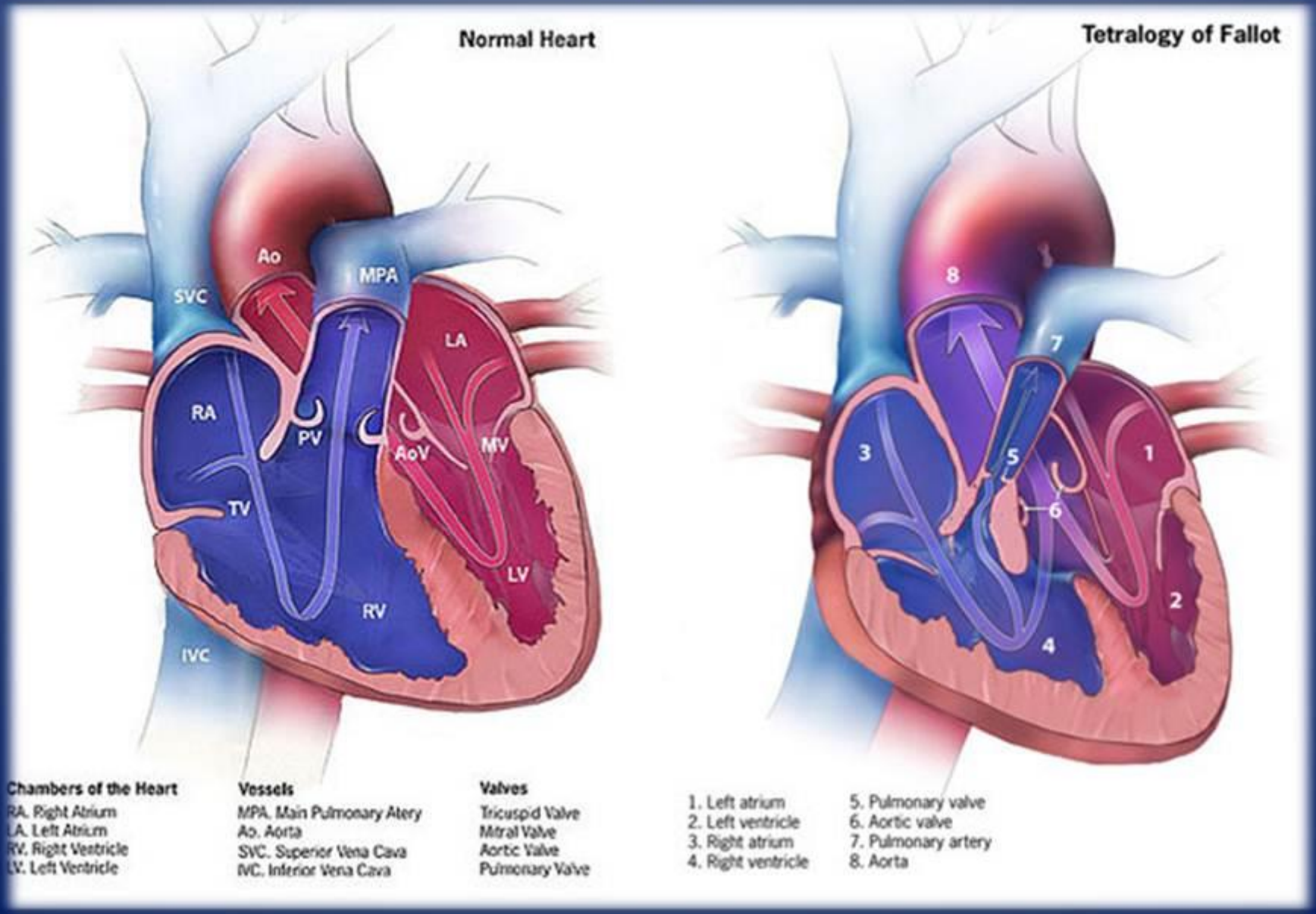
Here we have 2 major defects:
Stenosis of pulmonary flow + communication between cavities and right to left shunt

Example:

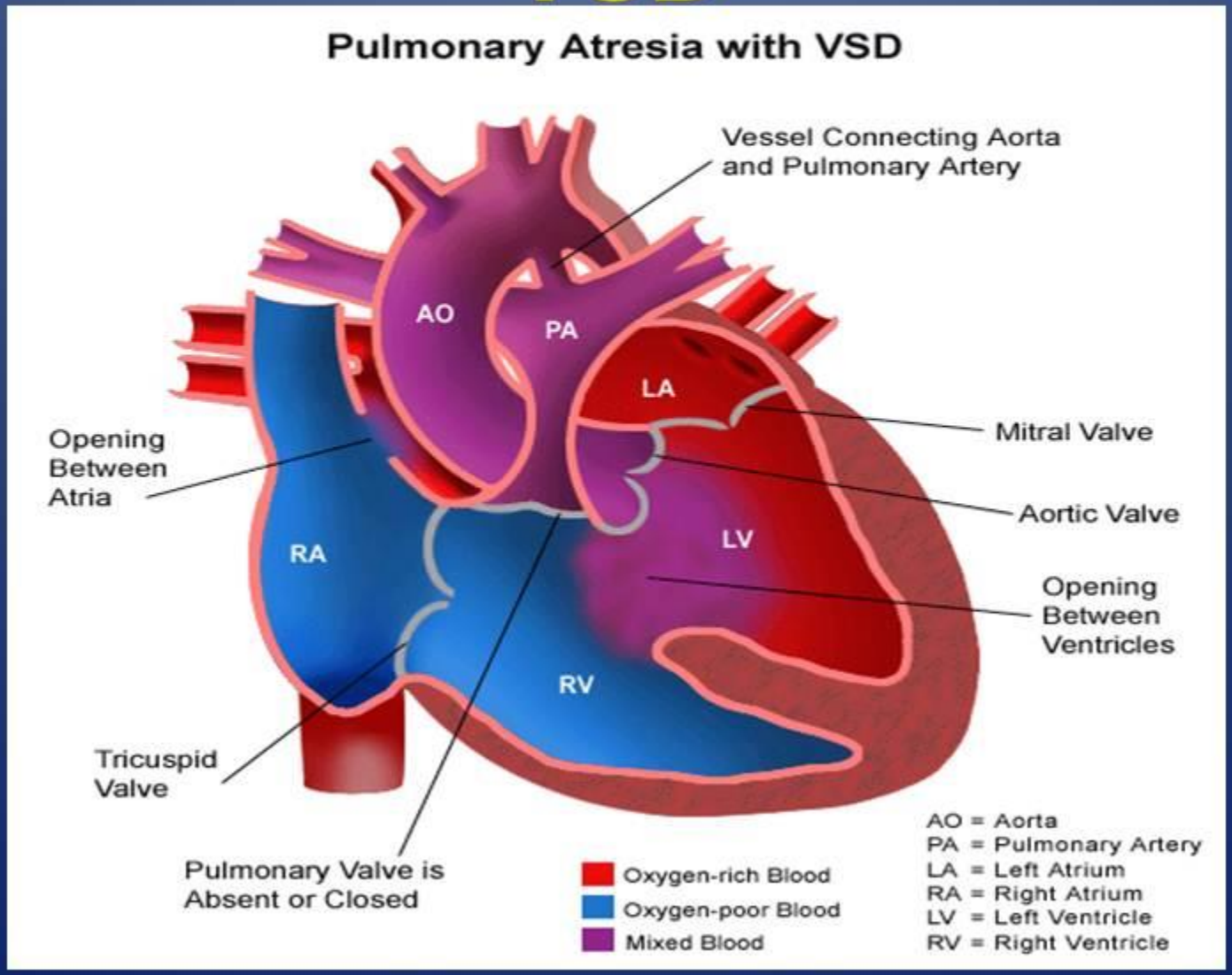
*TOF

*Pulmonary atresia with VSD

TOF


Normal Heart
Ao
MPA
SVC
LA
RA
PV
AoV
MV
TV
LV
RV
IVC
Tetralogy of Fallot
8
7
3
5
1
6
2
4
Chambers of the Heart
RA. Right Atrium
LA. Left Atrium
RV. Right Ventricle
LV. Left Ventricle
Vessels
MPA. Main Pulmonary Atery
Ao. Aorta
SVC. Superior Vena Cava
IVC. Inferior Vena Cava
Valves
Tricuspid Valve
Mitral Valve
Aortic Valve
Pulmonary Valve
1. Left atrium
2. Left ventricle
3. Right atrium
4. Right ventricle
5. Pulmonary valve
6. Aortic valve
7. Pulmonary artery
8. Aorta

Pulmonary Atresia with VSD



Parallel circulation I

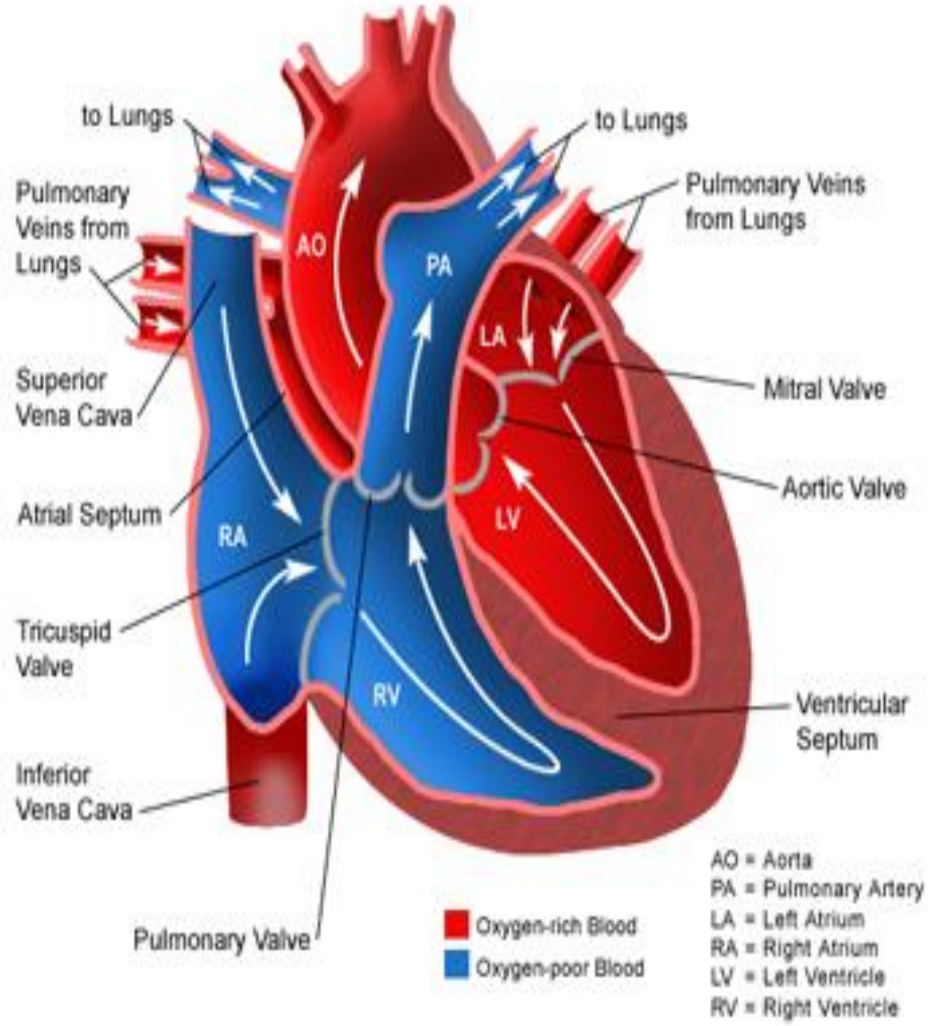
TGA is the good example and here the right ventricle is connected to the aorta And the left is connected to the pulmonary

So the pulmonary venous return goes to the lung and the systemic venous return goes into the aorta

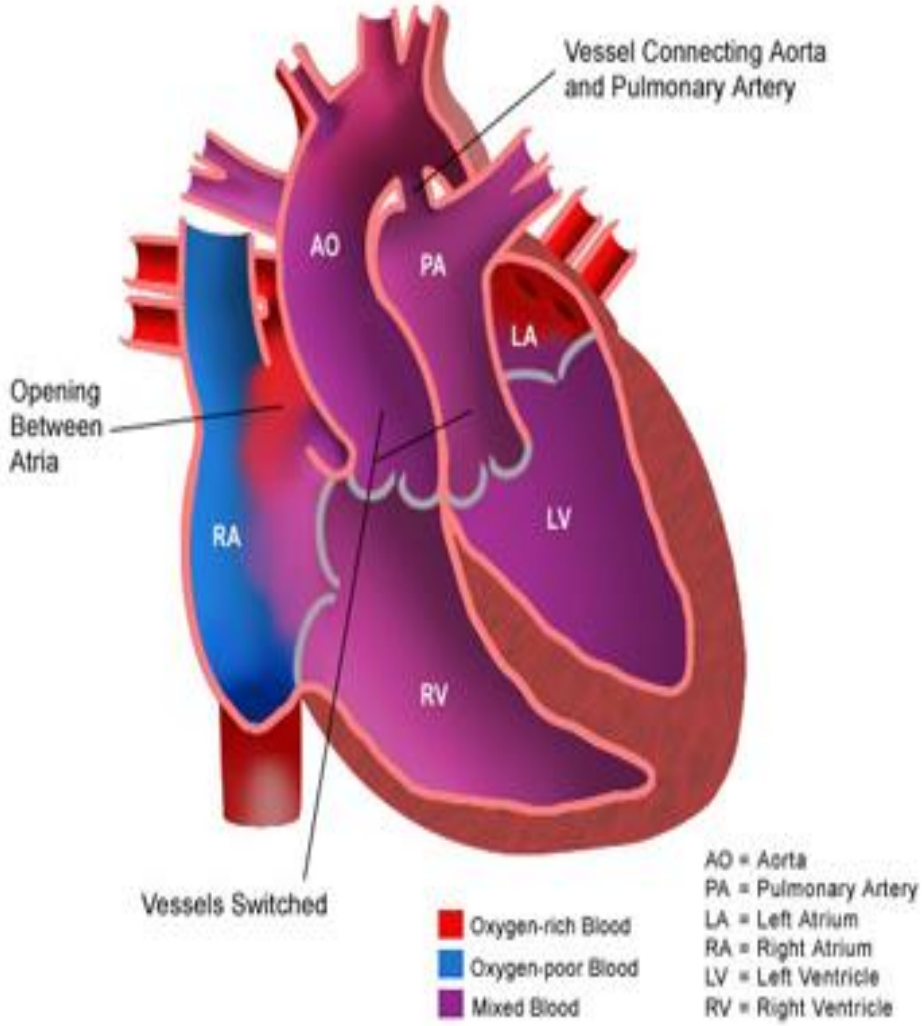
Parallel circulation II

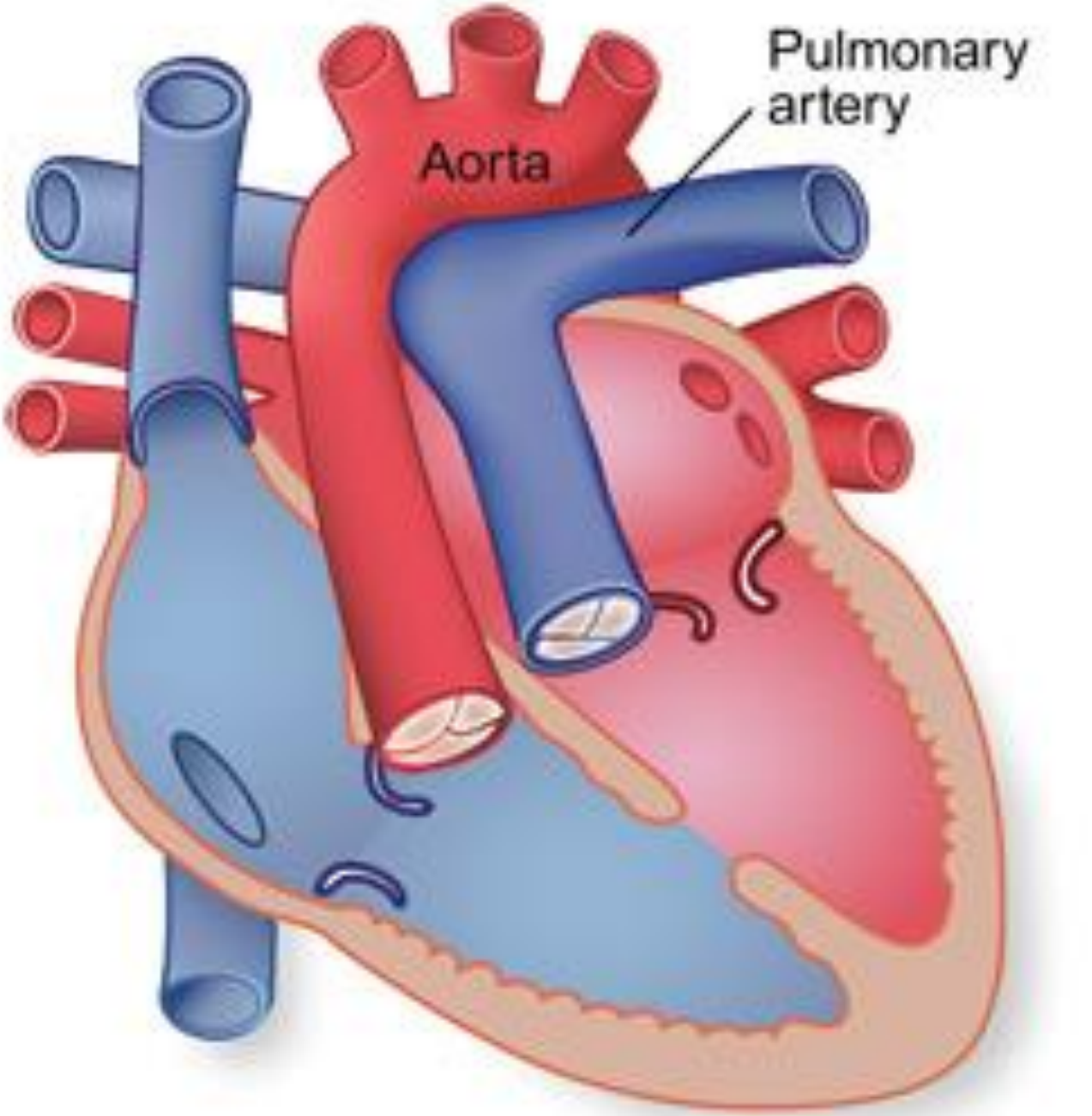
here we have important cyanosis, The severity of cyanosis depends on the mixing between systemic and pulmonary return

Normal Heart



Transposition of Great Arteries




Pulmonary artery
Aorta

congenital heart disease with single cavity I

This means cardiac disease in which the pulmonary and systemic return to the same place

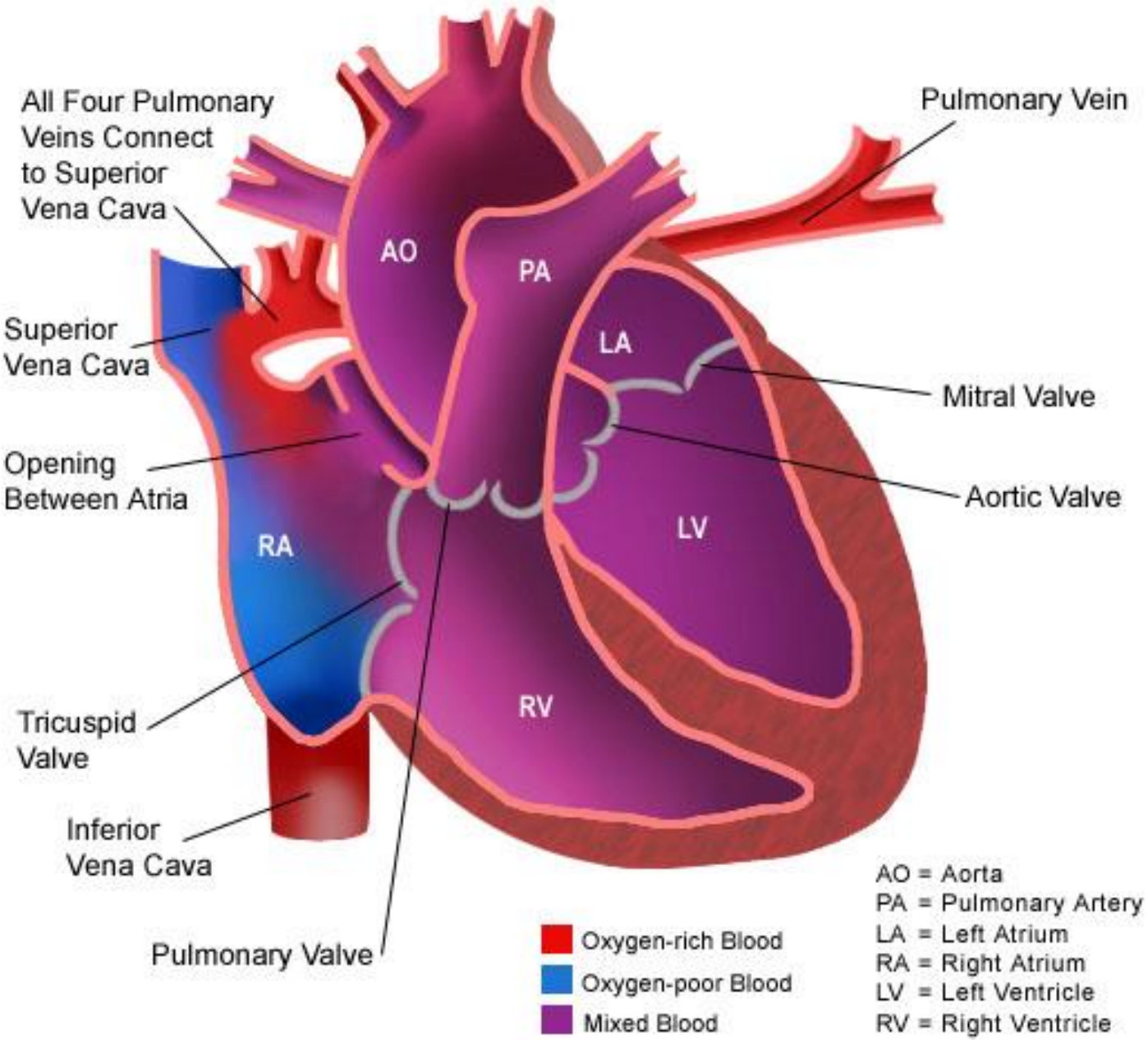
(atrium , ventricle , great vessels)

congenital heart disease with single cavity II

Mixing at the atrium level (single atrium, total anomalous pulmonary venous connection):

These defects cause Slight cyanosis and low pulmonary resistance

Total Anomalous Pulmonary Venous Return

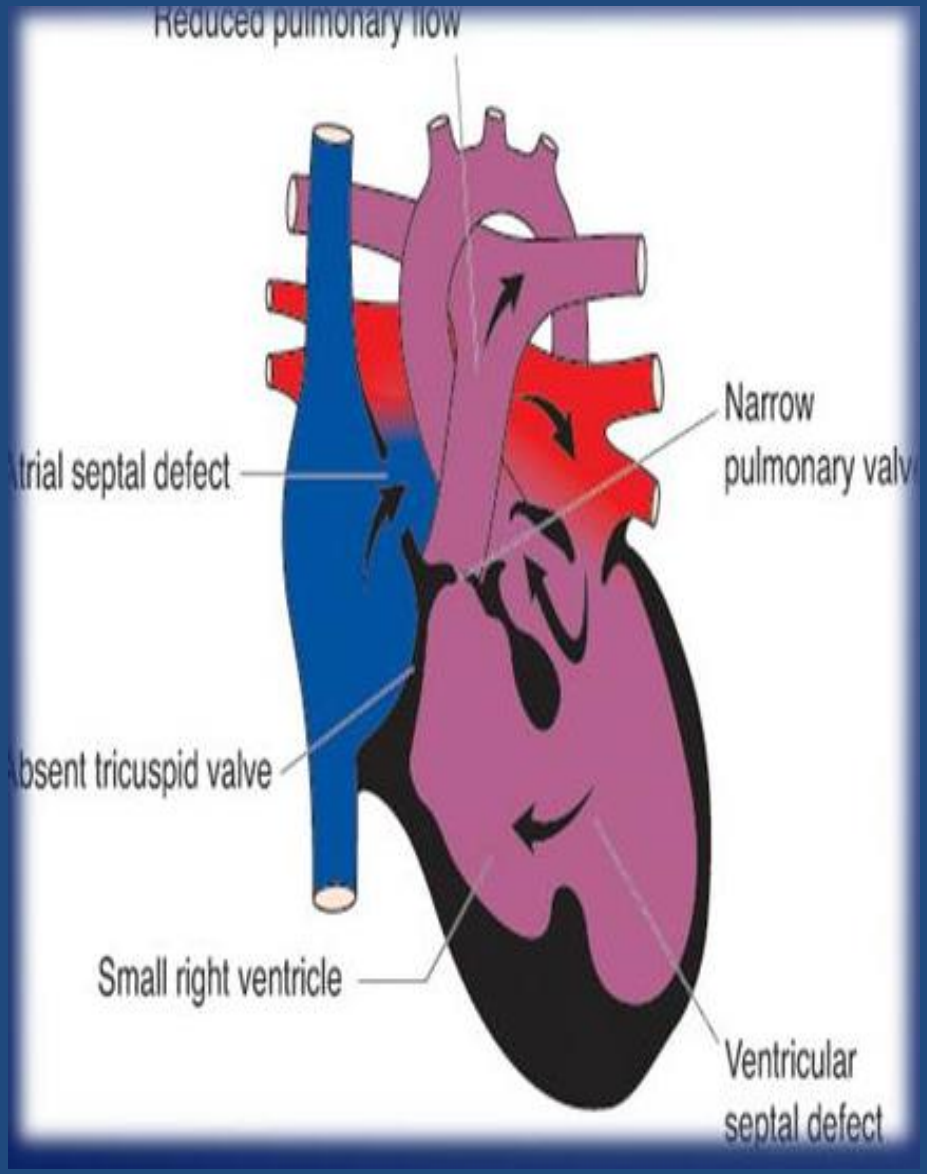


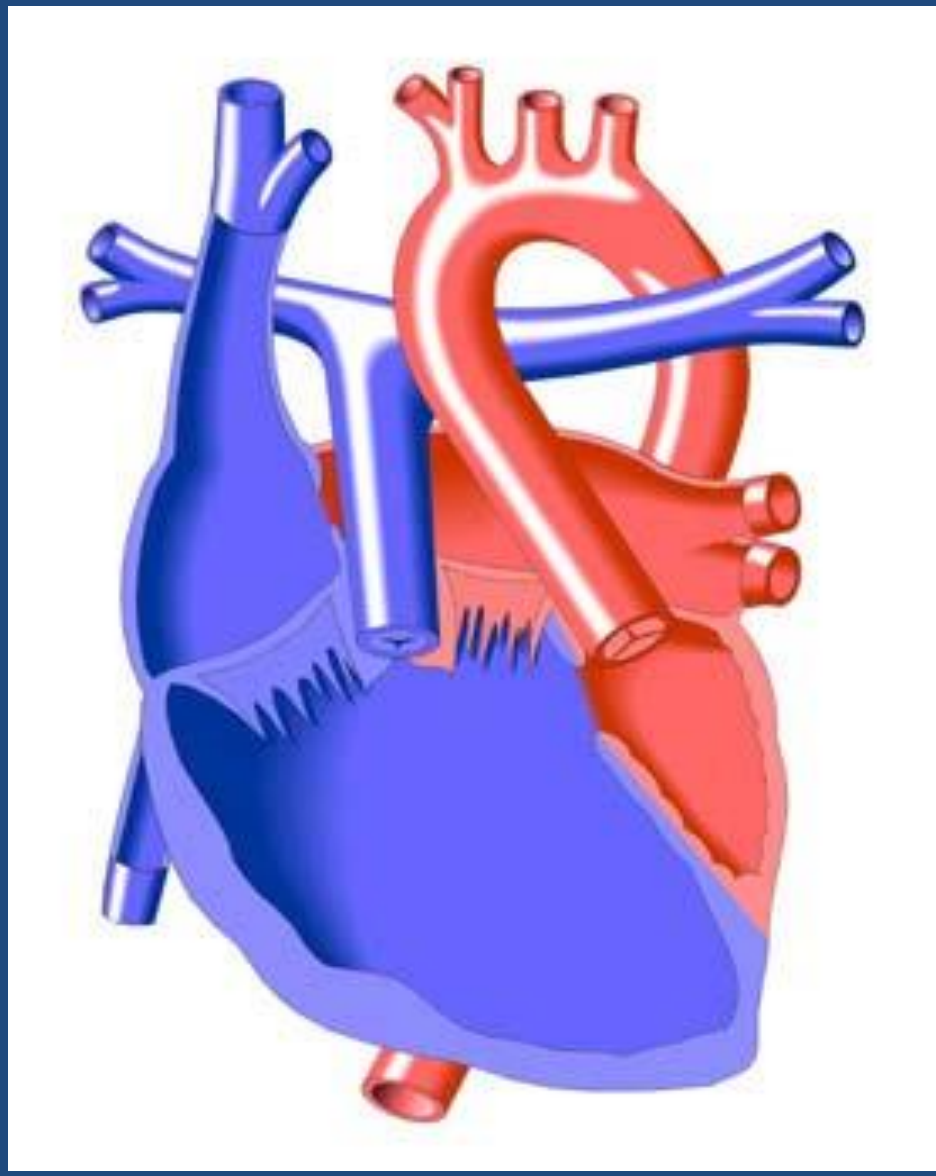
total anomalous pulmonary venous return

One exception is the infracardiac total anomalous pulmonary venous return: Generally it's stenotic with severe cyanosis and pulmonary edema

Single ventricle

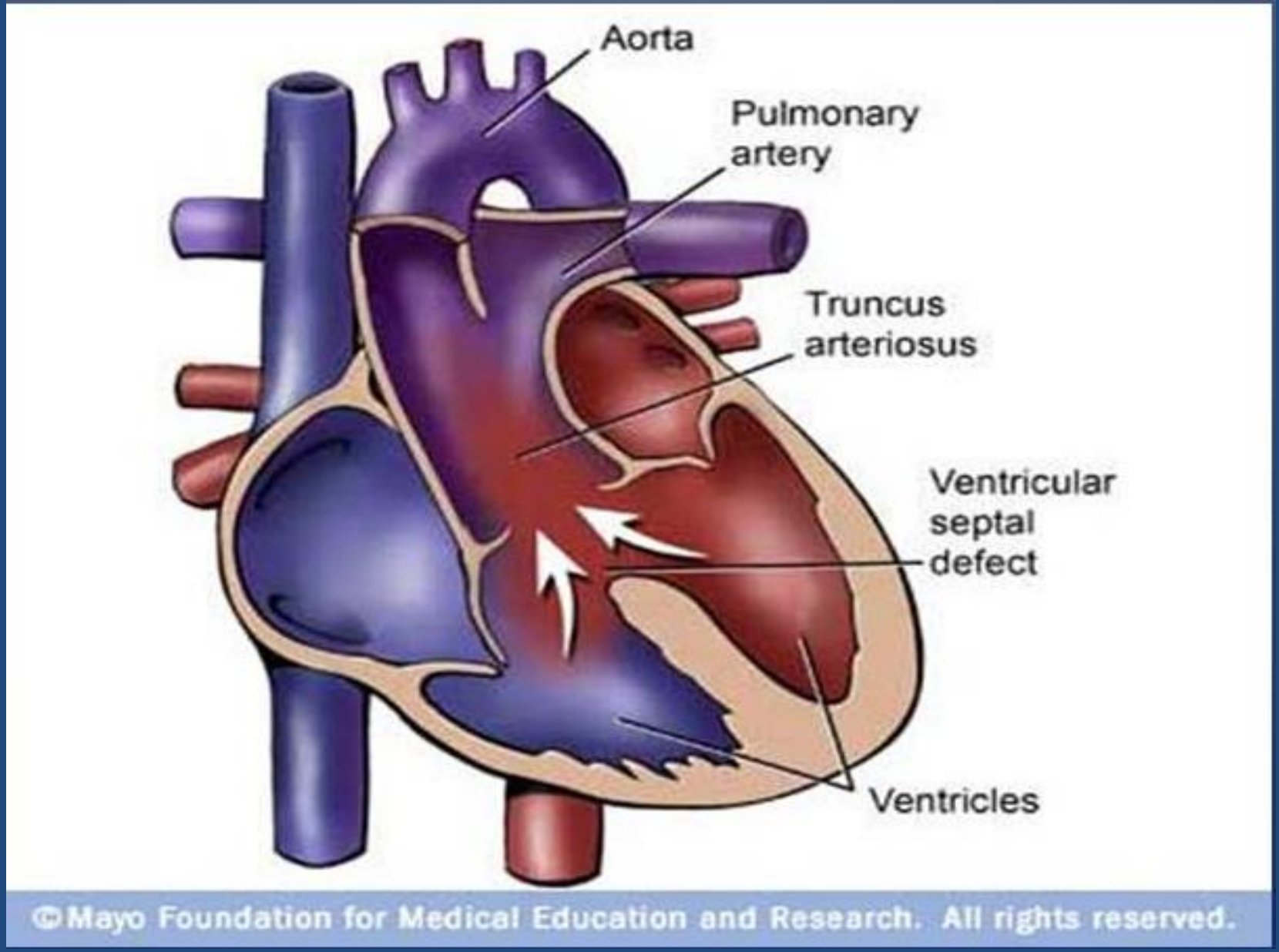
Mixing is in the ventricles and the cyanosis depends on the flow in systemic and pulmonary


Reduced pulmonary flow
Narrow
pulmonary valv
trial septal defect
bsent tricuspid valve
Small right ventricle
Ventricular
septal defect

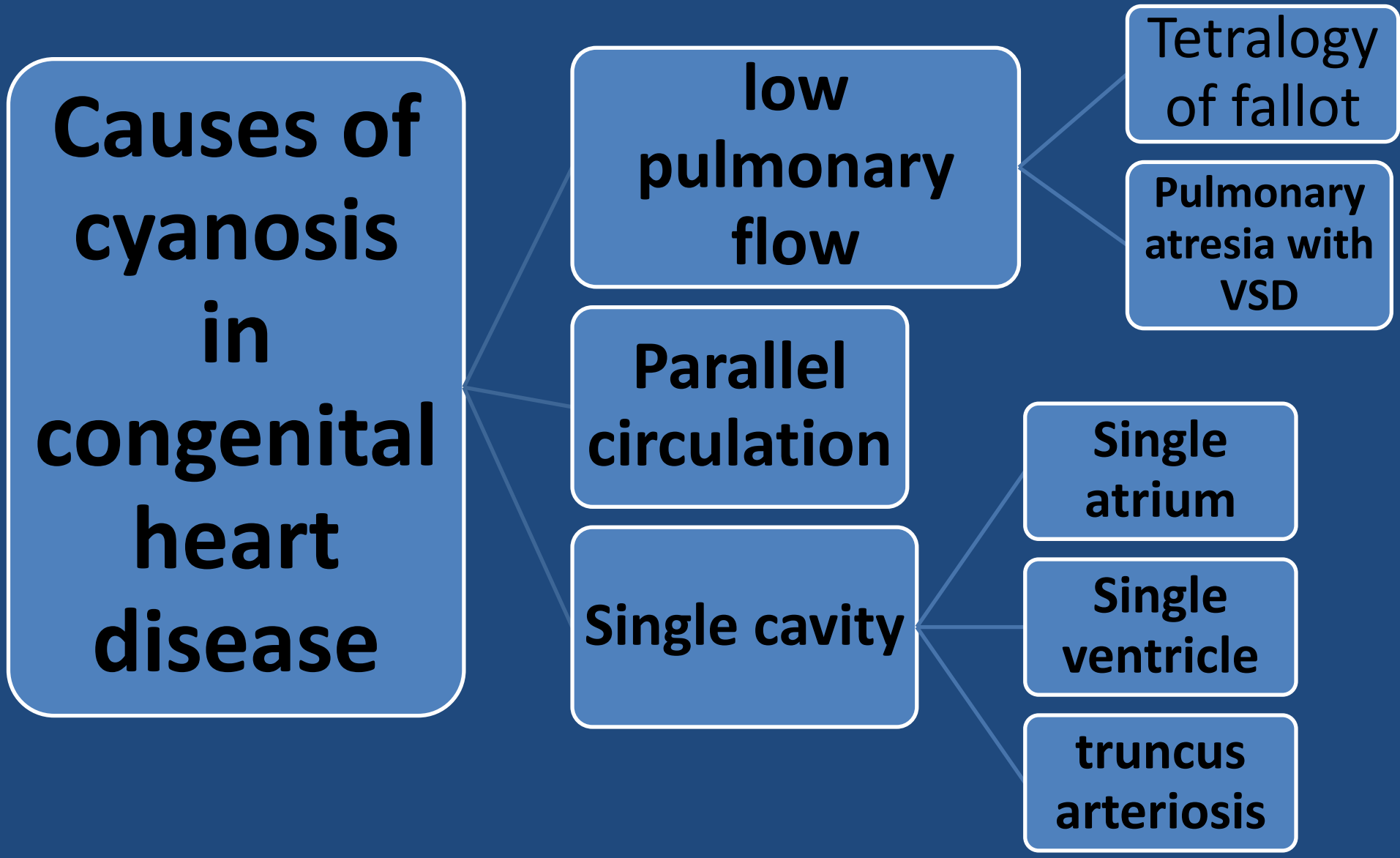


Truncus arteriosus

Mixing is at the arteries and here in absence of pulmonary stenosis the symptoms are pulmonary hyper flow and slight cyanosis



Truncus arteriosus


Causes of cyanosis in congenital heart disease
low pulmonary flow
Tetralogy of fallot
Pulmonary atresia with VSD
Parallel circulation
Single cavity
Single atrium
Single ventricle
truncus arteriosis

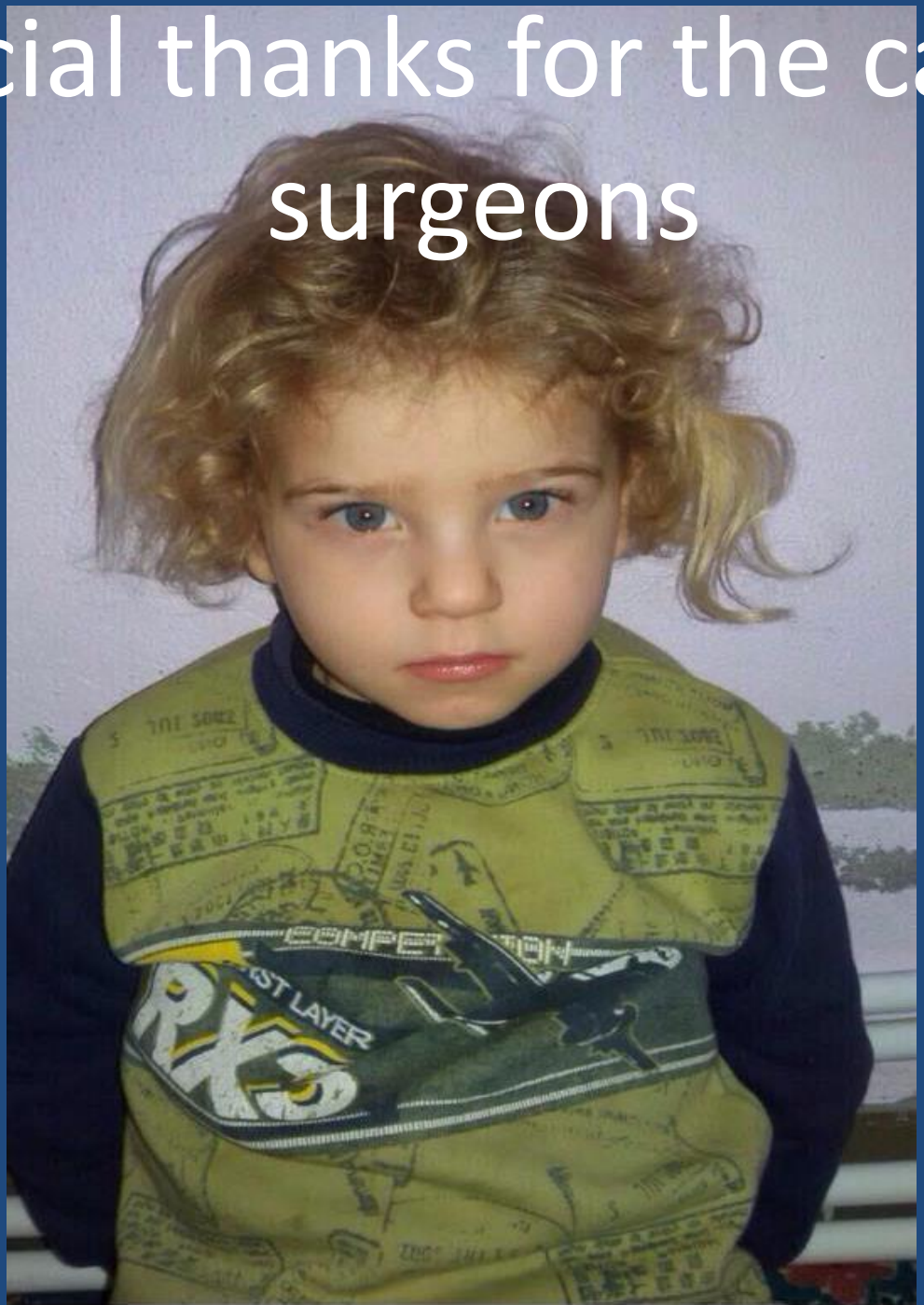
Outlook for cyanotic congenital heart disease

The outlook varies based on the severity of the underlying defects

Three decades ago it was considered a predominantly pediatric condition Patient care markedly improved resulting in growing and aging population


after
before

Special thanks for the cardiac surgeons



Thank you