Formation of heart tube: 3rd week
Heart beat: 22nd – 23rd day (beginning of fourth week)
USG detection of heart beat: 7th week
Foetal ECG: 11th week
Endocardium from original heart tube
Myocardium from surrounding mesoderm & epicardium (myoepicardial mantle)
(visceral pericardium)
Lining of pericardium epithelium of pericardial cavity
Transverse sinus formed by disappearance of dorsal mesocardium (Present between arterial and venous ends of the heart tube)
FATE Of SINUS VENOSUS

Left horn of sinus venosus, along with medial part of common cardinal vein forms **coronary sinus**

Lateral part of common cardinal vein forms **oblique vein of left atrium**
Left venous valve merges with septum secundum.

Right venous valve is divided in three parts by appearance of two transverse muscular bands, called limbic bands.

i) The part above superior limbic band forms crista terminalis

ii) The part between the two bands forms valve of inferior vena cava

iii) The part below the inferior limbic band forms valve of coronary sinus
INTERATRIAL SEPTUM

i) Upper, thicker part is formed by septum secundum

ii) Lower, thin part (floor of fossa ovalis)
    is formed by septum primum

iii) Sharp margin of fossa ovalis
    is formed by lower, curved margin of septum secundum
DEVELOPMENT OF RIGHT ATRIUM

It develops from

1. Right half of primitive atrial chamber (rough part);

2. Absorption of right horn of sinus venosus (smooth part) and

3. Right atrioventricular canal.
DEVELOPMENT OF LEFT ATRIUM

It develops from

1. Left half of primitive atrial chamber (rough part – confined to the auricle);

2. Absorption of pulmonary veins (smooth part) and

3. Left atrioventricular canal.
DEVELOPMENT OF LEFT ATRIUM

It develops from:

1. Left half of *primitive atrial chamber* (rough part - confined to the auricle);
2. Absorption of *pulmonary veins* (smooth part) and
3. Left *atrioventricular canal*. 
Bulbus cordis elongates and this part can be divided into:

1. Proximal bulbus cordis,
2. Middle conus cordis and
3. Distal truncus arteriosus.
INTERVENTRICULAR SEPTUM

1. Lower, fleshy part of IV septum is formed by growth from the ventricular wall
2. Upper, membranous part is formed below by fused endocardial cushions and above by the fused right and left bulbar ridges.

The membranous part of IV septum separates
   right ventricle from left ventricle
   and also left ventricle from right atrium.
DEVELOPMENT OF RIGHT VENTRICLE

i) By the right half of *primitive ventricular chamber & proximal bulbus cordis* and
ii) Its outflow part (*infundibulum*) is formed by *right half of conus cordis*.

DEVELOPMENT OF LEFT VENTRICLE

i) By the left half of *primitive ventricular chamber & proximal bulbus cordis* and
ii) Its outflow part (*vestibule*) is formed by *left half of conus cordis*. 
CONGENITAL ANOMALIES OF HEART

I. Anomalies of position:
   i). Dextrocardia
   ii). Ectopia cordis

II. Anomalies of interatrial septum:
   i). Probe patency
   ii). Persistent foramen secundum
   iii). Persistent foramen ovale
   iv). Premature closure of foramen ovale
   v). Three chambered heart
      cor triloculare biaatriale

III. Anomalies of interventricular septum:
   a. ventricular septal defect
   b. absence of ventricular septum-cor triloculare
      biventriculare
CONGENITAL ANOMALIES OF HEART (contd.)
IV. Anomalies of truncus arteriosus and bulbus cordis:
   i). Fallot’s tetralogy comprises
       a) Pulmonary stenosis
       b) Overriding aorta
       c) Persistent IV foramen (VSD in membranous IV septum)
       d) Hypertrophy of right ventricle
   ii). Persistent truncus arteriosus
   iii). Transposition of great vessels
V. Anomalies of valves:
   Stenosis/ atresia of pulmonary, aortic, mitral or tricuspid valves
FATE OF AORTIC ARCHES

First aortic arch disappears (except a small portion which forms part of maxillary artery).

Second arch artery disappears (except the stapedial artery which also disappears after birth).

Third aortic arch forms:
   a. Common carotid artery from its proximal part.
   b. Internal carotid artery from its distal part.

Fourth aortic arch:
   a. On the right side forms proximal part of right subclavian artery.
   b. On the left side forms part of arch of aorta

Firth aortic arch disappears.

Sixth aortic arch:
   a. Proximal part forms pulmonary artery
   b. Distal part –
      i) Disappears on right side.
      ii) Forms ductus arteriosus
DEVELOPMENT OF ARCH OF AORTA

1. Ascending aorta is formed by aortic sac.
2. Part of arch of aorta between brachiocephalic and left common carotid arteries is formed by left limb of aortic sac. Part of arch of aorta between left common carotid and left subclavian arteries is formed by left 4th aortic arch. Remaining part is formed by left dorsal aorta up to the level of the future lower border of 4th thoracic vertebra.
Development of common carotid artery

1. Formed by proximal part of 3\textsuperscript{rd} aortic arches.

Development of internal carotid artery

1. Proximal part is formed by distal part of 3\textsuperscript{rd} aortic arch
2. Distal part is formed by cranial part of dorsal aorta.

Development of subclavian arteries:

i) Left subclavian artery is formed by 7\textsuperscript{th} cervical intersegmental artery.

ii) Right subclavian artery is formed by right 4\textsuperscript{th} aortic arch and 7\textsuperscript{th} cervical intersegmental artery
CONGENITAL ANOMALIES

1. Persistence of ductus arteriosus.

2. Coarction of aorta:
   i) Preductal
   ii) Postductal

3. Right sided arch of aorta

4. Double arches of aorta

5. Abnormal origin of right subclavian artery.
Development of brachiocephalic veins

1. Right brachiocephalic vein is formed by cranial part of right precardinal vein and
2. Left brachiocephalic is formed by cranial part of left precardinal vein and the interprecardinal anastomosis.

Development of superior vena cava

- The part up to the opening of vena azygos develops from caudal part of right precardinal vein and
- The part below the opening (intrapericardial part) is formed by the right common cardinal vein.