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| --- | --- |
| **Embryonic part** | **Adult part** |
| Truncus arteriosus | Ascending aorta  Pulmonary trunk |
| Bulbus cordis | **Smooth** left ventricle  **Smooth** right ventricle |
| Endocardial cushion | Atrial **septum**  **Membranous** IV **septum**  **Heart valves** |
| **Primitive** atrium | **Trabeculated** left atrium  **Trabeculated** right atrium |
| **Primitive** ventricle | **Trabeculated** left ventricle  **Trabeculated** right ventricle |
| Primitive pulmonary vein | **Smooth** left atrium |
| **Left horn**, sinus venosus | Coronary sinus |
| **Right horn**, sinus venosus | **Smooth** right atrium |
| Right common cardinal vein  Right anterior cardinal vein | Superior vena cava |
| Allantois  Urachus | Median umbilical ligament |
| Ductus arteriosus | Ligamentum arteriosum |
| Ductus venosus | Ligamentum venosum |
| Foramen ovale | Fossa ovalis |
| Umbilical arteries | Medial umbilical ligaments |
| Umbilical vein | Ligamentum teres hepatis  (round ligament of liver) |

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| **Right to Left Shunt**  **Early cyanosis** | **Presistent truncus arteriosus** | Outflow failure to divide  **AP septum fails to form**  Often accompanying VSD | | **Tricuspid atresia** | **Absence of tricuspid valve**  Hypoplastic RV  **Requires both ASD, VSD** |
| 22q11 syndrome |
| **Total anomalous pulmonary**  **venous return (TAPVR)** | **Pulmonary veins drain into right side**  Requires ASD and PDA for life | | **Ebstein abnormality** | **Tricuspid valve displaced towards RV apex**  (atrializes ventricle)  **Tricuspid regurg, right HF** |
| **Tetralogy of Fallot** | **Pulmonary stenosis**  (degree determines prognosis)  **RV hypertrophy**  (boot heart)  **Overriding aorta**  **VSD**  Tet spell: worse outflow obstruction | | Lithium in Utero |
| Alcohol in utero  22q11 syndrome | **Transposition of great vessels** | **Aorta leaves RV**  **Pulmonary trunk leaves LV**  Two separate circuits  **Survival requires shunting**  Surgery required |
| **Diabetic mother** |
| **Left to Right Shunt**  **Late cyanosis** | **Ventricular septal defect** | **Most common cardiac defect**  Manifests weeks after birth  May remain asymptomatic  **Can cause LV overload, HF** | | **Patent ductus arteriosus** | Normal in utero, closes after birth  **Patent causes progressive RVH**  (leads to LVH, HF)  **Machine like murmur**  **Late cyanosis of legs** |
| Alcohol in utero  Down syndrome | Alcohol in utero  Congenital rubella |
| **Atrial septal defect** | Interatrial septum missing tissue  **Loud S1, wide fixed split S2**  Asymptomic or can lead to HF  **Different than patent foramen ovale** | | **Eisenmenger syndrome** | **Uncorrected left-right shunt**  Pulmonary HTN, RVH compensation  **Becomes right-left shunt**  Late cyanosis, clubbing, polycythemia |
| Alcohol in utero  Down syndrome |
| **Coarctation of aorta** | | | **Aortic narrowing near ductus arteriosus insertion**  **Brachial femoral delay**: HTN in upper extremities, weak delayed pulse in lower extremities  Intercostal arteries provide collateral circulation, **erodes ribs**  **Causes HF, cerebral hemorrhage/berry aneurysm, aortic rupture, endocarditis** | | |
| Turner syndrome  Bicuspid aortic valve | | |