FETAL CARDIAC OUTFLOW TRACT ANOMALIES CHART

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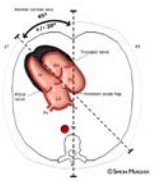
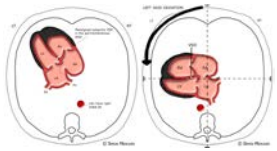
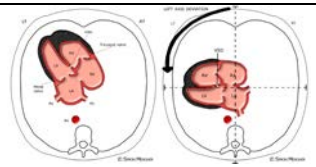
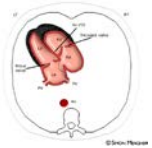
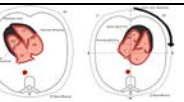
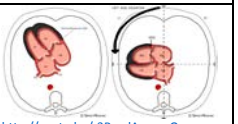
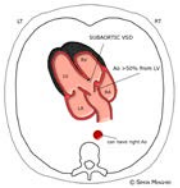
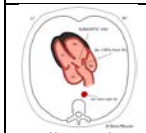
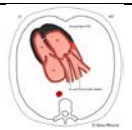
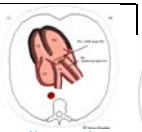
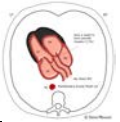
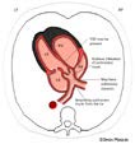
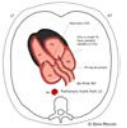
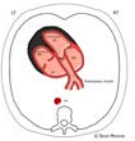
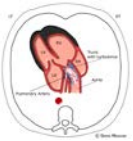
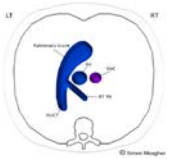
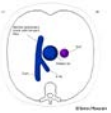
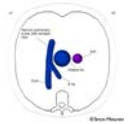
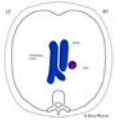
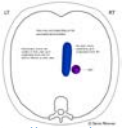
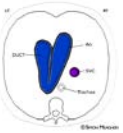
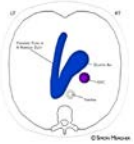
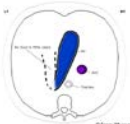
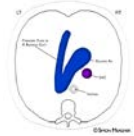
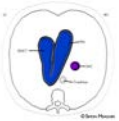
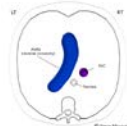
Normal	Tetralogy of Fallot	Double outlet right ventricle				Transposition of the great arteries/ Ventricular arterial discordance		Double discordance (Congenitally corrected TGA)	Common arterial trunk (Truncus arteriosus)
						Simple TGA	Complex TGA		
4CV  http://youtu.be/2n3v3GGRGN0 http://youtu.be/nlSeavQGXn4	 http://youtu.be/E6tUFc7WNdk http://youtu.be/8QQV74NViY0	 http://youtu.be/3c0SVo6-nbU http://youtu.be/pgDwbh9_gBE				 http://youtu.be/ZJXQTf7oXys	 http://youtu.be/zr8WeM8XjDY http://youtu.be/GBDk49CtMLM	 http://youtu.be/tY82Pz63ms0 http://youtu.be/UpvLQ91HOFg http://youtu.be/K9mLeTuw_mg	 http://youtu.be/r3R_ydAwmmQ
LOFT/5CV  http://youtu.be/zSiNqu_qd44 http://youtu.be/34VBumc5guU	 http://youtu.be/2f3WlGQ2-EI http://youtu.be/yDkUoe2x3_o	DORV "Fallot" subaortic VSD +/-PS with normally related vessels  http://youtu.be/3SRI9j2KoEQ	DORV uncommitted VSD with normally related vessels  http://youtu.be/QRpMh3LMXgg	DORV uncommitted VSD with malposed vessels  No video	DORV "TGA" subpulmonary VSD with malposed vessels  http://youtu.be/J1yRWh7dtIY	 http://youtu.be/h_tXwZQjxwU http://youtu.be/diSBpe2rGkc 	 http://youtu.be/oHoUf4br16o 	 http://youtu.be/k9aY0x9S2_o http://youtu.be/26ks-pRAr8k http://youtu.be/l2o7Y4O4CKs	 http://youtu.be/nEF3lq6_UIY
ROFT/ 3vv  http://youtu.be/UUE0zmXFcBo http://youtu.be/6NGWSycZjhk	**Main subtypes:** **(VSD/PA/MAPCAs-see rare cardiac table)** Pulmonary stenosis (75% cases)  http://youtu.be/s2V_wrY-rLw http://youtu.be/ePb5f0EIXIE	Pulmonary atresia (20%  http://youtu.be/9kwzLLPoo00	Absent (dysplastic/ring) pulmonary valve syndrome (5% cases)  http://youtu.be/Kgs9s1LLHxg http://youtu.be/-Mq3Wy3HPeQ	 http://youtu.be/7N5NBVKuW4M	 http://youtu.be/HkaiXDwfn2A	 No video	 http://youtu.be/G4MDZs4XCUY	 http://youtu.be/E5smuE0N3dk	 http://youtu.be/IkokBFyEE_U	 http://youtu.be/Ksu7ACooWYU	 http://youtu.be/6KnveXnKM7M
Transverse arches/ 3vT  http://youtu.be/9DmGCiNqbG0	 http://youtu.be/PctXMePw9G8	 http://youtu.be/jpDwJ9J8tEI http://youtu.be/uQdvwvqpfJc	 http://youtu.be/tefgLsRfioE	 http://youtu.be/Aqm_S2OBG3Q	 http://youtu.be/JQtjprj8MQ0	 No video	 http://youtu.be/CpPT4pNXlUw	 http://youtu.be/orFlbEJGni4	 http://youtu.be/Q2wP_GiWoZI	 http://youtu.be/SmxJ7qvTde0	 http://youtu.be/6KnveXnKM7M
Overview videos http://youtu.be/KfNZHFKLBOY http://youtu.be/86KlIFSa1Jk	http://youtu.be/e02Q-RvEVOo	http://youtu.be/8m937otqgFU http://youtu.be/GYFnQ48vmeY	http://youtu.be/ZZIiOD8-VYg http://youtu.be/bRkoGUVNWcY	http://youtu.be/l6CXACb6nvs	http://youtu.be/JGVcmB7DS2k	No video	http://youtu.be/Zgmy8jNfCaA	http://youtu.be/C_KCaUJiL0U http://youtu.be/R4rCiu414rg Advanced clips:http://youtu.be/6aXed5gHLkM http://youtu.be/LdSjxJOfFxU	http://youtu.be/xgeLd6znxM0 Advanced clips: http://youtu.be/kAQLxb45zb0 http://youtu.be/lDga1T6kqyE	http://youtu.be/fcDZ0NkyO2Q	http://youtu.be/3hJexKoNX04

Definition	**Tetralogy**: 1. Malaligned VSD in perimembranous area 2. Aorta overrides interventricular septum 3. Pulmonary artery usually smaller than aorta (degree of pulmonary stenosis usually increases during pregnancy) 4. +/- right ventricular hypertrophy and/or dilatation	**DORV** Both great arteries arise predominantly from RV Subaortic VSD: PA exclusively from RV >50% aorta from RV Great artery connections are normal Uncommitted VSD: Both great arteries arise from RV VSD remote from either vessel Vessels may be malposed Subpulmonary VSD ("TGA" type/ Taussig Bing): aorta exclusively from RV >50% pulmonary artery from RV Vessels are malposed	**TGA** LV gives rise to PA RV gives rise to aorta **Subtypes**: Simple: Interventricular septum intact No other cardiac abnormality Commonly missed cardiac disease Aorta may be anterior and on right or side by side to the pulmonary artery Complex: TGA with other cardiac anomalies Vessels may be malposed	**Double discordance** Atrial ventricular and ventricular arterial discordance (RA connects to LV which connects to PA, LA connects to RV which connects to Ao) Synonymes: ventricular inversion, congenitally corrected TGA	**Common arterial trunk** Single common artery from heart which supplies coronary, pulmonary and systemic circulation Usually no duct. Rare cases may have an interrupted aortic arch with a duct supplying head and neck vessels
Incidence	+/- 4/10 000 live births 7-10 % of congenital heart disease	1 to 1.5% of congenital heart disease	3% of congenital heart disease	Rare (<1% all cardiac anomalies)	Rare (1% cardiac anomalies)
Associated abnormalities	Usually sporadic 15% part of a syndrome: T21 (T18/T13) 22q11 Alagille syndrome 40% have other fetal abnormalities: VACTERL Omphalocoele CNS Skeletal Cardiac: Right sided aortic arch (25%) Multiple VSDs AV incompetence AVSD	30% genetic abnormality Genetic: 22q11 deletion T18, T13 Cardiac: Always VSD present May have subaortic conus Right atrial isomerism Aortic coarctation Pulmonary stenosis	Genetic: Simple: Not usually associated Complex: Slightly increased risk 22q11 del Association with heterotaxy Cardiac: May have abnormal coronary artery anatomy Complex: 30% to 50% VSD Pulmonary stenosis/ atresia Coarctation of aorta Interruption of aorta LVOT obstruction AV valve abnormalities	Genetic: Uncommon Cardiac: 50% VSD 90% Tricuspid valve problems (Ebsteins) 40% PS 10% coarctation of Ao Subaortic stenosis AV block Dextrocardia AV valve atresia DORV or LV	Genetic: 22q del Cardiac: Interrupted Ao arch Other: Urinary tract Neural tube Malrotation of gut Absent gall bladder Situs inversus Asplenia Cleft lip/palate Polydactly and talipes Bone defects Hypoplastic lungs
Antenatal management	Discuss the option of TOP Karyotype Deliver in tertiary centre with paediatric cardiology input as condition may be duct dependant	Discuss the option of TOP Karyotype Deliver in tertiary centre if Fallot or "TGA" type or if coarctation of aorta is suspected	Consider option of TOP if complex Karyotype: Simple: Unlikely to be helpful Complex: May be indicated Deliver in tertiary setting with cardiology support as may be duct dependant if ASD is small	Consider TOP Karyotype unlikely to be helpful Serial ultrasounds: may develop heart block Deliver tertiary centre with cardiology input if significant PS	Consider TOP Karyotype (22q) Serial US Usually standard care Deliver in tertiary centre Paediatric cardiology input Truncal valve stenosis/ incompetence: risk of hydrops
Immediate postnatal management	Variable depending on subtype TOF with severe pulmonary stenosis or atresia: Prostaglandin treatment needed to maintain pulmonary blood flow until a modified surgical BT shunt is carried out Absent pulmonary valve: May need ventilation support as large pulmonary arteries can compress the bronchi	Variable depending on subtype Subaortic VSD with severe pulmonary stenosis: Prostaglandin treatment Uncommitted VSD: Usually stable at delivery if no obstruction Subpulmonary VSD: Usually stable, may need prostaglandin (because of arch obstruction) and/or balloon atrial septostomy depending on VSD size	Variable depending on subtype Simple: Prostaglandin and/or balloon atrial septostomy indicated as intercirculatory mixing between two circulations is needed Complex: Variable: dependant on size of VSD and other associated cardiac anomalies	Usually stable If severe pulmonary stenosis may need prostaglandin treatment and modified BT shunt	No immediate treatment Prostaglandin not needed unless interrupted Ao arch Drop in pulmonary vascular resistance in 2 to 4 weeks leads to increased pulmonary blood flow, increased respiratory effort and poor weight gain
Surgery (dependant on local experience)	All need surgery Fallot with forward flow in duct (pulmonary stenosis): Total repair from 6m, some centres on diagnosis Fallot with reversed flow in duct (pulmonary atresia): Initial BT shunt with total repair and conduit between RV and PA at about 12 months Absent pulmonary valve: May need surgery early if ventilation support needed, otherwise total repair is considered at about 12 months	All need surgery Subaortic VSD: Surgical repair similar to TOF Uncommitted VSD: May consider proceeding along Fontan pathway Consider pulmonary artery banding (if no pulmonary stenosis to protect pulmonary circulation) Subpulmonary VSD: Arterial switch and VSD closure If coarctaion of the aorta is present it is repaired If pulmonary stenosis may need more complicated repair (Rastelli or Nakaidoh) with possibility of an earlier modified BT shunt	All need surgery Simple: +/- 1- 2w of life provided adequate mixing at atrial and or duct level Arterial switch procedure (low mortality) Anatomy of coronary arteries variable and can make repair more difficult Complex: Dependant on associated anomalies If large VSD: Surgery: 1-2m if failure controlled Arterial switch and VSD closure VSD and PS: may require initial PG infusion followed by a modified BT shunt Surgery usually Rastelli (+/-conduit-REV) or Nakaidoh procedure	If RV failure develops may consider PA banding to hypertrophy LV prior to a double switch (Senning inflow diversion and arterial switch) If VSD and PS the timing and nature of surgery varies May develop complete heart block which requires pacing	Usually complex surgery VSD closed: trunk arises from LV while PA's connected via conduit to RV Repeat surgery for conduit change needed as child grows Truncal valve may be abnormal with stenosis and/or incompetence and may require treatment
Outcome (dependant on local experience)	Usually good with surgery but dependant on type of Fallot Low mortality Often develop pulmonary incompetence following surgery Conduits replaced as child grows	Dependant on subtype Usually good outcome with surgery	Simple: Usually good with surgery Complex: Outcomes variable and dependent on associated cardiac anomalies May need repeat surgeries and conduit replacements	Outcomes variable Dependant on function of systemic ventricle	Usually need repeat surgeries with associated morbidity