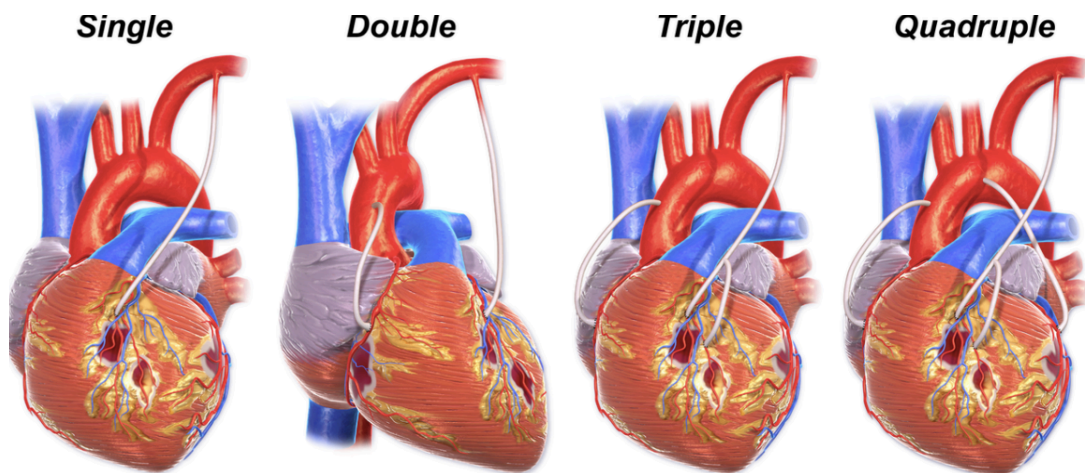


Surgical Guide for Anaesthetists: Coronary Artery Bypass Grafting



Key

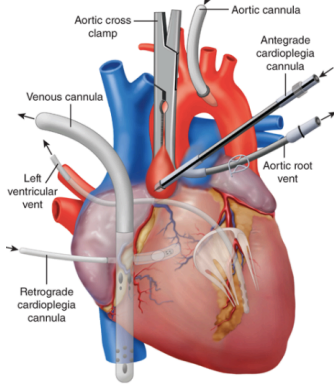
Explanations
Speech
Actions

Event	Surgeon	Anaesthetist	Perfusionist
1. Time out to pre knife to skin	WHO checklist Procedure Equipment Cannulation (antegrade/retrograde)	WHO checklist Allergies Antibiotics Concerns/ASA Blood products: availability/requirement Internal defib paddles checked	WHO checklist Issues Cannulae size
2. Sternotomy	Sternotomy Lungs off	Disconnect ventilator temporarily if asked	

Highly stimulating. Lungs off to avoid lung injury from saw

3. Preparation of bypass vessels LIMA Harvesting	Table up Tilted to left Reduce ventilation	Adjust table Alter ventilator settings Reduce TV + increase RR	
Optimises surgical field, lungs can get in the way of LIMA harvesting, Lt internal mammary artery-branch of left SCA			
4. Preparation of bypass vessels: LSV or left radial artery harvesting		Mix 20-40mls blood via arterial line with 1000-2000iu heparin and give to scrub nurse if asked	

LSV: Long saphenous vein Heparinised blood may be taken by surgeon or anaesthetist; used to flush and check integrity of vein.			
5. Opening/ Lifting the pericardium	Lifting the pericardium Watch pressures	Inform the surgeon if the pressure is very low SBP < 60 or doesn't recover quickly. May require fluid bolus/small amount of metaraminol	
Why does BP drop here?			
6. Heparinisation before aortic cannulation	Give heparin	Heparin in Give 300-400IU/kg via central vein	
Contact between blood and artificial surface of the bypass circuit causes massive activation of clotting and complement cascades. Heparin prevents fatal coagulation. Activation of the complement cascade causes cell lysis, histamine release, vasodilatation and increased vascular permeability. This inflammation + micro/macro emboli is responsible for post CPB organ damage.			
7. Verify adequate anticoagulation	What's the ACT?	Sampling Blood in 1 ml non heparinized syringe Make surgeons aware arterial trace will disappear during sampling Aim ACT > 480s/4x baseline	ACT is X and rising
ACT > 300 ok for cannulation, ACT > 400 ok for going on bypass ACT > 480 ok for DHCA			
8. Aortic cannulation	Cannulating Aortic Cannulation Give 100	SBP aim 80-90mmHg prior to aortic cannulation May need GTN 0.2-0.3mls or small bolus of propofol to achieve	Good swing in line (due to aortic pulsation) 100 in
SBP target of 80-90mmHg to minimize risk of aortic dissection and blood loss			
9. Atrial cannulation	Cannulation of the IVC via the RA (SVC also cannulated in MV/TV/aortic dissection cases)	Hypotension +/- dysrhythmias	
Manipulation of the RA arrhythmogenic			
9. Connection of CPB circuit	Come up on red De-airing lines		Coming up on red
Flushing the CPB prime via arterial limb prior to connection aortic cannula, ensuring no air enters the circulation			

10. Going on CPB	Go on Cool to X (usually 32-34 C)	Ensure temp probe is working	Going on Cooling to X Commence CPB
Cooling reduces tissue O2 requirements. Also increases tolerance for ischaemia of the vital organs enabling low flows during CPB.			
11. Achievement of full flow		Switch ventilator off Give syringe of metaraminol to perfusionist Up on propofol infusion	Full flow
Oxygenation now performed by CPB, lungs kept out of the surgical field. Metaraminol administered by perfusionist to maintain adequate MAP. Propofol infusion increased to ensure patient asleep.			
12. Placement of LV cardiotomy vent (via pulmonary vein or LA)	Up on green		Up on green
The vent is a catheter attached to suction to remove blood from the LV which accumulates during the surgery; bronchial+/thebesian veins, intracardiac shunt or AR. The blood results in distension of the LV and myocardial warming both of which increase myocardial O2 demand + should be avoided.			
13. Application of aortic cross clamp	Blue clamp on Cross clamp applied + anterograde cardioplegia cannula sited		
14. Administration of cardioplegia	Give cardioplegia	Giving cardioplegia Ensure no electrical activity on ECG	
15. Rewarming	Rewarm	Turn on bair hugger Connect fluid warmer Start any infusions needed for separation from bypass Ensure temp probe is working	Rewarming Rewarm via the CPB circuit
16. Cross clamp off	Cross clamp off		Cross clamp off
The heart is now being perfused by the coronary arteries			

17. Preparing to separate from CPB	Are you - the anaesthetist + perfusionist - happy?	Yes ABG within normal limits Normothermia Hb >70 Pacing wires attached+checked - asynchronous mode if pacing required	Yes
18. Separation	¾ ½ ¼ Off	Ventilator back on Titrate fluids - ask perfusionist to give volume from CPB pump Vasopressors, inotropes, chronotropes, pacing Look at the ventricle/ assess with TOE	That's ¾ flow ½ flow ¼ flow Off
Off = venous line has been clamped			
19. Protamine administration	Give protamine	Protamine going in Check ACT after 2 minutes	Pump suckers are off
Give protamine slowly. Pump suckers off avoids clotting the pump in case need to go back onto CPB			
20. Venous cannula out			
21. Aortic cannula out	Removing aortic cannula	SBP aim 80-90mmHG	
Again to avoid dissection/rupture/xs bleeding			
22. Admin of cell salvaged blood		Give via fluid warmer	
23. Chest closure + sign out		Watch for hypotension due to tamponade from any packs in situ Change pacemaker to synchronous mode prior to leaving theatre	