Topic 26 - Cardio-thoracic General Surgery- Chest - Heart and Lungs

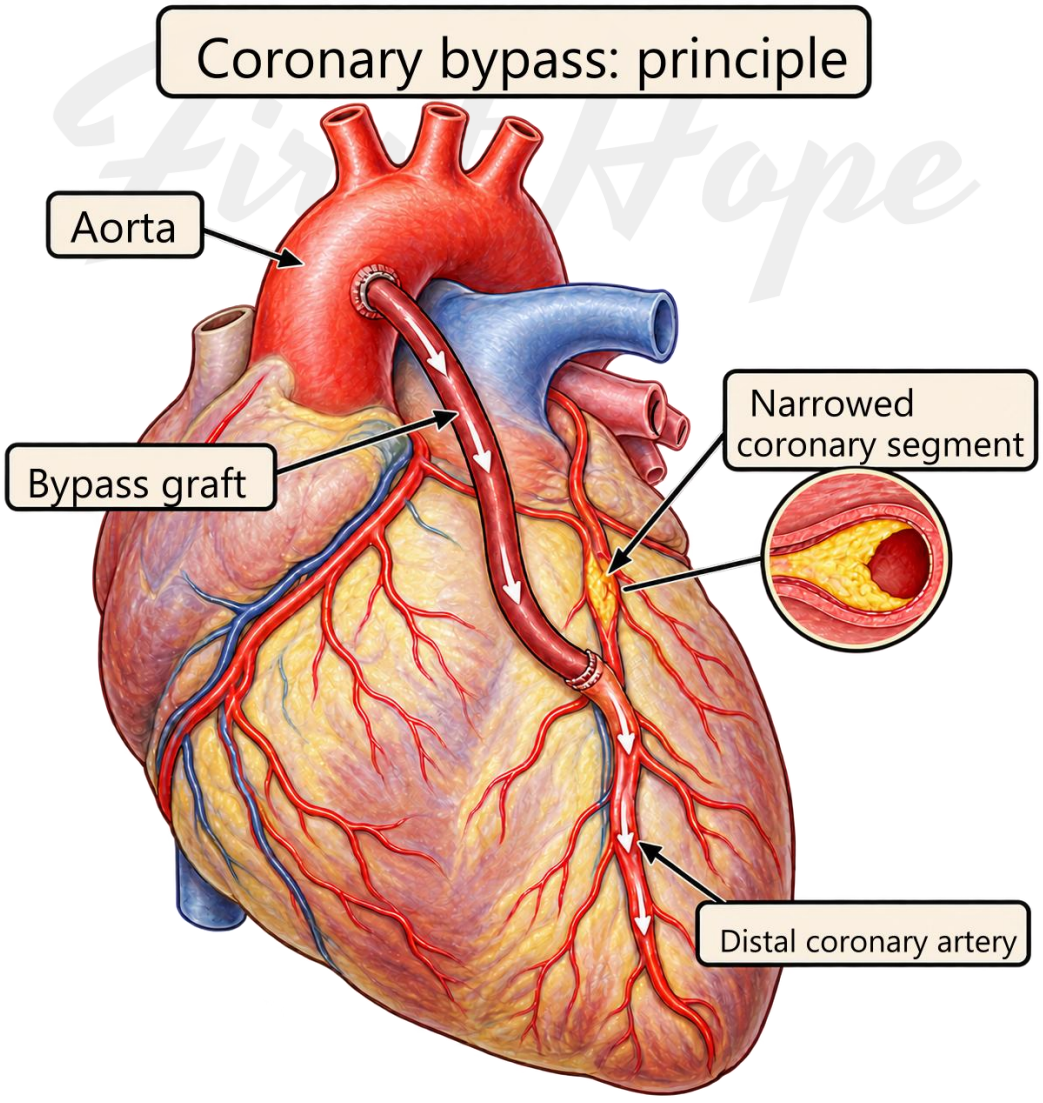
Surgery for Coronary Heart Disease

- Coronary atherosclerosis can restrict myocardial blood flow and cause angina, infarction or impaired ventricular function.

Why Revascularization Is Considered

- Medical treatment addresses symptoms, thrombosis risk and progression of the underlying disease.
- Revascularization is considered when symptoms, anatomy, ischaemic risk or prognostic benefit justify an intervention.
- Percutaneous coronary intervention opens a vessel from within, while coronary artery bypass grafting creates another route for blood to reach myocardium beyond a narrowing.
- Neither procedure eliminates the need for smoking cessation, lipid control and other secondary prevention.

When Bypass Surgery Can Be Useful



A free bypass graft illustrates how blood is directed from the aorta to a coronary artery beyond a narrowing

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- CABG may be favoured for suitable patients with significant left-main disease or complex multivessel disease.
- In suitable patients with diabetes and multivessel disease involving the left anterior descending artery, CABG often offers advantages over PCI.
- Ventricular function, coronary anatomy, symptoms, surgical risk and the feasibility of complete revascularization influence the decision.
- A multidisciplinary Heart Team helps choose between medical treatment, PCI and surgery when the best approach is uncertain.
- Urgent surgery may be required for selected acute coronary presentations when PCI is unsuitable or unsuccessful, or for certain mechanical complications of infarction.
- The timing after an acute infarction balances ongoing ischaemia, haemodynamic instability, antithrombotic exposure and operative risk.

Principles and Follow-up

Graft Conduits and Operative Techniques

- The internal thoracic artery is a preferred conduit for the left anterior descending artery when suitable.
- Other arterial or venous grafts can supply additional coronary territories.
- Operations may use cardiopulmonary bypass or selected off-pump techniques according to the patient's anatomy and the team's expertise.

Consent, Early Care and Rehabilitation

- Consent includes risks such as bleeding, infection, stroke, renal injury, arrhythmia and death, using an individualized estimate where available.
- Postoperative care monitors circulation, rhythm, bleeding, ventilation, renal function and wound recovery.
- Cardiac rehabilitation, appropriate antiplatelet treatment and risk-factor control help protect long-term benefit.

Role of Surgery in Valvular Heart Disease

- Valve stenosis obstructs forward flow, while regurgitation allows abnormal backward flow and volume overload.

Assessment and Choice of Intervention

- Echocardiography defines the lesion, severity, ventricular response and associated valve or pulmonary-pressure abnormalities.
- Symptoms, ventricular function, chamber size, pulmonary pressure and the natural history guide the timing of intervention.

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- Waiting for advanced irreversible ventricular damage can reduce the benefit of a technically successful operation.
- A Heart Team considers surgical repair or replacement and appropriate catheter-based options together with the patient's goals.

Valve-Specific Intervention

1. Aortic Valve Disease

- Severe aortic stenosis can produce exertional breathlessness, angina or syncope and requires assessment for valve intervention.
- Surgical aortic valve replacement and transcatheter aortic valve implantation are selected according to anatomy, age, life expectancy, access, comorbidities and future treatment needs.
- A fixed age cutoff alone does not capture the full decision.
- Severe aortic regurgitation may require surgery because of symptoms or adverse ventricular changes even before advanced heart failure occurs.
- Associated aortic-root or ascending-aortic disease may require an additional surgical procedure.

2. Mitral and Other Valve Disease

Mitral Regurgitation and Mitral Stenosis

i. Mitral Regurgitation

- Durable repair is preferred for many suitable degenerative mitral regurgitation lesions when expertise is available.
- Replacement is needed when repair is unsuitable or unlikely to remain effective.
- Secondary mitral regurgitation requires treatment of the underlying ventricular disease before selecting an intervention.

ii. Mitral Stenosis

- Rheumatic mitral stenosis may be suitable for balloon commissurotomy when valve anatomy is favourable and important contraindications are absent.
- Surgery is considered when a catheter approach is unsuitable or other cardiac surgery is needed.

Tricuspid Disease and Infective Endocarditis

- Tricuspid disease may be treated with repair or replacement, sometimes during left-sided valve surgery.
- Infective endocarditis may require urgent surgery for heart failure, uncontrolled infection, destructive lesions or selected embolic risk.

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Choice of Prosthesis and Counselling

1. Mechanical Prostheses

- A mechanical valve is durable but generally requires lifelong vitamin-K-antagonist anticoagulation.
- Direct oral anticoagulants are not substituted for a vitamin-K antagonist in a mechanical valve.

2. Bioprosthetic Valves

- A bioprosthetic valve usually has less long-term valve-related anticoagulation burden but can deteriorate structurally over time.
- A bioprosthesis does not mean that anticoagulation will never be needed because atrial fibrillation or other indications may coexist.

Shared Prosthesis Decision

- Age, pregnancy plans, bleeding risk, ability to monitor anticoagulation and possible future intervention influence the choice.
- Explain follow-up, dental health, relevant endocarditis prevention and warning symptoms such as new breathlessness or fever.

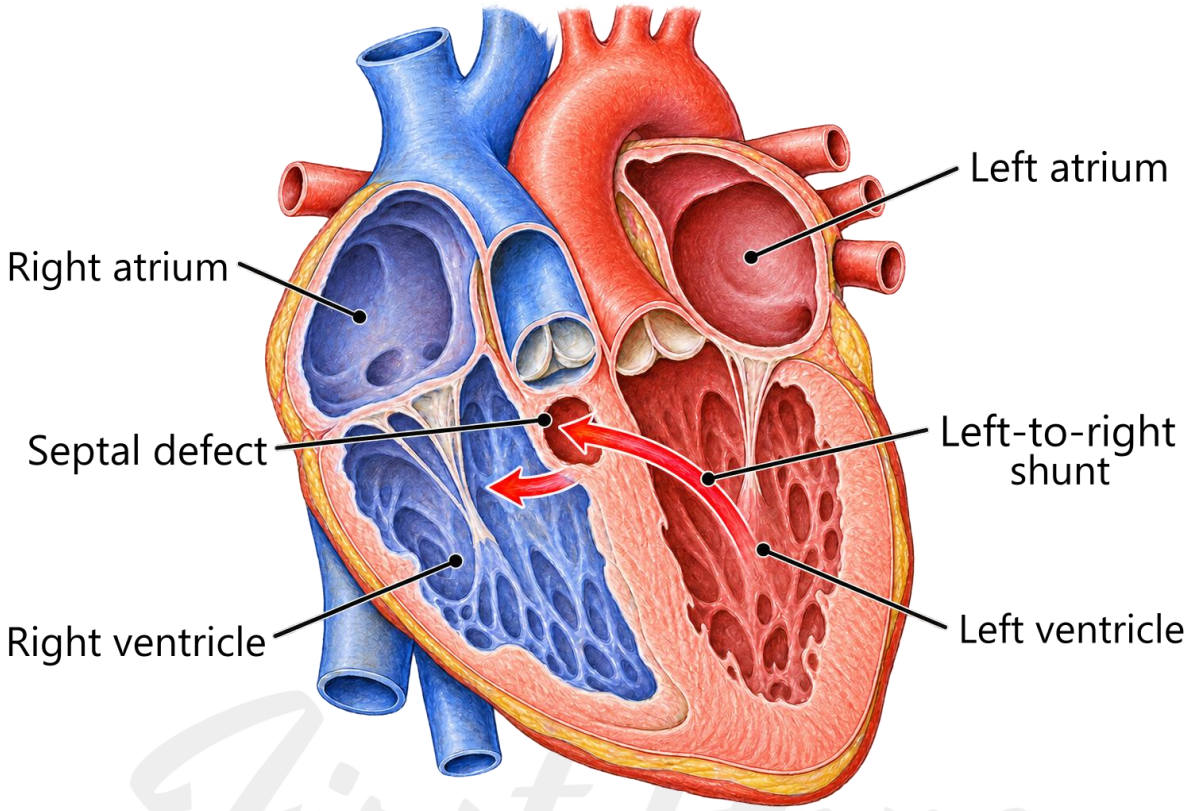
Comparison of Surgical Roles in Cardiac Disease

Disease group	Examples of a surgical role
Coronary disease	CABG supplies myocardium beyond obstructive disease in selected anatomy and risk groups.
Valve disease	Repair or replacement treats severe disease when symptoms or cardiac effects justify intervention.
Congenital disease	Defect closure, relief of obstruction or staged palliation is selected according to anatomy and physiology.

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Role of Surgery in Congenital Heart Disease

- Congenital lesions may cause excessive pulmonary flow, systemic or pulmonary obstruction, cyanosis or a combination of these effects.



A ventricular septal defect allows a left-to-right shunt when left-sided pressure exceeds right-sided pressure

Principles

- Echocardiography defines anatomy and physiology, with CT, MRI or catheter assessment added when necessary.
- Some small defects close spontaneously or require observation, while others need catheter treatment or surgery.
- The decision depends on shunt size, symptoms, growth, chamber effects, pulmonary vascular disease and the specific anatomy.
- Irreversible severe pulmonary vascular disease can make closure of a long-standing shunt harmful, so late presentation requires specialist assessment.

Common Surgical Examples

Common Corrective Procedures

- A significant ventricular septal defect may require patch closure when it causes important symptoms or haemodynamic effects.
- A suitable atrial septal defect may be closed by a catheter device, while anatomy unsuitable for a device may require surgical closure.
- A significant patent ductus arteriosus can be closed by catheter or surgery according to age, anatomy and clinical context.

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