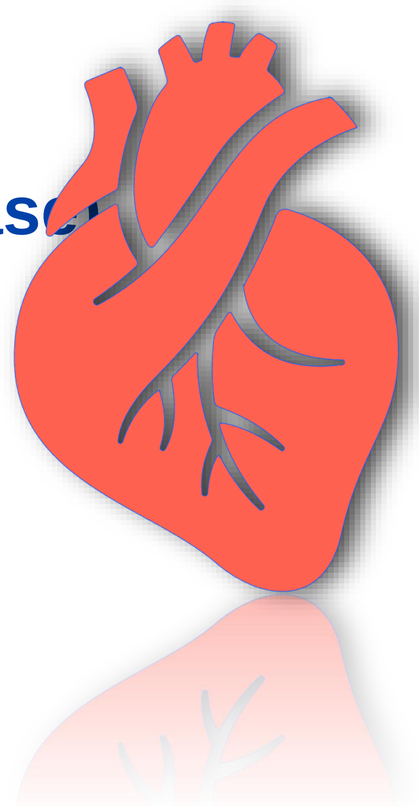
Prosthetic valves

Sami Mukhlif Al-obaidy
Interventional Cardiologist and Senior Lecturer
FIBMS Cardiol , CABM(Med.), D.M(Med) , D.M (Chest Disease)
,MBChB , MESC



- Diseased heart valves can be replaced with mechanical or biological prostheses. The three main types of mechanical prosthesis are the ball and cage, tilting single disc and tilting bi-leaflet valves. All generate prosthetic sounds or clicks on auscultation. Pig or allograft valves mounted on a supporting stent are the most commonly used biological valves. They generate normal heart sounds. All prosthetic valves used in the aortic position produce a systolic flow murmur.

- All mechanical valves require long-term anticoagulation because they can cause systemic thromboembolism or may develop valve thrombosis or obstruction ; the prosthetic clicks may become inaudible if the valve malfunctions.

- Biological valves have the advantage of not requiring anticoagulants to maintain proper function although many patients undergoing valve replacement surgery, especially mitral valve replacement, will have AF that requires anticoagulation anyway. Biological valves are less durable than mechanical valves and may degenerate 7 or more years after implantation, particularly when used in the mitral position. They are more durable in the aortic position and in older patients, so are particularly appropriate for patients over 65 undergoing aortic valve replacement.

16.92 Anticoagulation targets and prosthetic heart valves

Mechanical valves	Target INR
Ball and cage (e.g. Starr–Edwards) **Tilting disc** (e.g. Bjork–Shiley)	3.0–4.0
Bi-leaflet (e.g. St Jude)	2.5–3.0
Biological valves with atrial fibrillation	2.0–3.0

(INR = International Normalised Ratio)

- **Transcatheter aortic valve implantation**

- For patients being considered for aortic valve surgery, especially due to aortic stenosis, transcatheter aortic valve implantation (TAVI) is an alternative to surgical aortic valve replacement. The native valve is not removed but is compressed by the new bioprosthetic valve, which is implanted within it. The bioprosthetic valve is mounted on a large stentlike structure and is implanted through a catheter inserted in the femoral artery. TAVI has several major advantages. It avoids the need for a sternotomy, is associated with a short recovery period, can be used in high-risk and otherwise inoperable patients, and is much better tolerated by older patients. Complications include stroke (2%) and heart block necessitating pacemaker implantation (5%–15%).

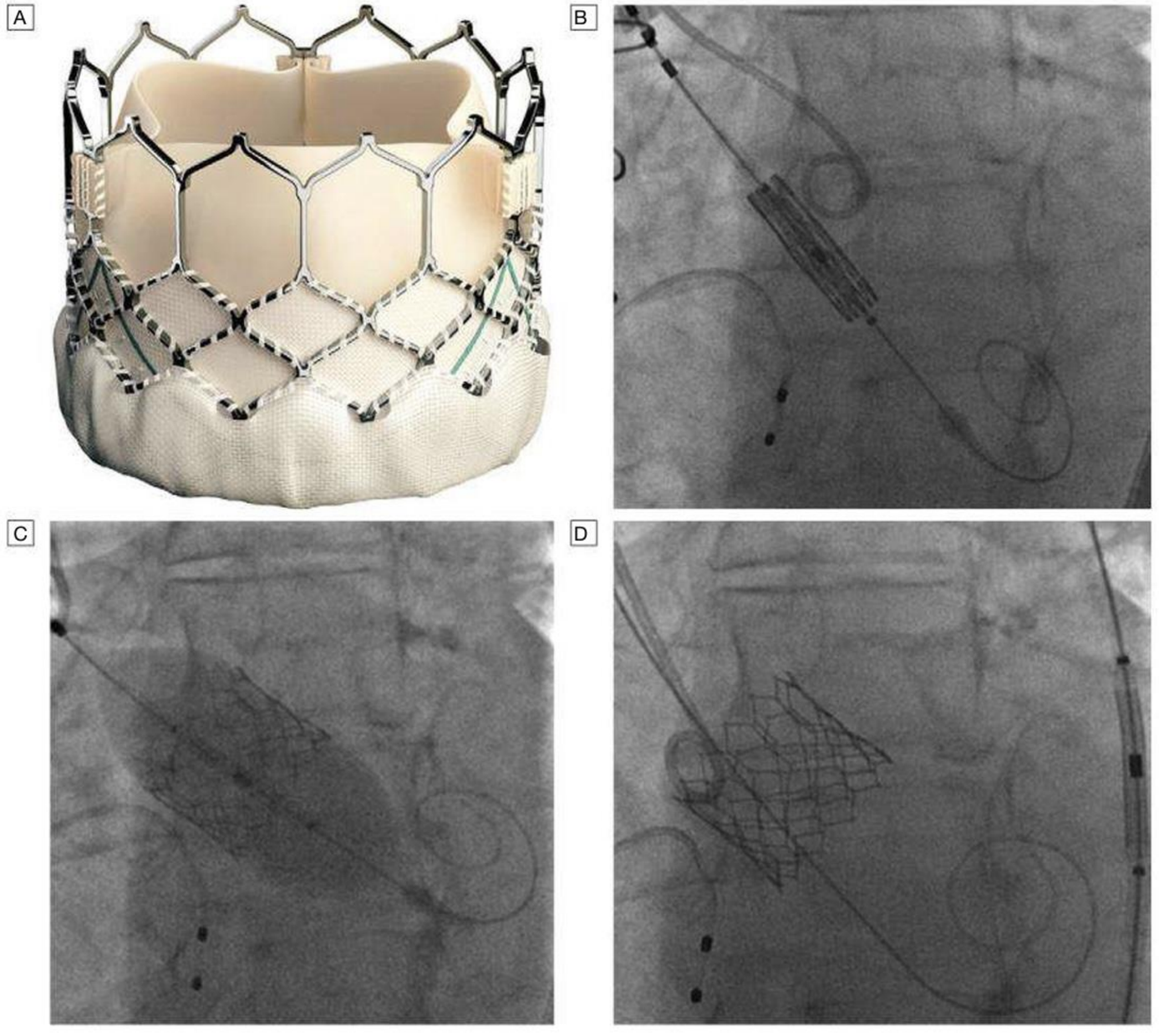


Fig. 16.86 Transcatheter aortic valve implantation (TAVI). Appearance of an expanded bioprosthetic valve [A], which is positioned through a large femoral catheter in an unexpanded form [B], before the valve is deployed by a balloon [C] during rapid ventricular pacing, to leave behind the fully expanded valve [D].

- **Prosthetic valve dysfunction**

- Symptoms or signs of unexplained heart failure in a patient with a prosthetic heart valve may be due to valve dysfunction, and urgent assessment is required. Metallic valves can suffer strut fracture and fail, causing catastrophic regurgitation. Alternatively, they may thrombose and cause systemic thromboembolism or valve obstruction, especially in the presence of inadequate anticoagulation. Biological valve dysfunction is usually associated with the development of a regurgitant murmur and may begin to develop 8–10 years after implantation.