DISEASES OF THE HEART VALVES

A diseased valve may be narrowed (stenosed) or it may fail to close adequately, and thus permit regurgitation of blood. Doppler echocardiography is the most useful technique for assessing patients with valvular heart disease. Patients require regular review, usually every 1 or 2 years, to ensure that deterioration is detected before complications such as heart failure ensue. Are susceptible to bacterial endocarditis which can be prevented by good dental hygiene and the use of antibiotic prophylaxis at times of bacteraemia such as dental extraction.

Valve regurgitation

- Acute rheumatic carditis
- Chronic rheumatic carditis
- Infective endocarditis
- Valve ring dilatation (e.g. dilated cardiomyopathy)
- Senile degeneration
- Damage to chordae and papillary muscles (e.g. MI)

Valve stenosis

- Congenital
- Rheumatic carditis
- Senile degeneration

MITRAL STENOSIS

Is almost always rheumatic in origin. In the elderly,and CRF., it can be caused by heavy calcification of the mitral valve apparatus,(with mitral ring calcification, and MR.). The mitral valve orifice is slowly diminished by progressive fibrosis, calcification of the valve leaflets, and fusion of the cusps and subvalvular apparatus. Thus:left atrial pressure rises, leading to pulmonary venous congestion and breathlessness. Mitral valve orifice is normally about 5 cm^2 in diastole and may be reduced to 1 cm^2 or less in severe mitral stenosis. Atrial fibrillation due to progressive dilatation of the left atrium is very common, its onset often precipitates pulmonary oedema. In contrast, a more gradual rise in left atrial pressure tends to cause an increase in pulmonary vascular resistance, which leads to pulmonary artery hypertension ,which lead to right ventricular hypertrophy and dilatation, tricuspid regurgitation and right heart failure. All patients with mitral stenosis, and particularly those with atrial fibrillation, are at risk from left atrial thrombosis and systemic thromboembolism.

Symptoms: dyspnea/palpitations due to AF. /hemoptysis (either due to acute pulm. Oedema , or PHT.)/ strock or hemoptysis, due to thromboembolism.

Signs;AF./S1loud/opening snap/Apical diastolic murmur: faint, rumbling, localised, not radiating, augmented by left decubitus posture.(Coexisting mitral regurgitation causes a pansystolic murmur .which radiates towards the axilla.)/ bilateral basal crepitations: pulm. Oedema/IF pulmonary HT.: loud S2, RV. Heave , murmure of TR.

Investifations :P mitrale (bifid)/dilated LA./ LV. : not dilated /RV. Dilated , if PHT. , secondaryb to severe MS./ RV. Strain/pulm. Oedema/ mitralization of left cardiac border /MV. Cusps: thick, calcified, immobile , reduced cross sectional valve area./ high pressure half time across MV., by Doppler ./PHT,with TR. , and prominent PA. by CXR.)

Treatment: definitive treatment is by balloon valvuloplasty, or mitral valve replacement, if the patient remains symptomatic despite medical treatment or if pulmonary hypertension develops.

Medications include : anticoagulants to reduce the risk of systemic embolism, a combination of digoxin, β-blockers to control the ventricular rate in atrial fibrillation , diuretics to control pulmonary congestion. Antibiotic prophylaxis against infective endocarditis.

CRITERIA FOR MITRAL VALVULOPLASTY

- Significant symptoms
- Isolated mitral stenosis
- No (or trivial) mitral regurgitation
- Mobile, non-calcified valve/subvalve apparatus on echo
- Left atrium free of thrombus

Mitral valve replacement

Valve replacement is indicated if there is substantial mitral reflux, or if the valve is rigid and calcified

MITRAL REGURGITATION

CAUSES OF MITRAL REGURGITATION

- Mitral valve prolapse
- Dilatation of the left ventricle and mitral valve ring-secondary MR. (e.g. coronary artery disease, cardiomyopathy)
- Damage to valve cusps and chordae (e.g. rheumatic heart disease, endocarditis)
- Damage to papillary muscle –Papill. Muscle rupture –flial leaflet
- Myocardial infarction –papill. Muscle dysfunction.

Chronic mitral regurgitation causes gradual dilatation of the left atrium with little increase in pressure and therefore relatively few symptoms, the left ventricle dilates slowly. Chronic mitral regurgitation produces a symptom complex that is similar to that of mitral stenosis, but sudden-onset mitral regurgitation usually presents with acute pulmonary oedema.

Examination:The apex beat feels active and rocking due to left ventricular volume overload and is usually displaced to the left as a result of dilatation of the left ventricle. The apex beat feels active and rocking due to left ventricular volume overload and is usually displaced to the left as a result of dilatation of the left ventricle.

apical systolic murmur ,which often radiates into the axilla, and may be accompanied by a thrill, with signscof pulm .venous congestion, or PHT. , if severe and prolomged. Atrial fibrillation is common, as a consequence of atrial dilatation

In practice, a common problem lies in deciding on the extent to which cardiac failure is due to mitral regurgitation as opposed to impaired left ventricular function.

Investigation:P mitrale/dilated LA./dilated LV./ pulm. Oedema , if acute MR. /abnormal MV. , as prolapsing, flial , if : primary MR) / ;otherwise: normally looking MV: secondary MR.) /PHT., if severe and chronic.

MEDICAL MANAGEMENT

- Diuretics
- Vasodilators, e.g. ACE inhibitors
- Digoxin if atrial fibrillation is present
- Anticoagulants if atrial fibrillation is present
- Antibiotic prophylaxis against infective endocarditis

High afterload may worsen the degree of regurgitation and hypertension should be treated with vasodilating drugs such as ACE inhibitors. Patients should be reviewed at regular intervals because worsening symptoms, progressive radiological cardiac enlargement or echocardiographic evidence of deteriorating left ventricular function are indications for surgical intervention (mitral valve replacement. A common dilemma in patients with ventricular dilatation and mitral regurgitation is to determine which of the two abnormalities is the predominant problem(primary or secondary MR.). If, for example, ventricular dilatation is the underlying cause of mitral regurgitation, then mitral valve repair or replacement may actually worsen ventricular function as the ventricle can no longer empty into the low-pressure left atrium.

AORTIC STENOSIS

TYPES: Congenital (in infants, children, adolscents)/ rheumatic , calcified bicuspid congenitally (if adult, middle aged) /degenerative ,calcified bicuspid , rheumatic (if elderly).

Clinically: asymptomatic , if mild- moderate ./exertional dyspnea /post exertional syncope / exertional-nocturnal angina.

The three cardinal symptoms are angina, breathlessness and syncope. Angina arises because of the increased demands of the hypertrophied left ventricle working against the high-pressure outflow tract obstruction leading to a mismatch between oxygen demand and supply. Angina may also be due to coexisting coronary artery disease, especially in the elderly where it affects more than 50% of patients

Examination : aortic harsh systolic murmur-radiating to right base of neck and apically (seagull quality) /heaving or sustained apex / aortic syst. Thrill./ faint S2 (if severe and calcified)/ narrow pulse pressure (if severe or associated LVF.)

With bicuspid aortic valves, significant obstruction may take years to develop as the valve becomes fibrotic and calcified as the patient ages. The aortic valve is the second most frequently affected by rheumatic fever, and commonly both the aortic and mitral valves are affected. The patient should be carefully examined for the presence of other valve lesions, particularly in rheumatic valve disease when there is frequently concomitant mitral valve disease

In contrast to mitral stenosis, which tends to progress very slowly, patients with aortic stenosis typically remain asymptomatic for many years but deteriorate rapidly when symptoms develop; thus death usually ensues within 3-5 years of the onset of symptoms.

Investigation : LVH. (ECG./CXR./ Echo)(In advanced cases, ECG features of hypertrophy are often gross and down-sloping ST segments and T inversion ('strain pattern') may be seen in leads reflecting the left ventricle). / LBBB. /proinmant ascending aorta by PA. CXR. (post stenotic diated AA.) / calcified AV. (if long standing significant AS.) / Doppler ": to estimate AS severity , and associated other valv. Dis. (take care if there is syst. HF.)/ Cardiac catheterisation is usually necessary to assess the coronary arteries before aortic valve replacement(and in all patients with valv. Heart dis. ,prepared for surgery, above 40 years).

Symptoms in the elderlies : a common cause of syncope, angina and heart failure in the very old.

And biological valve is often preferable to a mechanical, for AV . replacemenbt , because this obviates the need for anticoagulation, and the durability of biological valves usually exceeds the patient's anticipated life expectancy.

Treatment:
All patients with asymptomatic aortic stenosis should be kept under review, as the development of angina, syncope, symptoms of low cardiac output or heart failure is an indication for prompt surgery. Those with moderately severe or severe stenosis should be evaluated every 1-2 years with Doppler echocardiography to detect progression in severity;
Asymptomatic aortic stenosis in older people has a relatively benign prognosis without surgery, and for these patients conservative management is appropriate. Patients with symptomatic severe aortic stenosis should have aortic valve replacement, even for elderlies. Aortic balloon valvuloplasty is useful in congenital aortic stenosis but is of no long-term value in elderly patients with calcific aortic stenosis.

Anticoagulants are only required in patients who have atrial fibrillation, such as those with coexisting mitral valve disease, or those who have had a valve replacement with a mechanical prosthesis.(while those elderlies with tissue AV. Prosthesis ,they need asperin, but no warfarin).ACEIs or vasodilatersare contraindicated .

AORTIC REGURGITATION

Types; congenital bicuspid/rheumatic /infective endocarditis , in acute AR,complicating subaortic VSD. /Ascending aortic dilation , in Marfans syndrome , dissecting AA. Aneurysm ,ankylosing spondylitis(if long standing)

Clinicaly: mild/ moderate : asymptomatic or exertional palpitation .
Acute and severe : presents in shock state (cardiogenic shock)
Severe and chronic : presents with exertional dyspnea and palpitations., or nocturnal / exertional angina.

- **Signs** Deviated, Diffuse heaving apex beat (volume overload) – indicating Dilated LV.

  Pulses

  - Large-volume or 'collapsing' pulse
  - Low diastolic and high sustolic BP. With increased pulse pressure
  - Femoral bruit ('pistol shot')-
  - Head nodding with pulse-

  Murmurs

  - Early diastolic murmur
  - Austin Flint murmur (soft mid-diastolic)- mimiking associated MS.

Investigation:LVH. In ECG.: with strain pattern (asymmetrical T. inversion, in V6.)/ cardiomegaly (LV.dilation)/ AA. Dilation(by CXR. : at upper Rt. Cardiac border)/ Doppler echo /fluttering of anterior MV. Leaflet (esp. in acute severe AR.- with premature MV. closure)/ MRI is particularly useful in assessing the degree and extent of aortic dilatation(in Marfans syndrome)
Treatment: chronic aortic regurgitation may remain asymptomatic for many years because compensatory ventricular dilatation and hypertrophy occur, but should report the development of any symptoms of breathlessness or angina. Asymptomatic patients should also be followed up annually with echocardiography for evidence of increasing ventricular size; if this occurs or if the end systolic dimension increases to 55 mm or more, then aortic valve replacement should be undertaken. May need to be combined with aortic root replacement and coronary bypass surgery. When aortic root dilatation is the cause of aortic regurgitation (e.g. Marfan's syndrome), aortic root replacement may be necessary.
Treatment may be required for underlying conditions such as endocarditis. Systolic blood pressure should be controlled with vasodilating drugs such as nifedipine or ACE inhibitors.

Is usually associated with pulmonary artery dilatation due to pulmonary hypertension, complicating mitral stenosis; producing an early diastolic murmur at

the left sternal edge that is difficult to distinguish from aortic regurgitation (Graham Steell murmur). The pulmonary hypertension may be secondary to other disease of the left side of the heart, primary pulmonary vascular disease or Eisenmenger's syndrome , or chronic diffuse lung dis..