Role of cardiologist for the treatment of eye diseases
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Introduction
Eye disease is not always a single entity. It may be multifactorial and multidimensional. Many systemic and cardiac problems such as Hypertension, Ischaemic heart disease, Bronchial Asthma, DM etc may be associated with eye diseases. Cardiologist play a vital role in the management of cardiac and other systemic diseases, preparing the patients for safe and sound eye surgery. Post-operative management also includes cardiologist's role to continue the previous treatment by adjusting the effective drugs with doses.

Opinion regarding specific diseases
Hypertension
Persistent rise of blood pressure more than 140/90 mmHg irrespective of age, sex and mental status is usually defined as hypertension. Many risk factors contribute to hypertension among which smoking, dyslipidaemia, Diabetes Mellitus, age older than 60 years, sex (men and post menopausal women), family history etc. are very important. Adequate control of hypertension is always important as there is a great risk of target organ damage (TOD). Commonest TOD are in heart - LVH, angina/MI, heart failure; in brain -stroke, TIA; in kidney -nephropathy, renal failure; in eye - retinopathy; in peripheral vessels -peripheral occlusive vascular disease (POVD) etc. Adequate control of hypertension can be achieved by life style modifications include to keep body weight normal, to limit alcohol intake, to increase physical activity, to reduce sodium intake & to increase potassium intake, to stop smoking etc. Drug therapy is also multidimensional starting from simple low dose thiazides or beta-blockers, up to calcium channel blockers, ACE-inhibitors (ACEI), Angiotensin receptor blockers, vasodilators etc. Safe and sound eye surgery can not be done in hypertensive patients due to risk of exclusive bleeding, sudden increase in BP leading to CVD, arrythmias, heart failure etc.

Coronary Heart Disease
Coronary heart disease (CHD) is usually results from partial or complete occlusion of any coronary artery by atheromatous plaque, thrombus or vasospasm with or without chest pain. Angina pectoris is a discomfort in the chest and adjacent areas due to a transient inadequate blood supply to the heart. Angina is of various types: stable, unstable, prinzmetal's etc. Ischaemia without any symptoms is called silent ischaemia; which is only diagnosed by incidental ECG where changes are ST-segment elevation or depression. Important causes of silent ischaemia are -DM, leprosy, neuropathy, myopathy etc. Myocardial infarction may be defined as myocardial necrosis secondary to an acute interruption of the coronary blood flow. According to duration myocardial infarction is usually three types: acute, recent & old. Each has got different ECG and enzyme changes. In silent myocardial infarction, patients has got no chest pain. He or she may not attend any doctor. For this reason fatal cardiac problems may be ignored by an expert Physician or Cardiologist while one incidental ECG is sufficient enough to draw a correct diagnosis. In acute myocardial infarction all types of surgical intervention is strictly contraindicated due to risk of fatal arrhythmmas like VT, VF, cardiac arrest, heart failure etc till patient becomes haemodynamically stable. In recent MI eye surgery is contraindicated, except life threatening any ocular condition like traumas,
where surgery may be done with caution under strict cardiac supervision. In old MI, eye surgery can be done with caution.

**Other Cardiac Problems**

There are many other cardiac problem among which heart failure (CCF, LVF), cardiomyopathies (DCM, HCM, RCM), Pericardial diseases (acute pericarditis, pericardial effusion) etc. In heart failure any sorts of surgical procedure is contraindicated, but after control of heart failure eye surgery can be done under L/A with caution. Ocular surgery in cardiomyopathy can be done with caution unless there is any evidence of HF or fatal arrhythmias. In pericardial disease, ocular surgery should be avoided in acute inflammatory condition and pericardial tamponade; but in minimal asymptomatic pericardial effusion ocular surgery can be done under L/A with caution. In pulmonary embolism any sorts of surgical procedure is strictly contraindicated.

**Cardiac arrhythmias**

There are many cardiac problems which cardiologists have to manage before, during and after eye surgery under L/A or G/A. Commonest cardiac arrhythmias are extrasystoles (PAC & PVC), Atrial fibrillation, ventricular tachycardia and fibrillation, conduction defects like right and left bundle branch blocks; first, second degree & complete heart blocks etc. Eye surgery should be done very carefully when patients have any sorts of cardiac arrhythmias. Atrial extra systoles are usually benign, not always associated with organic diseases. But premature ventricular contractions are usually associated with IHD, MI, HTN etc. Use of some sympathomimetic and adrenergic drugs like adrenaline, dopamine, dobutamine, atropine, isoprenaline etc should be used with caution as these agents may aggravate extrasystoles together with increase in heart rate. In Atrial fibrillation operation can be done with mild caution from cardiological point of view in asymptomatic patients. But when AF is associated with other systemic and cardiac diseases like thyrotoxicosis, cardiomyopathy, in those cases surgery should be done after control of AF with non-selective β-blockers and cardiac glycosides (digitalis). Heart blocks are of various types. Eye surgery can be done with mild caution in 10HB, 20HB, RBBB etc. LBBB is usually associated with IHD, MI, HTN. So in these conditions eye surgery should be done under strict cardiac monitoring and pulse oxymetry except acute MI where it is contraindicated. Another important point is that eye surgery can not be done in CHB, VT, VF as these conditions may lead to cardiac arrest within seconds to minute. Patients with PPM implanted for the management of CHB and other symptomatic second degree, bifascicular and trifascicular blocks should undergo eye surgery with some precautions: 1) To avoid electrocautery, 2) To avoid adrenaline, atropine. 3) To avoid adrenaline, atropine. In cardiac conduction defects β-blockers such as atenolol, metoprolol, timolol, carvedilol should be avoided due to decrease in heart rate, cardiac conductivity and contractility.

**Some Medical Problems**

There are some important medical problems which cardiologists have to look after during management of eye patients. Those are DM, electrolyte imbalance, lung diseases etc.

**Diabetes mellitus**

Diabetic patients are particularly prone to CHD. But there is also a diabetic form of cardiomyopathy. DM is commonly associated with HTN. DM is managed with diet control, exercise, oral Hypo-glycaemic agent and insulin. Eye surgery cannot be done without proper control of DM as there is a risk of delayed wound healing, development of retinopathy and corneal haziness, optic neuritis, occasionally hypoglycaemic shock which is life threatening, risk of excessive bleeding and HF with stroke when DM is
Electrolyte imbalance is a fatal complication of diabetes.

**Lung diseases**
Eye surgery can not be done in acute bronchial asthma, acute pulmonary embolism, pulmonary hypertension, acute pneumonia, open TB, advanced malignancy etc. Eye surgery can be done with caution under strict cardiac monitoring in chronic bronchial asthma which is under control with bronchodilator therapy; in COPD after one to two weeks treatment; in chronic old PT treated or under anti Koch’s therapy. In acute respiratory problems patient will be restless, dyspneic, cyanosed, will be unable to lying flat, associated with hypoxaemia. So smooth eye surgery is impossible at this critical condition.

**Hyperlipidaemias**
Raised serum lipid profile above normal with or without any clinical presentation. Commonest complications are: in heart- IHD, MI, HTN; in kidney-renal artery stenosis; in peripheral vessels - peripheral occlusive vascular diseases; in brain -cerebral ischaemia, infarction, TIA; in eye - central and peripheral retinal arteries and veins occlusion etc. Cardiologists should look after and to manage all dyslipidaemic conditions in eye patients.

**Conclusion**
Many congenital and valvular diseases are not always associated with chest pain, SOB, Palpitation. Those may be asymptomatic for many years but can easily be diagnosed incidentally by ECG and other cardiovascular modalities. Long standing cardiac diseases usually produce HF and fatal arrhythmias, ultimately leading to death. From cardiological point of view all patients requiring surgery under L/A or G/A should undergo thorough clinical examination, cardiovascular evaluation & ECG examination as a routine investigation irrespective of age and sex.

**References**