Any patient who needs to undergo cataract surgery must be evaluated in a thorough manner so as to establish the requirement, appropriateness, expected surgical problems, expected benefits and co-morbid conditions having an influence on cataract surgery.

The preoperative assessment consists of an
i) ocular and a systemic history
ii) examination and
iii) suitable laboratory investigations.

**OCULAR AND A SYSTEMIC HISTORY**

Ocular history is directed at obtaining information to enable a complete understanding of the patient's ocular problem and its impact on his or her activities and quality of life. The patient's visual symptoms are analyzed to establish whether they are consistent with the presence of and correspond to the cataract. The time course of vision deterioration and associated ocular symptoms are determined. The presence of glare and colored haloes is noted. Different morphological types of cataract present with different symptoms. Nuclear cataracts induce a myopic shift and usually reduce distance vision more than near vision. They also cause loss of contrast sensitivity function, difficulty in nighttime vision and nighttime glare. Colour perception is also significantly hampered in some cases. Posterior sub capsular cataracts adversely affect near vision in advance of a reduction in distance vision. They cause greater disturbance in brighter illumination than in dim light. They also tend to induce disabling symptoms of daytime glare. The presence of redness, pain, acute onset of vision loss should alert us to an alternate diagnosis. Symptoms like flashes, floaters, heaviness of the eyes, transient blurring of vision, metamorphopsia require detailed specific evaluation to find the cause. A history of discharge must be investigated to rule out contamination of the conjunctiva or the lacrimal system and requires treatment. The patient's perception about his or her vision prior to
development of cataract must be noted. If the patient never had better vision in the affected eye, the possibility of amblyopia, optic neuropathy or retinal disease should be explored. The presence of concomitant eye diseases like glaucoma, retinal diseases, large refractive errors, viral keratitis, etc. must be elicited. Any treatment for the above must also be recorded as it may have a bearing on the surgical plan and on the prognosis of cataract surgery. Information about previous cataract surgery in the fellow eye can identify potential risk factors like weak zonules, poor dilatation, etc. where they exist. Eliciting the patient’s expectations from surgery is also warranted.

A general medical review aims to identify factors that have a bearing on the timing of surgery, patient’s response to stress, intraoperative co-operation and post-operative compliance.

A history of cardiac, pulmonary, or cerebrovascular events, especially recent, influences the timing of surgery. Surgery is stressful to a patient, even if topical anesthesia is used. It is better to wait for cardiovascular stability as determined by a physician before embarking on elective surgery. Significant cardiac events in predisposed patients may necessitate a pause or even termination of the procedure midway and self sealing incisions or preplaced sutures facilitate rapid closure in such situations. Osmotic diuretics like mannitol are generally contraindicated in patients with congestive cardiac failure. Patients with emphysema or chronic bronchitis and asthma require special attention to optimize the airway patency, and patient and surgeon comfort. Tenting the surgical drape a few inches above the patient’s mouth and nose minimizes the claustrophobic effect on the patient. Supplemental oxygen may be given if deemed appropriate by the anesthetist. Diabetes mellitus and systemic hypertension are common in the population predisposed to operable cataract. Especially in our country, many of the elderly patients have not had prior serious contact with the health care system and may be diagnosed with the above conditions at the preoperative assessment. Both these conditions can adversely affect the course of surgery and the post-operative outcome. Hence, good control is desirable before surgery. Genito-urinary problems should be enquired about with special reference to urinary tract infection. This will require treatment before surgery.
Prostatism is not a contraindication to surgery as early ambulation can easily be achieved after surgery.

Certain disorders may make patient co-operation difficult during surgery and the operating environment must be suitably modified. These include Parkinson’s disease and other involuntary movement disorders involving the head, face and lids, communication disorders, and excessive fear or anxiety. These factors influence the decision about the form of anesthesia to use and the need for sedation. Orthopnoea or severe kyphosis or scoliosis may make optimal positioning of the patient on the operating table difficult.

Certain systemic disorders are associated with cataracts of particular morphology and a history may provide a clue to diagnosis of unusual lens opacities.

The patient’s personal and social history gives us important information. Smoking may be associated with decreased oxygen carrying capacity of blood and oxygen supplementation may be required. Breathing difficulty during surgery, cough during and after surgery can compromise the surgical outcome. Patients with alcoholism and a history of substance abuse may require higher than average doses of anesthetics and they may demonstrate poor compliance to instructions during and after surgery.

The patient’s systemic medication history should be elicited with special reference to anticoagulants, antihypertensives and steroids. Anticoagulants must be stopped 5-7 days ahead of cataract surgery if a clear corneal incision under topical anesthesia is not being planned. The patient’s physician must be consulted before stopping anticoagulants. Patients on certain antihypertensives (e.g. diuretics) have a contracted vascular compartment and osmotic diuretics can precipitate electrolyte imbalances. Patients on long term steroids for arthritis, asthma, connective tissue disorders, etc. may exhibit delayed healing and increased incidence of bleeding complications, besides the need for higher than usual post-operative anti-inflammatory dosage. Eliciting a history of hypersensitivity to medications is very important.
EXAMINATION

The ocular examination is conducted to identify the cause of the patient’s complaints, to ensure that factors likely to adversely affect surgical outcome are recognized preoperatively and suitably modified, and to predict the visual potential of the eye after cataract surgery. The diagnosis of an operable cataract in the outpatient department is fairly straightforward. However, once the decision to operate is taken, a subsequent careful examination with the following points in mind will secure good results post-operatively.

Visual acuity should be determined both for distance and for near. In patients with nuclear sclerosis, diminution of near vision more than that for distance should alert us to the possibility of macular dysfunction. A polarizing or variable density filter placed in front of the eye causes a marked reduction of visual acuity in patients with macular disease, whereas it does not have any effect on an amblyopic eye. A modified photostress test using bright light from an indirect ophthalmoscope can be performed and will suggest a macular pathology if abnormal. 10 seconds of illumination will generally require less than a minute for recovery to a visual acuity of one line less than previously recorded.

The position of the eyes, a cover-uncover test and congruity of movements in the cardinal positions of gaze will reveal any muscle dysfunction and the possibility of amblyopia if strabismus is present. A diffuse torchlight examination followed by detailed slit lamp examination is essential. The ocular adnexa is examined for abnormalities. Lid position abnormalities, misdirected cilia, presence of blepharitis or meibomitis, discharge regurgitating on pressure over the lacrimal sac require attention prior to cataract surgery. Presence of conjunctival congestion warrants investigation and possibly postponement of surgery. An abnormal tear film may delay wound healing and be the cause of post-operative discomfort attributed by the patient to the surgery. The corneal status is very important in deciding
the type of surgery possible and the response of the eye to surgery. An opacity may make surgery difficult. The presence of pigment or KPs on the endothelial surface alerts us to the possibility of glaucoma or uveitis, which need to be appropriately dealt with. The patient should be free of uveitis for at least 4-6 months prior to surgery. Presence of Fuch’s dystrophy will modify decision on the type of surgery to be performed. The depth of anterior chamber is important as phaco and SICS may be difficult to perform in a shallow chamber, especially in the learning phase. Large amplitude shifts in the posterior capsule may be present in myopic eyes with deep chambers. The iris surface should be carefully examined for areas of atrophy, alteration in the pattern, neovascularization, tremulousness etc. which may complicate surgery. The presence of miosis and posterior synechiae point towards the possibility of having to operate with a small pupil, with known risks. The pupillary reaction is of great importance. The pupils should react briskly to light even in the presence of very advanced cataracts. A sluggish response or a relative afferent pupillary defect makes the prognosis for restoration of vision after cataract surgery extremely poor. The size of the pupil should be noted and the extent to which it dilates must be estimated before surgery. The presence of a small pupil will necessitate iris handling during surgery. The cataract type must be identified prior to surgery. A posterior polar cataract requires special care to prevent posterior capsular dehiscence and subsequent vitreous disturbance. Hydrodissection must be avoided in this type of cataract. The size of the nucleus and grade of the sclerosis must be assessed to decide on the incision and type of surgery. The zonular apparatus examination is also possible under mydriasis. All cataract surgery is prone to develop complications in cases with inadequate zonular support. This may require additional instrumentation or modification of the technique of cataract surgery and the possibility of not implanting an IOL in cases with inadequate capsular support should be explained to the patient. Wherever possible, the fundus must be visualized, especially with the indirect ophthalmoscope, to rule out developmental anomalies, degenerative conditions and other retinal and optic nerve pathology so as to suitably modify the prognosis offered if these conditions are present.
The intraocular pressure must be recorded pre-operatively. An elevated pressure may require modification of surgery, pre-operative regimen, post operative care and the prognosis. Where elevated pressures are encountered, a careful gonioscopy should be done to diagnose the type of glaucoma and aid in surgical planning.

After ensuring a thorough ocular examination, we need to assess the potential visual function after cataract removal. Determination of the expected visual outcome after surgery is the most important guide to the surgeon’s and the patient’s decision for or against surgery. The principle of such testing devices is to estimate the visual acuity by projecting a visible target through the cataract to the retina for subjective interpretation. Two main types of instruments are employed for this. One is the Guyton-Minkowski potential acuity meter (PAM). This is attached to a slit lamp and projects a reduced Snellen’s chart through a pinhole clear area in the cataract towards the macular region. Refractive errors are compensated by the apparatus. The second type (Lotmar, Rodenstock type laser interferometers) utilizes coherent white light or helium-neon laser generated interference stripes or fringes that are projected onto the retina through the ocular media. The width of the fringes corresponds to the visual acuity and can be varied. Refractive errors need not be corrected in interference testing as projection of interference fringes occurs over three dimensions and is not affected by ametropia.

These potential acuity devices (PAM and laser interferometers) are subjective methods that require an alert and cooperative patient and a skilled and compassionate examiner. Moreover these tests are of greatest use when the cataract is not far advanced. Very dense cataracts yield false negative results. Caution must also be exercised in some cases of maculopathy where there may be false positive (pseudo-good prognosis) results. A rule of thumb is that a predicted improvement of four lines on the acuity devices suggests a good prognosis for surgery.
Tests of entoptic phenomena give a good estimation of the retinal function. Blue field entoptoscopy relies on the observation of leucocytes flowing in the macular retinal capillaries. The leucocytes appear as ‘Flying Corpuscles’ when the retina is diffusely illuminated with a bright blue light. This test requires a very discerning patient and may yield false negatives if the retina cannot be sufficiently illuminated through a dense cataract. The Purkinje’s vascular entoptic test is a simple method which elicits the response by placing a penlight against a closed eyelid or the globe and moving it back and forth, creating images of the patient’s retinal vascular tree. Patients who can identify the foveal avascular zone are predicted to have a visual acuity of 6/12 or greater. Like the previous test, this is also limited by the patient’s subjective interpretation and some patients cannot appreciate the images altogether. This test is more useful to compare two eyes of one patient assuming that one eye is normal and the other has opaque media.

Glare disability and contrast sensitivity function testing may be required in those patients who have significant complaints in the face of a good distance visual acuity. The Brightness Acuity Tester (BAT) and the Miller-Nadler glare testing device are two commonly used instruments to test for disabling glare. Simple alternatives to these are the testing of Snellen acuity indoors and then outdoors with the chart positioned in front of direct sunlight, or with a penlight shining obliquely towards the pupil. The difference between the acuity with and without the additional source of light is attributed to glare disability. Contrast sensitivity drops with cataract and causes a drop in the quality of vision. It can be tested by various devices or wall mounted charts (Pelli Robson chart, Terry chart, CSV 1000, B-VAT II, etc).

Evaluation of the visual potential of a patient with an advanced or mature cataract is a challenging problem commonly faced by us. However, a reliable estimate of retinal function (not macular integrity) can usually be attained. The history should elicit information about pre-existing ocular problems and where possible, a record of a previous ophthalmic examination must be gone through. The presence of light perception is absolutely necessary if cataract surgery is being proposed for visual improvement. A gross idea of retinal function may be obtained by testing for the ability to project light. Though opaque media can diffuse light to an extent that the directional quality is lost, this test offers a reasonable idea about the
absence of a large retinal detachment or advanced field defect, or other gross retinal and optic nerve pathology. A loss of light projection after retinal bleaching with an indirect ophthalmoscope light for about 20 seconds is useful to identify significantly abnormal retina. A very simple, yet useful test is the ‘two point discrimination’ test. Two light sources are held close together 25 inches from the patient. If the patient can correctly identify two lights, retinal function is assumed to be grossly intact. No information is obtained about the macular status. Similarly, gross colour perception is a useful tool to establish general retinal integrity. This can be tested most easily on the slit lamp using the cobalt-blue or the red-free (green) filters. This gives some estimate of the macular function. The possibility of congenitally deficient colour perception must be kept in mind and the other eye tested to rule out the same. Another simple reliable test which tests the macular function is the Maddox rod test. A Maddox rod is placed in a trail frame or held in front of the eye to be tested. The other eye is occluded and the patient asked to fixate on a bright light source held 14 inches (35 cms) away. If the patient observes an unbroken red line, macular integrity may be assumed. The test should be done in various meridians to reveal detachment or glaucomatous defects. The perception of a discontinuity in the red line suggests a macular lesion. This test also evaluates the patient’s colour perception. Occasionally, it may not be possible to perform this test because of a totally opaque media.

Where the above tests have questionable responses or are impossible to perform, a structural evaluation should be performed using ultrasonography (B-scan). This gives a gross idea about the anatomic normalcy of the eye, and rules out pathologies like vitreous hemorrhage, retinal detachment, optic nerve anomalies, etc. Where USG-B scan is not available, a standardized A-scan can be used. The scanning is carried out in 8 longitudinal meridians, the probe initially placed on the limbus and moved to the fornix. The patient is instructed to look in the direction of the meridian being scanned. This scanning is repeated at tissue sensitivity settings lower and higher to the normal for more information. Scanning does not offer any information on macular function. Electrophysiological tests may be used in a research setting to evaluate patients but have a very limited role in clinical practice. Electroretinography (ERG) estimates total rod function and is of little value in determining postoperative visual potential. The visual evoked potential (VEP) is more
specific and requires an intact macula and optic nerve besides the cortical centres. This is a very useful test in predicting visual acuity in patients where no other means is available.

LABORATORY INVESTIGATIONS

The preoperative workup also involves certain basic laboratory investigations to diagnose some of the above mentioned conditions. Opinion is divided about the scope and array of investigations to be done routinely before cataract surgery. A good compromise is to undertake certain basic investigations as a routine on all patients undergoing surgery, and to let clinical judgement guide the need for more extensive investigations. Experience has shown us that a blood pressure measurement, blood sugar estimation, a urine sugar and microscopy, and an electrocardiogram will identify most of the patients having an undiagnosed systemic condition requiring attention prior to surgery. More specific investigations like x-ray chest, hemogram, serum urea and creatinine, etc., may be required in patients who have a positive risk factor identified in the history or when general anaesthesia is being contemplated.

An informed consent must be taken after a detailed discussion of the prognosis and possible complications of surgery. This is an absolute must in today’s scenario, to avoid subsequent allegations of not having fully explained the pros and cons and having performed bad or unnecessary surgery. The consent must have a witness, usually a blood relative.

Preparation of the patient for surgery:

A patient deemed fit and assigned to be operated should be started on topical antimicrobial therapy (a broad spectrum antibiotic drop four times a day) 3-4 days before surgery. The role of systemic antibiotics is controversial, but given its low cost and very few adverse effects, a broad spectrum antibiotic with good ocular penetration (like ciprofloxacin) may be started a day prior to surgery, if desired. An anti-anxiety medication may be given to apprehensive patients. Oral hypotensive agents need to be given for extracapsular cataract surgery alone. Acetazolamide may be given one to two hours before surgery. Patients need not be restricted and
they may be safely allowed their normal routine of activities in today’s era of safe and minimally invasive surgery.

A xylocaine sensitivity test must be done as there are numerous instances of hypersensitivity reactions to it. With modern self adhering drapes, eyelashes need not be clipped, as they are kept away from the operating field and they actually assist in proper adherence of the drape. Where such drapes are not being used, eyelashes must be clipped. Patients should be told to wash their faces with soap and water and have a full head bath on the morning of surgery. Where the time of surgery may not be predictable because of the long operative list, patients must be told to have a light meal in the morning.

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