AgingEye Times

Any opacity of the lens or its capsule is termed a **cataract**. A cataract is not a 'new' growth in the eye or lens. The term 'cataract' merely implies that the lens is not completely transparent any more. The loss of transparency may be generalized or limited to some or the other part of the lens.

The lens has to be transparent for good vision. Any loss of transparency will produce less optimal vision. Vision through a 'cloudy' less transparent lens is blurry and is quite like looking through a misty glass or looking from behind a 'waterfall'. In fact, the literal meaning of the term 'cataract' is 'waterfall'.

Types of Age-related Cataracts.

- Nuclear Sclerosis
- Cortical
- Posterior subcapsular

A cataract does not have to become '**ripe**' to be ready for surgery. Even at an earlier stage the cataract will be considered to be visually significant if it interferes with a patients routine activities. Advances in the technique of small incision cataract surgery now allow surgeons to perform cataract surgery in a symptomatic patient well before the 'ripe' stage.

A far advanced cataract is termed a 'Morgagnian' cataract if the cortex liquefies and the nucleus sinks to the bottom of the capsular bag. Trauma or a fall can dislocate a far advanced cataract as it has weak zonules. Sometimes cataract changes appear as polychromatic crystals within the lens; It is then called a 'Christmas Tree' cataract.

Risk Factors for Developing Cataracts

Risk factors for cortical cataract development include **female gender**, **sunlight exposure** and **myopia**.

Other risk factors for nuclear cataract include **brown iris** and **cigarette smoking**. In addition to these risk factors several eye diseases are associated with cataract formation. Amongst them, **steroid use**, **trauma** to the eye and **diabetes** are more commonly associated with cataracts.

Female Gender

A number of epidemiological studies using cross-sectional data have shown an increased prevalence of cataract in women compared with men. Although some have shown an increased prevalence of cataract generally, most have demonstrated an increased prevalence of cortical cataract, with only one study showing an increased prevalence of nuclear cataract *(Am J Ophthalmol 1999;128:446–65)*. The cause of the gender differences in cataract occurrence is not clear but could be related to the hormonal differences between women and men. Postmenopausal estrogen deficiency may be a factor. Recent epidemiologic data provide some evidence that estrogen and hormone replacement therapy (HRT) may play a protective role in reducing the incidence of age-related cataract and cataract surgery *(Am J Epidemiol 2002;155:997-1006)*. Data from the Beaver Dam Eye Study have found that early age of menarche, current and longer duration of estrogen therapy, as well as ever use of the oral contraceptive pill, is protective for nuclear cataract. Recently the Beaver Dam Eye Study has assessed possible associations between reproductive

exposures and incident cataract. The only significant finding was a trend of decreasing incident posterior subcapsular cataract with increasing numbers of livebirths.

Smoking

The observational evidence linking cigarette smoking with risk of cataract is well-established; heavy smokers (15 cigarettes/day or more) have up to three times the risk of cataract as nonsmokers. Smoking is thought to increase risk of cataract, at least in part, by increasing oxidative stress in the lens. Oxidative stress can be caused by free radicals produced by reactions in the presence of tobacco smoke or other air pollutants; these free radicals may directly damage lens proteins and the fiber cell membrane in the lens. Intake of certain antioxidants has been shown to decrease cataract in a number of studies. A recent study investigated the effect of smoking cessation on cataract in US men and women *(Am J Epidemiol 2002;155:72-9)*. Findings suggested that any healing from damage due to cigarette smoking occurs at a very modest pace, and this emphasizes the importance of never starting to smoke or quitting early in life. Compared with current smokers, former smokers who had quit smoking 25 or more years previously had a 20% lower risk of cataract extraction. However, risk among past smokers did not decrease to the level seen among never smokers.

Steroids

The association between steroid use and development of cataract is well established. There seems to be consensus that higher the dose of steroid and longer the duration of use, the higher will be the risk for PSC cataracts. However, despite all the published data, we still do not know what is a safe daily dose of corticosteroid, and how long can this dose be maintained? It is difficult to determine a safe steroid dose even by pooling all published data because of the differing cataract diagnosis criteria of the studies as well as the differing potency of steroids used.

Steroids differ in their potency as well as in the side effect potential. Pred Forte (prednisone acetate) eye drops are perhaps the most widely prescribed steroid eye drop for eye inflammation treatment. There are now several steroid eye drops that have less tendency to cause eye pressure rise or cataract than Pred Forte (FML, Vexol, Lotemax or Alrex, HMS), in part because they are metabolized in the cornea to some extent. Steroids like Inflamase (prednisone phosphate) penetrate the cornea less.

FML, Lotemax or Vexol are good alternatives to Pred-Forte if avoidance of steroid induced cataract or eye pressure rise is a consideration. Using Alrex, Inflamase or a much lesser steroid dose (0.12% prednisone instead of 1%) as is available in Pred Mild is a good idea if only ocular surface inflammation is being treated. (Lotemax & Alrex have the same steroid but in different concentrations, Alrex being milder)

We will present data from 3 widely quoted studies. These data are generally viewed as good guidelines for assessing the risk of cataract development with steroid treatment.

Oral Steroids

Patients treated with Prednisone in amounts less than 10 mg/day for one year stand a negligible chance of developing a PSC cataract. However 75% of patients receiving more than 15 mg/day Prednisone for more than one year were found to have cataracts (JAMA 1960;174:166-71). Other studies have shown that children develop cataracts much earlier than adults, often as early as within 6 months with similar steroid doses.

Topical Steroids

The total dose of steroids that produced a PSC cataract in half of the cataract patients was 765 drops of 0.1% dexamethasone over 10.5 months. 765 drops represent slightly less than 8 bottles of 5 ml each. By reducing the dose to 360 drops (less than 4 bottles of 5 ml each) the chances of developing a cataract are significantly reduced. Prednisone acetate 1% (Pred Forte) is expected to behave similar to 0.1% dexamethasone eye drops (Ann Ophthalmol 1981;13:29-32).

Inhalational Steroids

In adult patients who use less than 14 puffs per week of Beclomethasone inhaler the presence of a cataract is increased, but not too much (about 30% higher). However, if twice as much steroid inhalations are used i.e. 28 puffs per week or more, then cataract presence is about 3 times more.

When the cumulative dose of Beclomethasone is more than 2000 mg, the odds of developing a PSC cataract increases 10 times (N Engl J Med 1997;337:8-14).

For more on steroid induced cataract you can read the full text of this review article.

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