CATARACT AND DIABETES

REZA SOLTANI MOGHADAM,MD

ASSOCIATE PROFESSOR OF OPHTALMOLOGY,GUIALN UNIVERSITY OF MEDICAL SCIENCES

NURSING SEMINAR

- The prevalence of diabetes mellitus (DM) is increasing on a daily basis, with the International Diabetes Federation estimating that there will be 439 million DM patients by 2030.

- DM can affect all ocular structures, with cataract being the most common ocular complication

- Due to the increasing prevalence of DM, the incidence of diabetic cataracts has also risen.

- . Patients with DM are reported to be up to five times more likely to develop cataract, in particular at an early age

- Recent technological advancements in cataract surgery have improved surgical outcomes. However, in diabetic individuals, the scale of improvement is still a matter of debate

MECHANISMS FOR CATARACT IN DIABETES

- The enzyme aldose reductase (AR) catalyzes the reduction of glucose to sorbitol through the polyol pathway, a process linked to the development of diabetic cataract

- It has been shown that the intracellular accumulation of sorbitol leads to osmotic changes resulting in hydropic lens fibers that degenerate and form sugar cataract

CATARACT INCIDENCE IN DIABETIC PATIENTS

- cataract formation occurs more frequently and at an earlier age in diabetic patients than in nondiabetic patients .

- Some studies indicate that cataracts are three to four times more prevalent in patients with diabetes under the age of 65. In patients over 65, cataracts are twice as prevalent.

- The main risk factors are longer duration of diabetes and poor metabolic control. Although older patients suffer from irreversible cataract formation, good metabolic control may reverse cataract in young diabetics

- The increased accumulation of sorbitol creates a hyperosmotic effect that results in an infusion of fluid to countervail the osmotic gradient.

- Animal studies have shown that the intracellular accumulation of polyols leads to a collapse and liquefaction of lens fibers, which ultimately results in the formation of lens opacitie

- Furthermore, studies have shown that osmotic stress in the lens caused by sorbitol accumulation induces apoptosis in lens epithelial cells (LEC), leading to the development of cataract

- In addition to increased levels of free radicals, diabetic lenses show an impaired antioxidant capacity, increasing their susceptibility to oxidative stress.

- Another recently proposed mechanism is autoimmune hypothesis in acute bilateral type 1 diabetic cataracts.

- It has been reported that insulin autoantibodies became positive within three months of beginning insulin treatment, and that this period coincided with cataract formation

CARARACT TYPES IN DM

- The type of cataract seen in diabetic patients has also been investigated. The most common is the senile type .
- However, snowflake cataracts, which are characteristic for DM, are very common in type 1 diabetics.

- Posterior subcapsular cataracts have also been shown to be significantly associated with diabetes. Increased levels of glycated hemoglobin were demonstrably associated with an increased risk of nuclear and cortical cataracts[

TIMING OF SURGERY

- the main cause of poor visual outcomes is macular edema (ME). For this reason, it is not recommend cataract extraction for eyes with DR until visual acuity has deteriorated to 20/100–20/200.
- Similarly, Schatz et al stated that diabetic patients with cataracts might wish to postpone surgery, especially if there is any retinopathy present preoperatively
- early surgery facilitates (PRP) and also allows for the identification and adequate treatment of diabetic macular edema (DME) before cataract surgery

PREOPERATIVE EVALUATION

- Before surgery, patients should have good glycemic control and no evidence of ocular or periocular infection

- Changes in corneal topographic parameters during periods of glycemic changes can be a potential source of error in keratorefractive and biometric calculation

- PRP is recommended preoperatively in patients with pre-existing proliferative diabetic retinopathy (PDR), because of its possible rapid progression after cataract surgery

- Treatment options for ME are laser photocoagulation, pharmacotherapy with intravitreal injections of antivascular endothelial growth factor (anti-VEGF) agents, or steroids . Because preexisting DME can increase the risk of ME progression by 20%–50%, intravitreal antiVEGF agents are recommended perioperatively

- both prophylactic and therapeutic usage of both topical steroidal and non-steroidal anti-inflammatory eye drops (NSAIDs) has become central to perioperative management of CME in diabetic patients.

- Especially NSAIDs have been shown to decrease the incidence of CME in the general population
- Kessel et al showed that the use of NSAIDs did not change the incidence of CME in patients with DR .

PERIOPERATIVE MEDICATION MANAGEMENT IN DIABETIC PATIENTS

- As the oral hypoglycemic agents have relatively long duration of action,they are usually withheld the day of surgery.

- In patients with relatively well-controlled insulin-requiring DM, it is better to hold all short-acting insulin and give a portion (one-third to one half) of usual dose of long or intermediate acting insulin.
- Close perioperative monitoring of blood glucose is mandatory.