Editorial

The Management of Diabetic Retinopathy:

The symptoms of Diabetes were reported, for the first time 3500 years ago. The complaint of polyurea was described in Papyrus Ebers[1]. The Papyrus Ebers is the oldest preserved medical document which was written in 1500 BC by Egyptians. It was recovered from Luxor, Egypt and is currently kept in the University of Lipzig, Germany. However the term Diabetes was used in the first century by Aretaeus of Cappadocia. Aretaeus was one of the most famous Greek Physician of 1st Century and practiced in Rome and Alexandria during the era of King Nero. He accurately described the detail of symptoms and diagnostic characters of many diseases. The term Diabetes is a Latin word and means 'to pass through or to siphon. Aretaeus described "because the fluid does not remain in the body but uses the man's body as a ladder whereby to leave it". Again Aretaeus was the first one to accurately describe the clinical signs of Diabetes, likening it to "an affliction melting down of the flesh and limbs into the urine". After about 1000 years, the Persian physician and philosopher, Avicenna wrote a book, the canon of Medicine (Al-Qanoon fi Al-Tibb). In this book he described the sweet taste of urine in Diabetes. Later in 16th Century a Swiss physician Paracelsus identified Diabetes as a serious general disorder. However it took another 300 years, when the ocular and more specifically, the retinal complications of Diabetes were identified. The diagnosis was made possible after the invention of Ophthalmoscope.

Ophthalmoscope was originally invented by a British mathematician in 1847. He gave this instrument to a doctor to try it at his clinic. But it was laid down and forgotten. Later in 1850 Helmholtz, unaware of the previous discovery devised his own version of ophthalmoscope. Because of his better luck he is often credited with this invention[2]. Two years after this invention Ruette introduced indirect ophthalmoscope. With the invention of indirect ophthalmoscope the ophthalmologists were able to examine the retinal periphery in detail. Fundus photography was initiated by Jackson and Weber in 1886. Due to these inventions the physicians were able to examine the retina directly. Lot of knowledge and understanding of eye diseases flourished and that decade, from 1850 to 1860, is rightly called the golden age of ophthalmology. During this era the retinal diseases like retinal detachment, retinitis pigmentosa, hypertensive retinopathy, retinal vein occlusion, glaucomatous cupping of optic disc and Diabetic retinopathy were initially diagnosed. In 1856, Eduard Jaeger was the first one to observe the diabetic macular changes in the form of yellowish spots and extravasations that permeated into the retina. Another distinguished ophthalmologist Albrecht Von Graefe denied his claim of relationship between retinal changes and Diabetes Mellitus. In 1872 Edward Nettleship proved on histopathology "the cystoid degeneration of macula" in patients with diabetes. The proliferative diabetic retinopathy, vitreous haemorrhage and tractional retinal detachment were described by Wilham Manz in 1876.

Different treatment modalities were tried in Diabetic Retinopathy, but with limited success. However the invention of Laser photocoagulation proved to be a big leap in the direction of finding an ultimate treatment of Diabetic retinopathy. Although the knowledge of the effects of radiations on the retina dates back to 400 BC when Socrates described eclipse burn of the retina, yet the first photocoagulator was developed in 1947. Inspired by the unprotected viewing of the solar eclipse of 1945 on the macula of a medical student, a German Ophthalmologist developed Sunlight photocoagulator. Later he used Beck Carbon arc photocoagulator in scores of patients. Xenon arc photocoagulator was assembled in 1956 by the same German Ophthalmologist. It was effective but the complication rate was very high and it was painful for the patients and its use was inconvenient for the operator. All these photocoagulators used energy in different wavelengths and full thickness retinal burns were

achieved instead of tissue specific burns which were made possible by single wavelength (laser) photocoagulators. The first ophthalmic Laser photocoagulator was invented in 1960 and later in 1968 argon laser was introduced[3].

There are different theories regarding the effect of laser photocoagulation in diabetic retinopathy. In diabetes there is ischemia of the retina. The ischemia induces production of vascular endothelial growth factor (VEGF), resulting in the growth of neovessels on the surface of the retina and into the vitreous. The bleeding from these vessels is the cause of vitreous haemorrhage. The contraction of fibrous tissue, associated with vascular element, causes tractions on the retina and tractional retinal detachment. The laser photocoagulation destroys the ischemic cells in the poorly perfused portions of the retina, thereby reducing the production of VEGF. The laser photocoagulation has its limitations. It does not work in hazy media. The large number of diabetic retinopathy patients, have hazy media due to vitreous haemorrhage and cataract. To apply laser, vitrectomy or cataract extraction is required. Moreover it becomes difficult to get good burns in severe macular edema.

It has been proved that VEGF plays a key role in the development of both proliferative diabetic retinopathy and diabetic macular edema. The importance of VEGF led to Anti-VEGF therapy[4]. These agents that could block the angiogenic cascade first came on the scene for cancer treatment in the early 1990s. Anti VEGFs were introduced to ophthalmology less than a decade ago and have fast become the mainstay of diabetic retinal diseases. Intravitreal injections of anti VEGF are given to patients with vitreous haemorrhage and with severe diabetic macular edema and later the treatment is completed with laser photocoagulation.

Untreated proliferative diabetic retinopathy leads to vitreous haemorrhage and tractional retinal detachment (TRD). If the macula is threatened, because of TRD, then vitrectomy surgery remains the only option. In vitrectomy the vitreous is removed and fibrovascular membranes, pulling the retina are either cut or peeled off. Endolaser is applied during surgery. The results of surgery improve when Anti-VEGF is used as an adjunctive therapy.

Although lot of treatment modalities is available, yet the diabetic retinopathy is the leading cause of blindness in our country and the prevalence is increasing every year. The treatment of diabetes and its ocular complications is also a financial burden on the society. A systematic and multidisciplinary approach is required to deal with the disease and its complications.

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