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Editorial

Diagnosis and Management of Keratoconus: A New Perspective

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The origin of the condition, Keratoconus, has been unknown and greatly debated. Environmental and genetic factors have been investigated widely, along with the recent addition to the factors - the component of inflammation. Scratching and rubbing the eyes and applying strong pressure on them triggers keratoconus and keratoconus is often associated with ocular allergy and vernal keratoconjunctivitis. While Keratoconus had been identified a century ago, in the past two decades the technological development has lead to substantial changes in its management and diagnosis [1]. However, with a wide range of technological developments and the changes, a number of questions and controversies have also made their way.

The most prevailing questions include the right way of defining the disease, along with its progression, when is the right time to intervene, and through what modalities. There some studies that have indicated that Keratoconus has good clinical variability and might be connected to various chromosomal regions. These studies highlighted genes like TGFB1, DOCK9, and VSX1 as involved potentially in this disease's pathogenesis. However, validation hasn't been achieved in bigger numbers [2]. Moreover, the advancements in surgical interventions and corneal imaging has also revolutionized management and diagnosis of keratoconus but they have still resulted in a number of other issues and have portrayed the fire need for more research and guidelines in order to take better care of the patients [3].

Keratoconus (moderate to severe) can be diagnosed clinically using slit lamp biomicroscopy and early keratoconus can be detected utilizing the topographer. This approach for its diagnostics may have been enough when the options for treating Keratoconus were restricted but with the emergence of CXL (Corneal Collagen Cross-Linking) became a game changer [4]. When full thickness keratoplasty is done, the intervention is merely done at the rather advance stage when the disease is obvious. Now, with so many advancements, the surgeons have the ability and tools to prevent or even eliminate the progression through CXL. This has changed the goals from trying to enhance the vision that has already decreased to stopping a decrease in vision. But, this can be done when the disease is identified at an earlier stage [5].

The primary treatment mode initially was the usage of rigid contact lenses and spectacles, while for advance cases keratoplasty was the preferred choice of treatment. However, after the advanced development in the past decade, there have been various therapeutic options now available that have revolutionized the treatment approach for this disease. There has been a paradigm shift from the preferred Keratoconus treatment option from fitting of contact lens, followed by Deep Anterior Lamellar Keratoplasty (DALK) or Penetrating Keratoplasty (PK) to Ultraviolet-A (UV-A) induced collagen cross-linking (CXL) for stabilizing the corneal ectasia for long term. The recent advances in Keratoconus treatment has introduced the usage of excimer laser application, Phakic IOLs, Intrastromal Corneal Ring Segments (ICRS), as well as the utilization of combination techniques which have resulted in a major contribution to offer effective management options for Keratoconus at different stages of its progression [6]. The newest technique is the Bowman layer (BL) transplantation which has been introduced recently as a substitute to PK/ DALK for Keratoconus at advance stage, unsuitable for ICRS or UV-CXL.

As per the recent consensus, the elevation of posterior corneal surface has been declared a must for diagnosing at early stage. The curvature of posterior corneal surface is the first thing to show up which makes it easier for early detection [7]. This recent criterion was determined after the latest developments in the imaging processes, including Scheimpflug photography and optical coherence tomography. This is why unusual curvature of posterior corneal has been recognized as the biggest component in the keratoconus diagnosis as the latest equipment can instantly highlight the elevation. Before this, the surgeons could only used to depend on a few instruments, like topographers, which merely detected the steepening of anterior corneal surface. Aside from this, there have been other factors that have been identified for keratoconus diagnosis including clinical non-inflammatory thinning and unusual distribution of corneal thickness [8]. The numeric values for all these factors haven't been specified by experts as they believe they can vary as per the measuring devices.

Another recent perspective on keratoconus diagnosis has been regarding the progression of the condition. Progression identification has become vital in treating as well as timely decisions. It is essential for the constant presence of at least two of the following parameters [9]:

- Steepening of the surface of anterior corneal surface
- Steepening of the surface of posterior corneal surface
- Enhanced rate of thickness changes or/and thinning of corneal thickness from periphery to the thinnest point.

Some other points of diagnosis includes distinguishing ecstatic conditions like post-refractive surgery ectasia, keratoglobus, pellucid marginal degeneration, keratoconus, as well as thinning disorders like Terrien marginal degeneration [10]. Other areas for keratoconus diagnosis included the usage of diagnostics and imaging devices, keratoconus, as well as the associated risk factors.

While the conditions and terms reached in the consensus leading to newer perspectives on keratoconus might seem overcritical but these are sure to have a major impact on the research and treatment of keratoconus condition. These recent factors would result in a much early intervention and can help in saving the vision of the patients instead of simply waiting to intervene till the loss of vision actually happens [11]. This means a better treatment plan for the patients suffering from keratoconus. However, the recent consensus has also made way for international implications. The main implication has been with the process of decision making in regards to the approaches of treatment, for instance using collagen cross linking [12].

While the clinical preferences typically differ as per the geographical region, the experts where still able to reach a consensus which is beneficial for the best practices advancements at a global level for the treatment and diagnosis of keratoconus and even other diseases.

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