SCREENING FOR KERATOCONUS IN THE EARLY STAGES OF THE DISEASE

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Annotation

Keratoconus is a progressive, degenerative disorder of the cornea characterized by thinning and protrusion, leading to irregular astigmatism and visual impairment. Early detection is crucial in halting or slowing disease progression through timely intervention, such as corneal cross-linking. This article reviews the methods of screening for keratoconus in its early stages, emphasizing the importance of advanced imaging techniques and clinical markers for early diagnosis. Understanding the risk factors and implementing appropriate screening in susceptible populations can improve clinical outcomes and reduce the burden of advanced keratoconus.

Key Words: Keratoconus, corneal topography, corneal thickness, early detection, screening, corneal cross-linking, Pentacam, Scheimpflug imaging.

Materials and Methods of Research

The study involved a cross-sectional analysis of 500 patients, ages 15-40, who underwent routine ophthalmologic screening. This population was selected due to the higher risk of developing keratoconus in adolescence and early adulthood. The screening protocol included a detailed clinical history, slit-lamp examination, and corneal imaging using Scheimpflug-based corneal tomography (Pentacam). Key diagnostic parameters, such as corneal curvature, corneal thickness (pachymetry), posterior elevation, and topographical indices (Kmax, IS value), were evaluated to identify early keratoconic changes.

Inclusion criteria included individuals with no prior history of ocular surgery or known corneal diseases. Exclusion criteria were eyes with advanced keratoconus, corneal scarring, or other ocular pathologies affecting corneal curvature. All participants provided informed consent, and the study adhered to the Declaration of Helsinki.

Results of Research

Among the 500 patients screened, 8% (40 patients) exhibited early signs of keratoconus based on abnormal topographic findings and pachymetric thinning. The most reliable indicators for early keratoconus were irregular astigmatism, increased

posterior corneal elevation, and thinning of the corneal apex. The average Kmax value in the keratoconus group was 47.5 D, compared to 42.1 D in the normal group. Pachymetry maps revealed that 75% of the keratoconus group had corneal thickness values below 500 microns, with central thinning observed in the majority. Subclinical keratoconus was detected in 3% of patients, where topographic abnormalities were present without clinical symptoms.

The Pentacam indices, including the Belin-Ambrosio Enhanced Ectasia Display (BAD-D) and the index of surface variance (ISV), were instrumental in identifying subtle corneal changes. Early keratoconus was more prevalent in males (65%) compared to females (35%), and most cases were bilateral (85%). Family history was a significant risk factor, with 20% of the early keratoconus group reporting relatives diagnosed with the disease.

Conclusion

Screening for keratoconus in its early stages is critical for preventing disease progression and preserving visual function. Corneal imaging technologies like the Pentacam, which allow for detailed analysis of corneal shape and thickness, are invaluable tools for early detection. The study highlights the importance of identifying clinical markers such as irregular astigmatism, corneal thinning, and abnormal topographic indices in at-risk populations. Routine screening, particularly in young patients and those with a family history of keratoconus, is essential to facilitate early diagnosis and timely intervention, such as corneal cross-linking, to prevent further corneal degeneration.