Original Article

Evaluation of the Effects of mRNA-COVID 19 Vaccines on Corneal Endothelium

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ABSTRACT

Purpose

The study aimed to compare corneal topographic and specular microscopic parameters before and after vaccination with activated (Pfizer -BioNTech (BNT162b2)) SARS-CoV-2 mRNA vaccine.

Methods

128 eyes of 64 patients were evaluated in this prospective study. The time interval between pre and post-vaccination examinations was nearly two and a half months (75.6 ± 4.5 days).The topographic evaluation was made with Sirius corneal topography (Sirius, CSO Inc, Florence, Italy) and specular microscopy was made with Tomey EM-4000 specular microscopy (Tomey GmbH, Japan). All patients underwent detailed ophthalmologic examination including best-corrected visual acuity assessment (BCVA), measurement of intraocular pressure (IOP), anterior segment evaluation with biomicroscopy, and dilated fundus examination.

Results

The significant change in the topographic evaluation was the post-vaccine (542.0 (534.25–548.0)) increase in central corneal thickness compared to pre-vaccine values (528.0 (520.25–537.75) ($p = 0.001$). The endothelial cell density (ECD) was 2597 (2550.0–2646.50) before vaccination and 2378.0 (2299.0–2419.0) at least two months after vaccination ($p < 0.001$). The median mean coefficient of variation (CV) value was 39.0(38.0–42.0) before vaccination measurements and 42 (40–44) after vaccination measurements ($p < 0.001$). The mean hexagonality was 50.0 (48.25–52.0) before vaccination and 48(46–49) after vaccination ($p < 0.001$).The median central corneal thickness (CCT) value was 533(526–538) before vaccination and 548 (543.50–556) after vaccination ($p < 0.001$).

Conclusion

Changes in corneal endothelium occur in the short term after two-doses of the Pfizer-BioNTech (BNT162b2) COVID-19 mRNA vaccine. Hence the endothelium should be closely monitored in those with a low endothelial count or who have had a corneal graft.

KEYWORDS:

Cornea endothelial | Covid-19 | specular microscopy | topography | vaccine

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Data supporting the findings of this study are available from the corresponding author [FS] upon reasonable request.

Additional information

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