Telemetric Intraocular Pressure Monitoring after Boston Keratoprosthesis surgery with the Eyemate-IO Sensor: Dynamics in the first year

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Purpose

To analyse the dynamics of telemetrically measured intraocular pressure (IOP) during year one after implantation of a Boston Keratoprosthesis Type I (Bi-KPro). To compare agreement of telemetric IOP measurements with finger palpation and to analyze the potential of home self-tonometry.

Methods

In this prospective, open-label, multicenter, single-arm clinical trial (ClinicalTrials.gov Identifier: NCT02945176) twelve individuals received implantation of an EYEMATE-IO system. Follow-up after surgery was 12 months with 13 visits planned per patient. During Bi-KPro surgery, an electromagnetic induction sensor ring enabling telemetric IOP data transfer to a handheld reading device outside the eye was implanted into the ciliary sulcus with or without transscleral suture fixation. Comprehensive ophthalmic examinations and IOP assessment via the telemetric system were compared to IOP assessed via finger palpation by two experts.

Results

Preoperative IOP measured by Goldmann tonometry was 13.4±6.2 mmHg. Telemetric IOP peaked at 23.1±16.5 mmHg at the first postoperative day. On day 5, mean IOP was 16.0±5.2 mmHg and 20.95±6.5 mmHg after 6-12 months. IOP estimation by finger palpation was grouped in four categories: normal (A), soft/hypotonic (B), borderline (C), hypertonic (D). Mean telemetric IOP was 18.2±6.1 mmHg in category A, 8.9±2.8 mmHg in B, 22.4±4.9 mmHg in C, 34.3±11.0 mmHg in D. Differences in mean telemetric IOP per category were statistically significant (P<0.001). Daily IOP fluctuations and peaks could be identified.

Discussion

Telemetric IOP assessment seems to be able to identify postoperative IOP peaks and a longitudinal increase of IOP after BKPro surgery. IOP measurements with the telemetric EYEMATE-IO sensor showed a satisfactory agreement with finger palpation by two experts.