Correlation between blood pressure, intraocular pressure and intracranial pressure – a pilot study

Purpose

- To simultaneously measure intraocular pressure (IOP), intracranial pressure (ICP) and blood pressure (BP) variations in glaucoma patients previously provided with an implantable intraocular sensor (EYEMATE-IO\textsuperscript{TM}), while inducing controlled orthostatic pressure variations with the use of a tilt table.

Methods

- A tilt table was used to induce controlled variations in IOP and ICP, in order to simulate normal upright and supine positions. (Fig. 1)

- IOP was continuously monitored by EYEMATE-IO\textsuperscript{TM} (Implandata Ophthalmic Products GmbH) with the help of an external antenna. (Fig. 2, 3)

- Changes in ICP were monitored by the ELIOS\textsuperscript{TM} (Echodia SAS) utilizing distortion product oto-acoustic emissions (DPOAE). (Fig. 4)

- Heart rate (HR) and blood pressure (BP) were measured with a digital arm sphygmomanometer.

- Patients were measured in four different positions (Fig. 5):

Conclusions

- 9 patients measured so far
- 2 patient ICPs excluded because of presbyacusic
- IOP and ICP depend on body position, both increase with increasing tilt
- BP and HR decrease with increasing tilt, potentially due to patient relaxation
- Extended supine position experiment hints at differences in ICP regulation between subjects, with potential implications for transmural pressure gradient and thus glaucoma progression rates.

References

1. Choritz et al., 2018; submitted to American Journal of Ophthalmology
2. Giraudet et al., 2017; Critical Care; doi: 10.1186/s13054-017-1616-2

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