Methods

- Chronic ocular hypertension animal models suffer from limitations, such as inflammation, high initial intraocular pressure (IOP) spikes, ischemia, short duration of elevated IOP, and risk of infection and hemorrhage.
- A better model is needed to provide a more accurate means of evaluating neuroprotection strategies and ocular hypotensive drugs.
- A model with prolonged elevated IOP (2-3 months) without intracocular entry may be more relevant, with reduced risks of infection and inflammation.

Purpose

- To characterize a rodent model of gradual chronic ocular hypertension, without an initial intraocular pressure (IOP) spike common to many current inducible models.

Methods

- Six-week-old male Long Evans rats used
- Intraperitoneal Ketamine-Xylazine cocktail anesthesia

Results

The gOHT model results in progressive RNFL thinning and decreased vision at 12 weeks. (A) Representative fundus and corresponding cross-sectional OCT images (B) Progressive thinning in the gOHT group compared to CON highly significant at 12 weeks. (C) Outer retinal thickness did not show statistically significant change at any time point. (D) Visual acuity at 12 weeks shows a highly significant difference. However, there was a statistically significant decrease in vision in all groups post-suturing (p<0.05). Notably, animals that responded poorly in terms of IOP elevation post-suturing did not show a statistically significant difference from CON. ****p<0.0001, *p<0.05, bars are SE; RNFL, retinal nerve fiber layer.

Conclusions

- The gOHT model produces chronic mildly elevated IOP in rats, accompanied by loss of retinal ganglion cells and visual function, and no evidence of inflammatory cell infiltration.
- The advantages with this model include the absence of a pathological initial spike in IOP, no intraocular entry or inflammation, and induction of a gradual increase in IOP, similar to clinical glaucoma.

References


Acknowledgements

- Sivak Lab members
- Kyle Cheung and Dr. Michael Reber for the surgical photographs

No Disclosures