SUMMARY

Postoperative scarring of the filtering bleb is the most crucial factor in determining the short and long term outcome of modern glaucoma filtration surgery. Trabeculectomy (TE) is the preferred operation. However, in conventionally performed trabeculectomy, a large retrospective study has shown a failure rate of up to 30% within 3 months after surgery.

To lower the incidence of this detrimental complication, various methods have been investigated in order to avoid the naturally occurring scarring of the filtering bleb, mostly dealing with the intraoperative or postoperative application of antimetabolic drugs—that is, 5-fluorouracil (5-FU) or mitomycin C (MMC), the two most widely used cytotoxic agents**.**

BCECF-AM (2,7,-bis-(2-carboxyethyl) -5- (and -6) -carboxyfluorescein, acetoxymethyl-ester) is an intracellularly acting photosensitiser. It is applied locally in its inactive form, diffuses into adjacent cells, and is then cleaved and rendered fluorescent by intracellular esterases. After additional illumination (activation) with blue light, it exerts a photo-oxidative effect that is only cell destructive within the targeted cells. Further, this effect is strictly limited to the local restriction of the illuminated area.

In vitro, carboxyfluorescein was shown to be phototoxic for human Tenon fibroblasts. In vivo, in a rabbit model of filtration surgery, its

potential to significantly delay postoperative scarring has also been demonstrated.

In our study comprising 30 human glaucoma eyes, the efficacy of the photodynamic effect was clinically represented by a functioning filtering bleb with a reduced IOP level. The clinical safety and tolerability was represented by no signs of local toxicity or intraocular inflammation, and the lack of any discomfort or adverse effects for the patient.

No severe complications as avascularity of the filtering bleb, long lasting hypotony, hypotony maculopathy, blebitis, uveitis, phthisis, or endophthalmitis were seen in any of the eyes included in this study. Though the applied carboxyfluorescein, as a lipophilic drug, could easily penetrate into adjacent superficial ocular tissues, no conjunctival or corneal-epithelial defect was observed in any eye, evaluated by thorough slit lamp examination postoperatively.

CONCLUSION

Cellular photoablation seems to be an effective therapeutic approach to control postoperative fibrosis in human glaucomatous eyes with a poor surgical prognosis.Multiple factors such as light dose, light application, wavelength, irradiation area, total dose , or multiple dosing may be altered in the future to improve the antifibrotic effect of PDT during glaucoma surgery. Further studies are necessary to optimize the safety and the reliability in the future.