Safety in treating primary acute angle-closure glaucoma under high intraocular pressure by compound trabeculectomy

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Abstract: In clinical practice, Primary Acute Angle-closure Glaucoma (APACG) is a common disease with an increasing incidence rate and blind rate, and has attracted attention of medical researchers. When a patient suffers both primary acute glaucoma and high tension glaucoma, drug therapy can achieve limited efficacy, and operative treatment is necessary on this occasion. This research mainly explored the safety in treating high tension APACG by compound trabeculectomy, and observed the clinical treatment effect and incident rate of postoperative complications after compound trabeculectomy. The compound trabeculectomy can effectively control the intraocular pressure and decrease the incident rate of postoperative complications, accelerating the rehabilitation of patients.

Keywords: High tension APACG, compound trabeculectomy, treatment effect, safety.

INTRODUCTION

As one of the most common glaucomas in clinical ophthalmological treatment, APACG is mainly caused by the sudden increase of intraocular tension after primary angle closure (Xiao, 2014). This disease happens suddenly, and once it occurs, patient's eyes will turn into congestive state, therefore it is also called congestive glaucoma. As shown in medical research data, the incident rate of APACG closely related to the anatomical structure of anterior segment and the anterior chamber angle state. In addition, working under the condition of insufficient light for pretty long time, mood fluctuations, and keep near-distance reading for long will increase the incident rate of such disease. Patient who cannot get the timely and effective treatment may eventually suffer visual loss or blindness due to the neurological function damage caused by long term of over-high intraocular pressure (Zhu, 2014). Compared with traditional surgery treatment method, compound trabeculectomy can achieve more significant efficacy with less postoperative complications, long-term control target intraocular pressure, and maintain functional filtering blebs (Chen, 2014). Performing compound trabeculectomy is of great significance to recovering the vision of the high tension APACG patient. Therefore, this paper mainly explored the safety in treating high tension APACG using compound trabeculectomy. The Pathological picture of APACG is shown in Figure 1. The pathological picture of primary open angle glaucoma is shown in Figure 2.

MATERIALS AND METHODS

APACG is a kind of glaucoma caused by increased intraocular tension, which is either due to the blocking of trabecular meshwork by peripheral iris or due to the permanent adhesion between peripheral iris and trabecular meshwork (Zhou, 2014).

Being different from APACG, primary open angle glaucoma normally does not show any significant ocular pathology damage in the early clinical stage, therefore it is difficult to distinguish whether primary open angle glaucoma belongs to APACG. However, in prodromal stage, it shows intermittent attacks. Mild to moderate eye pain may occur if eyes are in fatigue state, which can be relieved after proper relaxation. While if the attack frequency is getting higher, it means the disease is developing to acute exacerbation.

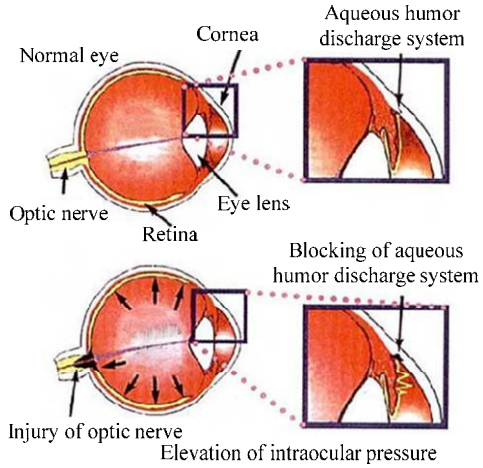

Fig. 1: Pathological picture of APACG

According to the clinical manifestation, intraocular tension, and anterior chamber angle, the APACG can be divided into 6 stages which are preclinical stage, prodromal acute stage, remission stage, chronic stage and absolute stage. In the acute stage, patient's clinical symptoms are significant as well as with high intraocular pressure. In this stage, the disease is of greater

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destructiveness to eyes, and emergency therapeutic measures are in urgent need. In clinical practice, the treatment to high tension APACG mainly include the method of eliminating pupillary block and the method of expanding aqueous humor outflow. Currently, the operations based on such treatment principle include iridectomy and trabeculectomy. In this research, there are totally 60 patients (62 eyes, two patients have problems with both eyes) who suffer high tension APACG imposed with compound trabeculectomy. All selected patients met APACG Clinical Diagnosis Standard, were acceptable with compound trabeculectomy. Patients with heart liver and kidney function disorders, patients with mental disorders, and patients with other diseases were excluded in this research. All selected patients had good compliance to treatment, enjoyed the right to know, and signed informed consent, and the flow chart of compound trabeculectomy is shown in Figure 3.

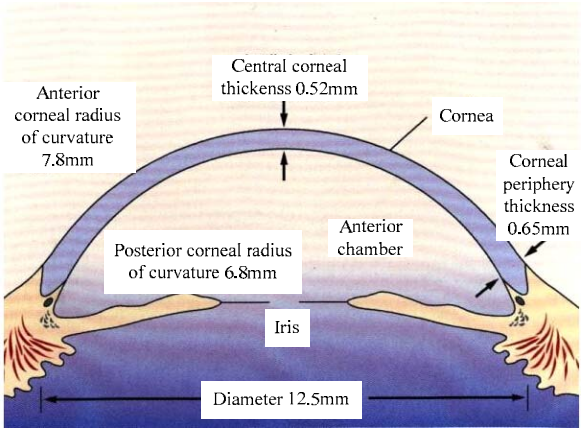

Fig. 2: Pathological picture of primary open angle glaucoma

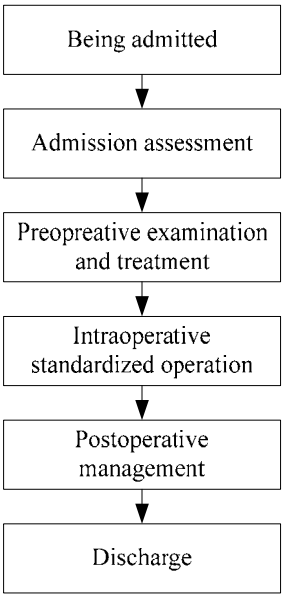

Fig. 3: Flow chart of compound trabeculectomy

After admission, assessment will be given on patients' physical status and disease condition, and then the patients who meet the requirement for operation treatment will be imposed with preoperative examinations on slit lamp, vision, gonioscope, ocular fundus, intraocular tension and field of vision, etc. After that the general check-up will be implemented, so as to guarantee the patients can complete endure the all emergencies before executing the operation. Before operation, drug therapy of reducing intraocular pressure will be given for the whole body or particularly the ocular region. When the eye intraocular pressure is controlled within 28~50mmHg, the intravenous infusion therapy of 250ml of mannitol will be implemented in 30 min before operation (Shi, 2015).

First, surface anesthesia of conjunctival sac was conducted using the SOM2000D ophthalmic operating microscope as the surgical unit. narcotic drug includes lidocaine hydrochloride(20g•L-1)and bupivacaine hydrochloride(7.5g•L-1), the materials used during operation are aseptic towel and dedicated eye film. After mixing above two drugs and pick 2ml of the mixture for retrobulbar anesthesia. Subsequently, massage for around 5 min and place eye speculum correctly before washing the conjunctival sac by the diluents of physiological saline and povidone iodine. After that, decide whether to conduct the operation of the anterior chamber paracentesis and discharge aqueous humor according to the intraocular pressure situation. After the bulbar conjunctiva above eye ball wall was completely anaesthetized, the scleral surface was cauterized based on fornices as the fundus. After that, if the edge of clear corneal above the eye temporal is 0.5mm in thickness, anterior chamber paracentesis can be executed, and gently push the puncture point to discharge aqueous humor in the mean time. However if the iris has been extruded already, it can cut a longitudinal small incision at the root region, as to discharge the aqueous humor and decrease the intraocular pressure as much as possible. After the intraocular pressure reach the optimal target range, and then cut trabecular tissue (1.5*3mm) at the root of the sclera flap as well as the surrounding iris before washing the deciduous pigment off. Finally, the incision is sewed up with nylon wire. In the next stage, patient's filtration effect is observed. If the anterior chamber is stable, it means incision was perfectly sewed. On this occasion, the injection treatment of 2.5mg dexamethasone can be conducted, and then apply erythromycin eye ointment and bind up the sick eyes before finishing the operation.

After operation, all patients are treated with drugs such as antibiotics, non-steroid anti-inflammatory drug, and glucocorticoid for infection prevention, thus preventing the formation of scar and accelerating the formation of filtering bleb. According to formation status of filtering bleb, anterior chamber depth, and intraocular pressure strength after operation, the suture is removed bit by bit.

After operation treatment, the therapeutic effect should be evaluated according to the therapeutic effect criterion of clinical treatment of high tension APACG (Jia, 2014). The specific effect evaluating criteria are shown in fig. 4. In addition, medical staffs should record possible postoperative complications such as lower intraocular pressure, shallow anterior chamber and compare the intraocular pressure conditions within half year and one year after treatment.

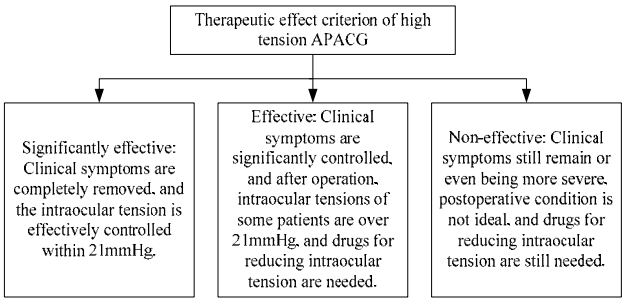

Fig. 4: Effect evaluating criteria for high-tension APACG

RESULTS

(1) Clinical therapeutic efficacy
In this research, there are totally 60 patients (62 eyes) ccepting compound trabeculectomy, and clinical symptoms and intraocular tension were significantly controlled, reaching a total effective rate of 96.8%(60/62). The specific data are shown in table 1.

(2) Intraocular pressure situation within half year and one year after operation
After receiving compound trabeculectomy, intraocular pressures of total 60 patients (62 eyes) were significantly decreased as compared with the intraocular pressures before compound trabeculectomy. Specific data is shown in table 2.

In addition, by comparing the intraocular pressure after treating for half year and that after treating for one year, it can obtain $t=3.70, P=0.0003<0.05$, statistical significance is existed within.

(3) Incident rate of postoperative complications
After implementing compound trabeculectomy to 60 patients (62 eyes), the incident rate of postoperative complications is only 3.22% (2/62), wherein there occurred one case of shallow anterior chamber and one case of lower intraocular tension. The all clinical syndromes of patients were significantly relieved.

DISCUSSION

Clinically, glaucoma is a kind of disease causing blind, while the APACG is a kind of acute ophthalmologic disease, which can be confirmed by identifying the acute exacerbation. In clinical practice, a patient who is suffering the acute exacerbation of APACG will show swellings in regional body area or all over the whole body, and the intraocular pressures remain unchanged or even become higher although having tried various intraocular pressure-reducing medicines. To reduce the incident rate of operative complications, normally the APACG patients with high intraocular pressure are firstly advised with drug treatment for 3-5d, and then operation will be executed after the intraocular pressure is slightly decreased (Huang, 2014). Regarding the patients who are in acute exacerbation of high tension APACG, executing operation after solid decrease of intraocular pressure will inevitably enhance the extent of visual function damage as well as cause an irreversible optic nerve damage, which not only increase the probability of blinding, but also leads to the insignificant response when continue to take intraocular pressure reducing medicines. Therefore, for acute APACG sufferer whose intraocular pressure remained unchanged after taking enough medicines, operation will be executed immediately so as to save the vision function (Chang, 2014).

Normally, it is of higher risk to implement trabeculectomy under high intraocular pressure, and some complications may be aroused. Therefore, in order to guarantee the success of operation, following tips should be focused on: first drug therapy should be given to reduce intraocular pressure before operation. It is suitable to employ the method of drug combination, and implement eye massage if necessary, which enhance the discharge of aqueous

Table 1: Total effective rate of clinical treatment [n/%]

Case number(n)	Significantly effective	Effective	Non-effective	Total effective rate
62	40(64.5)	20(32.3)	2(3.2)	60(96.8)

Table 2: Intraocular pressure situation within half year and one year after clinical treatment (mmHg)

Stage	Intraocular pressure	t	P
Before treatment	61.45±2.9	--	--
Treatment for half year	9.19±2.49	107.66	0.00
Treatment for one year	7.63±2.19	116.61	0.00

humor, thus effectively reducing the Intraocular pressure (Shi, 2015). Secondly the eyes of patient who is in the acute exacerbation of APACG is in congestive state, on this occasion, it should pay attention to tourniquet when cutting conjunctiva and iris. Thirdly, during operation, it is suggested to use mitomycin C according to patient's condition. This drug can inhibit the fibroblasts proliferation, reducing the formation of scar at filtration mouth (Huang, 2015). Fourthly, operations should be gentle when cutting iris and trabecula, and pay attention to the moving direction of iris. Fifthly the adjustable suture line is preferred in sewing incision, which can guarantee the recovery of anterior chamber, as well as make it possible to remove suture bit by bit and adjust intraocular pressure. In all, if comprehensive consideration before operation, careful operation during operation, and overall care after operation can be done, the safety of compound trabeculectomy under high intraocular pressure can be improved.

CONCLUSION

This research shows that during treating APACG patient under high intraocular pressure, the application of compound trabeculectomy can improve the clinical treatment efficiency, significantly reduce the intraocular pressure, and reduce the incident rate of various postoperative complications. Therefore, the compound trabeculectomy is an effective and safe operation treatment, which is of high clinical application value.

In all, in the process of treating primary acute angle-closure glaucoma under high intraocular pressure, performing compound trabeculectomy can enhance the clinical therapeutic efficiency, and significantly reduce the intraocular pressure, which is of high clinical application value.

Statement: this research results are true and reliable, and tested by clinical experiments, which does not involve the violation of moral principles and ethics.

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