

Analysis of surgical treatment on acute angle closure glaucoma with persistent high intraocular pressure.

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Abstract

Objective: This research was aimed to explore the effects of surgical treatment on acute angle closure glaucoma with persistent high Intraocular Pressure (IOP).

Methods: A total of 80 cases (89 eye cases) with acute angle closure glaucoma with persistent high IOP were selected (44 eyes in penetration group while 45 eyes in extraction group). Patients in penetration group were given anterior chamber penetration and trabeculectomy. Patients in extraction group were given vitreous aspiration and trabeculectomy. Treatment effects and treatment safety conditions of patients in two groups were analysed.

Results: Compared with extraction group, there were no significant differences in eye pressure of patients in penetration group before surgery and during hospital discharge, eyesight, functional filter blebs and formation rate of non-functional filter blebs ($P>0.05$). Complications rate of patients in penetration group was lower than that in the extraction group ($P<0.05$).

Conclusion: The surgical treatment has an effect on the acute angle closure glaucoma with persistent high intraocular pressure.

Keywords: IOP, Acute angle closure glaucoma, Surgical treatment, Effects.

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Introduction

Glaucoma is one of the most common eye diseases in clinics appearing characteristic optic disc cupping, nerve fiber layer loss, and visual field defects [1]. Glaucoma usually occurs in old people. Acute angle closure glaucoma is one common type of glaucomas, which due to the increasing of high Intraocular Pressure (IOP) by sudden closure of anterior chamber angle [2]. Some case reports showed that the drug abuse also may lead to the high intraocular pressure so as to result in acute angle closure glaucoma [3,4]. Onset of acute angle closure glaucoma is quick. Treatment not in time will lead to persistent decreased eyesight, even influences life quality of patients. At present, surgical treatment is common treatment method for acute angle closure glaucoma. For the treatment, one reports showed the compound trabeculectomy can effectively control the intraocular pressure and decrease the incident rate of postoperative complications, accelerating the rehabilitation of patients [5]. But it is still not clear that treatment methods for acute angle closure glaucoma with persistent high IOP. According to background above, 80 patients, 89 eyes of acute angle closure glaucoma with persistent high IOP in our hospital are divided into different groups, then given anterior chamber penetration and trabeculectomy, vitreous aspiration and trabeculectomy. The purpose is to provide safe and effective methods for this disease in clinics. Treatment procedures are given retrospective analysis in the following.

Materials and Methods

General data

80 cases (89 eye cases) with acute angle closure glaucoma with persistent high IOP in our hospital from January, 2015 to December, 2016 were selected for study. Inclusion criteria: patients were diagnosed as acute angle closure glaucoma by routine optic examination and clinical relevant examination [6]. IOP still more than 5.5 kPa for a long time after taking lots of drugs for lowering IOP. Patients were given surgery. Patients who are willing to participate in treatment study. Exclusion criteria: patients with other ocular diseases. Patient with severe diseases in heart, live, lung, kidney, spleen and stomach. Patients were given ocular surgery before. Patients were in gestation period and lactation period. Patients had consciousness disorder and can't cooperate with study. Patients were randomly divided into the penetration group (n=40, 44 eyes) and the extraction group (n=40, 45 eyes) by using random number table. There were 22 males and 18 females in penetration group. The age of patients was from 44 to 79. The average age was 60.6 ± 7.3 y old. There were 21 males and 19 females in extraction group. The age of patients was from 44 to 78. The average age was 60.6 ± 7.3 y old. General data of patients in these two groups were given independent sample comparison. When $P>0.05$, comparison can be given. This research was approved by the ethical committee of Hebei Eye Hospital.

Methods

All patients in this study were given routine preparation before surgery, proper Mannitol Injection by intravenous rapid infusion (Sichuan meidakangjiale pharmaceutical co., ltd, approved by H2005014). Then, patients were given 2 ml 2% lidocaine (Tianjin jintao pharmaceutical co., ltd, approved by H10940071) and 0.75% bupivacaine (Shanghai zhaohui pharmaceutical co., ltd, approved by H20056440) for routine peribulbar local anesthesia [7,8].

All patients in penetration were given anterior chamber penetration and trabeculectomy. All patients in extraction group were given anterior chamber penetration. 3 to 4 points in left eye infratemporal or 8 to 9 points in right eye infratemporal were selected. Penetration was given by 15 degree angle which was parallel to iris. Aqueous fluid was discharged out. If anterior chamber of patients was shallow, aqueous fluid discharge should be stopped. When the depth of anterior chamber discovered, patients were given treatment continuously. Then, patients were given trabeculectomy. Fornices of fundus, upper angle of sclera was selected as conjunctival flap and sclera flap. Gelatin sponge was put into lower part of sclera flap, after 5 min, gelatin sponge was washed by normal saline. Trabecular meshwork was cut off.

All patients in extraction group were given vitreous aspiration and trabeculectomy. First, patients were given vitreous aspiration. Vitreous body was given 15 degree angle penetration. Then it connected with needle injection syringe in the slope. Vitreous body was extracted about 5 ml. Then patients were given trabeculectomy.

Observation index

First, IOP of patients in two groups were analysed before and after treatment. IOP conditions before surgery and during hospital discharge of patients were measured by Goldmann applanation tonometer (German). Second, eyesight conditions of patients before and after treatment were analysed. Eyesight conditions before surgery and during hospital discharge were checked by visual testing chart. Third, formation conditions of filtering bleb were analysed before and after treatment. Small cystic type and dispersed flat type were divided into functional filtering bleb. Package type and scar type were divided into non-functional filtering bleb by using slit lamp. Fourth, complications conditions of patients in two groups were analysed.

Statistical methods

Data were analysed by using SPSS 19.0 software. IOP, eyesight of patients showed by mean and standard deviation. It was given t-test. Conditions of filtering bleb and complications were showed by ratio and given χ^2 test. $P < 0.05$, there were statistical differences.

Results

IOP conditions analysis of patients in two groups before and after treatment

Compared with extraction group in eye pressure of patients in penetration group before surgery and during hospital discharge, there were no statistical differences ($P > 0.05$, Table 1).

Table 1. IOP conditions analysis of patients in two groups before and after treatment ($\bar{x} \pm s$; kPa).

Groups	Eye (Eye)	numbers	Before surgery	During hospital discharge
Penetration group	44		6.31 ± 1.14	2.21 ± 0.69
Extraction group	45		6.35 ± 1.17	2.18 ± 0.65
t	-		0.163	0.211
P	-		>0.05	>0.05

Eyesight conditions analysis of patients in two groups before and after treatment

Compared with extraction group patients of eyesight in penetration group before surgery and during hospital discharge, there were no statistical differences ($P > 0.05$, Table 2).

Table 2. Eyesight conditions analysis of patients in two groups before and after treatment ($\bar{x} \pm s$).

Groups	Eye (Eye)	number	Before surgery	During hospital discharge
Penetration Group	44		0.02 ± 0.01	0.26 ± 0.03
Extraction Group	45		0.02 ± 0.01	0.27 ± 0.03
t	-	-		1.572
P	-		>0.05	>0.05

Table 3. Formation conditions of bleb analysis of patients in two groups after treatment (n (%)).

Groups	Eye (Eye)	number	Functional bleb	Non-functional bleb
Penetration	44		42 (95.5)	2 (4.5)
Extraction	45		44 (97.8)	1 (2.2)
χ^2	-		0.341	0.341
P	-		>0.05	>0.05

Formation conditions of bleb analysis of patients in two groups after treatment

Compared with extraction group in formation rate of non-functional filter blebs, of patients in penetration group before surgery and during hospital discharge, there were no statistical differences ($P > 0.05$, Table 3).

Complications conditions analysis of patients in two groups

Patients in two groups had different degrees of inflammation. Patients with bleeding in anterior chamber were given hemostasis. Symptoms were relieved after anti-infection. Tension shallow anterior chamber patients were given mydriasis, anti-inflammation. Anterior chamber formed after

compression. Patients with malignant glaucoma were given vitreous condensation, anti-inflammation and relaxation of ciliary muscle management. Symptoms of patients relieved. Complications rat in extraction group was lower than the penetration group, there were statistical differences (P<0.05, Table 4).

Table 4. Complications conditions analysis of patients in two groups (n (%)).

Groups	Eye number (Eye)	Bleeding chamber	in anterior	Tension chamber	shallow anterior	Malignant glaucoma	Total onset rate
Penetration	44	2 (4.5)		4 (9.1)		1 (9.1)	7 (15.7)
Extraction	45	0 (0.0)		1 (2.2)		0 (0.0)	1 (2.2)*
χ ²	-	2.093		1.98		1.034	5
P	-	>0.05		>0.05		>0.05	<0.05

Discussion

Glaucoma is one kind of eye diseases caused by persistent or interrupted increased IOP being affected by population aging, bad life habit and poor eye care habit. Acute angle closure glaucoma will develop quickly from the onset [9]. Patients with acute angle closure glaucoma under persistent IOP, which easily inhibit discharging chamber fluid, causing disorder of chamber fluid production and discharge process. It increases IOP, vascular lesion in fundus, optic nerve injury, and decreases eyesight. Finally, patients lost eyesight [10,11].

At present, acute angle closure glaucoma has become main eye disease which will cause blind. Early diagnosis and treatment of patients should be strengthened, which can reduce blind rate. It has been key topic in clinics [12,13]. Trabeculectomy is common surgery for treating glaucoma in clinics. This surgery build new extraocular drainage pathway of chamber fluid in cornea border by cutting off trabecular meshwork, which can inhibit chamber fluid drainage to improve patients IOP, reach treatment effects [9-11]. Patients should be given anti-IOP treatment before trabeculectomy. But persistent IOP acute angle closure glaucoma is given routine drugs for lowering IOP, which is not very well. Surgical treatment of patients is very difficult [14-16]. The treatment effects are not very well. The treatment has many complications, which influence prognosis of patients [17-19].

In this study, patients in two groups are given surgical anti-IOP before trabeculectomy. The results show there are no statistical differences in IOP, eyesight and functional bleb of patients in two groups before and after treatment, which show the effects of two treatment methods are equal. Anterior penetration surgery uses anterior penetration method to promote chamber fluid drainage, which can lower IOP. Vitreous aspiration extracts vitreous fluid to lower IOP [20,21].

In this study, complication rate in extraction group is low. The reasons: though chamber fluid can be extracted before anterior chamber penetration. But it also increases pressure difference

between anterior chamber and posterior chamber, which easily cause shift forward of iris, tension anterior chamber formation, anterior chamber bleeding and malignant glaucoma. Vitreous aspiration can decrease pressure of posterior chamber, avoid shift forward and prolapse of iris, reduce complications of patients effectively [22-24].

Conclusion

In conclusion, patients with persistent high IOP acute angle closure glaucoma are given anterior penetration surgery, trabeculectomy and vitreous aspiration and trabeculectomy. The effects are equal and significant. Complication of vitreous aspiration and trabeculectomy are less. Treatment safety is higher and the application value is high.

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