

Clinical curative effect analysis of non – penetrating trabeculectomy combined with 90 degrees trabeculotomy for the treatment of congenital infant glaucoma

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非穿透性小梁切除术联合小梁切开术治疗先天性婴幼儿型青光眼

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摘要

目的:探讨非穿透性小梁切除术联合 90 度小梁切开术(non-penetrating trabeculectomy combined with 90 degrees trabeculotomy, NPTST)对治疗先天性婴幼儿型青光眼的手术方法及治疗效果,提高临床治疗效率。

方法:回顾性分析 2010-01/2012-01 我院 15 例 30 眼原发性婴幼儿型青光眼的患者行 NPTST。并分析术后眼压(intraocular pressure, IOP)改变,角膜横径以及并发症的情况。

结果:本组术后 1wk;1,3,6,12mo IOP 控制较术前下降,角膜横径保持原来大小或稍有减小,术后并发症发生率低。

结论:NPTST 对治疗先天性婴幼儿型青光眼成功率高,并发症少,是一种安全有效的治疗术式。

关键词:非穿透性小梁切除术; 90 度小梁切开; 先天性婴幼儿型青光眼; 眼压

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Abstract

• **AIM:** To study the surgical method and curative effect of non-penetrating trabeculectomy combined with 90 degrees trabeculotomy(NPTST).

• **METHODS:** A total of 15 patients (30 eyes) with

congenital infant glaucoma from January 2010 to January 2012 underwent NPTST. The change of intraocular pressure(IOP), corneal diameter and incidence rate of postoperative complications were observed respectively.

• **RESULTS:** Compared to preoperation, the IOP in the group was lower at week 1, month 1, 3, 6 and 12, corneal diameter keep original size or a slight decrease, less complications occurred.

• **CONCLUSION:** NPTST is a safe and effective surgical treatment of congenital infant glaucoma with high successful rate and low incidence rate of postoperative complications.

• **KEYWORDS:** non-penetrating trabeculectomy; 90 degrees trabeculotomy; congenital infant glaucoma; intraocular pressure

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INTRODUCTION

Congenital infant glaucoma affects a large number of children and therapies for its management are limited. Congenital infant glaucoma occurs in small children and is a potentially blinding disease that usually does not respond adequately to medical treatment until the ocular structures damaged and vision lost^[1-2]. Not treated correctly and timely, the optic nerve will be damaged seriously at the early time. Therefore, early diagnosis and treatment is very necessary. In recent years, the surgical treatment for primary infantile glaucoma has got a great progress in the world such as goniotomy and trabeculectomy, but the effect of different operations for the primary infantile glaucoma is still discussed. Many children with primary infantile glaucoma require additional surgery to control IOP in the long-term^[3]. At present, by adopting the non-penetrating trabeculectomy combined with 90 degrees trabeculotomy (NPTST) for congenital infant glaucoma, we have got a satisfied effect by adopting the NPTST for the treatment of congenital infant glaucoma.

MATERIALS AND METHODS

Materials A total of 30 eyes of 15 patients with congenital infant glaucoma(in reference to the diagnostic criteria in 1987

Table 1 Preoperative and postoperative intraocular pressure ($\bar{x} \pm s$, mmHg, $n=30$)

Parameter	Preoperative	Postoperative				
		1 week	1 month	3 months	6 months	12 months
IOP	38.64±7.07	11.90±2.24	13.22±2.48	15.88±3.37	14.80±3.13	13.9±3.23
<i>t</i>		8.181	3.132	2.64	2.254	2.213
<i>P</i>		0.006	0.012	0.029	0.037	0.024

recommended by National Glaucoma Group) were included from January 2010 to January 2012 in our hospital. The number of male cases was 13 (26 eyes) and female cases was 7 (14 eyes). The age of patients was from 0 to 3 years old and the average life was 1.8 years old, the selected children all had three diagnostic elements such as high intraocular pressure(IOP), expanded corneal and obvious excavation of optic disc. The selected patients were all anesthetized by chloralhydrate for IOP measurement, the scope of IOP was from 25mmHg to 50mmHg. As the normal corneal diameter of the newborn was 10-10.5mm, and after 1 year increased 0.5-1.0mm, the patients whose corneal diameter was more than 12.0mm after the first year that should be highly doubt for those with congenital infant glaucoma^[4]. So we chose this standard for the selected children that the corneal diameter after birth was more than 11mm, after one year of age was more than 12mm.

Methods Early diagnosis and surgical treatment are the key to cure the children with congenital infantile glaucoma. We have taken NPTST as the first choice for the patient under the age of 3 years old. Antibiotic eye drops is used before operation.

The operation steps: After the success of general anesthesia, a thin conjunctival flap was made along the limbus, combined with a limited tenectomy. Electrocoagulation was used to minimize bleeding. In the homologous site, scleral flap with 4mm×5mm, 1/3 thickness was made 1.5-2mm the margin of corneal limbus. A sharp blade was used to make a ligulate and superficial scleral flap, a one-third of scleral thickness 4mm×5mm in limbus-based scleral flap was dissected 1.5-2mm into the clear corneal. Under the scleral flap, a 4mm×4mm size of the deep sclera flap was made, into the corneal limbus margin of 1.5-2.0mm carefully until to see the thin sclera and descemet's membrane. Along the margin of corneal the deep sclera flap was cut off, anterior chamber was punctured to release appropriate amount of aqueous humor. The dissection of the second flap was deepened at the apex to partially expose the choroid. The dissection was then carried forward to the scleral spur until Schlemm's canal appeared. It is the most important step to identify and open the schlemm's canal at the junction of white sclera and corneal limbus. Removed the external wall of Schlemm's canal and corneal stroma, teared apart the inwall of Schlemm's canal by Blunt forceps and aqueous outflow started to seep significantly. To cut the trabecular meshwork at nasal side with 90 degrees trabeculotome, we can see the anterior chamber becomes shallower. Applying high viscous sodium hyaluronate at sclera

bed surface. 10-0 nylon suture was used to the sclera flap intermittently, 8-0 absorbed suture was used to conjunctival flap. Dexamethasone 2.5mg was injected into conjunctiva after surgery.

Treatment after operation Conventional antibiotics treatment, corticosteroid eye drops treatment, daily observation and intraocular pressure measurement are performed in five days after operation. To low bias to minimum, all surgeries completed by the same ophthalmologist who has excellent surgical skills, exact anatomical knowledge of anterior chamber angle and strong foundation of microsurgery.

Observe index Postoperative elements included the change of intraocular pressure, corneal diameter and postoperative complications. All patients were followed up at week 1, month 1, 3, 6 and 12.

Statistical Analysis Data were statistically analyzed using SPSS13.0. The paired-samples Student's *t*-test was applied to study the statistical significance of the difference between preoperative and postoperative measurements. $P < 0.05$ was considered as statistically significant.

RESULTS

IOP The IOP of congenital infant glaucoma is commonly from 30 to 50mmHg, also as high as 80mmHg. The patients were followed-up after 1 week, 1, 3, 6, 12 months and the children had no medication to reduce the IOP. As a result, the IOP was reduced after operation. The change of IOP was shown in Table 1 (All IOPs were measured by Shiotz tonometer).

Corneal diameter Using caliper (or compasses) for corneal diameter measurement, corneal diameter was reduced in four cases (8 eyes), unchanged in 11 cases (22 eyes) and increased was in 0 case.

Complications Hyphema happened in 1 eye and disappeared in three to five days. The severe complications such as anterior chamber disappeared, vitreous emerge were not found in any cases.

DISCUSSION

Congenital infant glaucoma is bilateral in 90 percent of cases under three months of age and is a potentially blinding disease that usually dose not responds adequately to medical treatment. As the most children are too young to receive any medical treatments, Long-term medication is difficult and risk. As a result, surgical treatment of congenital infantile glaucoma is the first selection.

To avoid the numerous postoperative complications of trabeculectomy (e.g. hypotony, flat anterior chamber, and choroidal detachment), several techniques of non-penetrating

filtrated surgery have been applied^[5-7]. The traditional operation such as trabeculectomy and goniotomy to the patients with congenital infant glaucoma has low successful rate because of complicated cause of this disease and the serious complications of this operation. Non-penetrating trabeculectomy is a new technology, which lowered pressure without producing a hole in the sclera^[8]. Non-penetrating trabeculectomy increases aqueous outflow through Schlemm's canal to avoid complications associated with subconjunctival filtering blebs^[9-11]. Retrospective and prospective published studies have showed that the result of NPTST is more effective than that of trabeculectomy. We have a good IOP control, fewer postoperative complications and better visual acuity recovery with NPTST. We adopt the NPTST to reduce IOP in the ways that aqueous humor outflowing through the excision of the outer wall of Schlemm's canal and the subconjunctival filtering blebs^[12-13]. The analysis of the 15 cases with congenital infant glaucoma from January 2010 to January 2012 in our hospital showed that the IOP was reduced obviously than that of the preoperative ($P < 0.05$) and the corneal diameter is in good control. The most common complication of NPTST is hyphema. Only a hyphema had occurred in one eye during surgery, which dissolved within 3-5 days postoperatively. In our opinion, NPTST seldom cause serious complications. Shallow anterior chambers, severe choroidal detachments, and severe inflammation are much less frequent because the anterior region is not so much penetrated compared to classic penetrating trabeculectomy. The results of the study demonstrate a sustained effect of the combined surgery treatment and show that this surgery can be applied successfully in patients with congenital infantile glaucoma. Further randomized prospective studies with large cases

number are needed for the further analysis to the long-term effects of NPTST.

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