



# To Evaluate the Clinical Effect of Glaucoma Drainage Valve Implantation in the Treatment of Neovascular Glaucoma - A Retrospective Study

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**Abstract:** *Background:* Glaucoma is a group of diseases characterized by visual nipple atrophy and depression, visual field defects, vision loss and other common clinical manifestations. Neovascular glaucoma is secondary glaucoma. There are many treatment methods for neovascular glaucoma, each with its own advantages and disadvantages. There are mainly drug conservative treatment and surgical treatment. This study is a clinical feature analysis of the effect of glaucoma drain valve implantation in the treatment of neovascular glaucoma. Explain the advantages and disadvantages and research results. *Research methods:* The clinical data of 56 patients (56 eyes) with neovascular glaucoma who were hospitalized for glaucoma drain valve implantation from January 2022 to January 2023 were collected for retrospective analysis. The patient's follow-up time is 1 d, 1w, 1m, 3m and 1 last follow-up. The follow-up mainly includes the patient's postoperative intraocular pressure, optimal corrective vision, the number of types of anti-glaucoma drugs used and complications. The criteria for surgical success are complete success and conditional success. Comparison of intraocular pressure at different points after surgery, and the number of types of anti-glaucoma drugs used before and after surgery. *Objective:* To evaluate the effect of glaucoma drain valve implantation in the treatment of neovascular glaucoma. *Results:* The patient's preoperative intraocular pressure (39.7) mm Hg (1 mm Hg=0.133 kPa); glaucoma patients implanted 1 d, 1w, 1m, 3m and last follow-up intraocular pressure (19.5), (11.2), (12.5), (15.8) and (16.2) mm Hg after the operation with a drainage valve implantation. Compared with intraocular pressure at different points in time, the variance analysis of repeated measurements is statistically significant ( $F = 6.06$ ,  $P < 0.05$ ). 0-6 anti-glaucoma drugs were used before surgery, with an average of 5; 0-2 anti-glaucoma drugs were used after surgery, with an average of 1, and the difference before and after surgery was statistically significant ( $Z = 5.564$ ,  $P < 0.05$ ). The complete success rate of drain valve implantation is 86.7%, and the conditional success rate is 95.3%. Postoperative complications mainly include drainage valve tube obstruction, drainage valve tube exposure, shallow anterior chamber and inclusion cystic vesicles around the drainage disk, transient superficial anterior chamber, choroid detachment. Intraocular pressure can be controlled after active symptomatic treatment of all complications.

**Keywords:** Drainage Implants, Glaucoma Valve, Glaucoma, Anti-Glaucoma Drugs, Angiogenesis, Glaucoma Intraocular Pressure, Eye Bleeding, Complication

## 1. Introduction

Glaucoma is a disease characterized by optic nipple atrophy, depression, irreversible visual field defects, and irreversible vision loss. Increased pathological intraocular pressure and insufficient blood supply to the optic nerve are the risk factors

for the disease. The tolerance of the optic nerve to stress damage is also related to the occurrence and development of glaucoma. The incidence rate of the total population is 1%, and 2% after the age of 45 [1]. Neovascular glaucoma (NVG) in the study is a kind of secondary glaucoma that threatens vision. It is secondary to diabetic retinopathy, retinal vascular

obstruction, eye trauma and other diseases [2], and the treatment effect of the disease is poor. After that, it is very bad [3]. Its main pathogenesis is that the abnormal increase of vascular endothelial growth factor (VEGF) caused by systemic diseases causes the formation of new blood vessels on the surface of the iris and the corner of the room, which closes the corner of the room and increases the intraocular pressure [4]. At present, the mainstream treatment methods include: treatment for primary diseases, such as the use of intraocular pressure-lowering drugs, intravitra injection of anti-VEGF drugs, glaucoma surgery and other comprehensive treatment [5]. Among them, anti-glaucoma surgery is treated with trabeculectomy, glaucoma drainage valve implantation, ciliary body destructive surgery and other surgical treatment [6]. Recently, glaucoma drainage valve implantation has become the main surgical treatment for NVG due to low intraocular pressure and low incidence of shallow anterior chamber. This kind of operation is simple and the injury during the operation is small. It is the preferred surgical method [7]. This research analysis summarizes the analysis and safety of the clinical effect of glaucoma drainage valve implantation in the treatment of NVG, which is reported as follows.

## 2. Research Methods

This study selected 56 patients with NVG who were surgically treated in our hospital from January 2022 to January 2023. Among them, 31 were male, 25 were female, 34 were in the right eye and 22 were left eye. All patients signed an informed consent form, and this study was approved by the Ethics Committee of our hospital. The patient's follow-up time is preoperative, postoperative 1d, postoperative 10,000, postoperative January, March after surgery, and last follow-up. Inclusion criteria: (1) neovascular associated with intraocular hypertension could be seen in iris and atrial Angle; (2) there is a local or systemic primary disease; (3) Drug treatment of intraocular pressure is ineffective. Ineffective. Exclusion criteria: (1) Poor systemic basic condition; poor cardiopulmonary function. (2) The follow-up time is < 2 months. Observation indicators: Observe the best correction of vision, intraocular pressure changes and postoperative complications before, postoperative, 1d, 10,000, January, March and the last follow-up. Statistical methods The research data is processed with SPSS statistical software (version 25.0, SPSS, IL). The counting data is expressed in frequency and percentage, the measurement data is expressed and the difference of  $P < 0.05$  is statistically significant.

## 3. Results

The patient's intraocular pressure (39.7) mm Hg (1 mm Hg = 0.133 kPa); glaucoma patients use drainage valve implantation after surgery 1 d, 1w, 1m, 3m, and the last follow-up intraocular pressure is (19.5), (11.2), (12.5) and (15.8 respectively. ) And (16.2)mm Hg, See Figure 1.

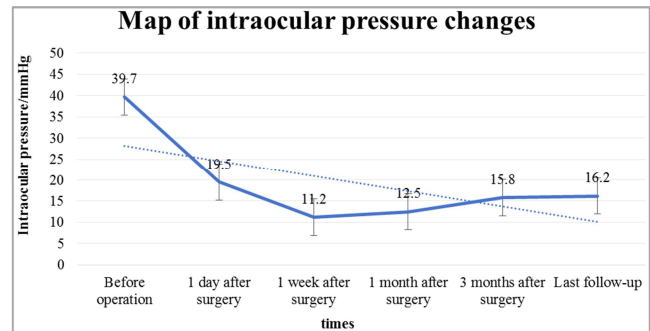


Figure 1. Map of intraocular pressure changes.

Compared with intraocular pressure at different time points, the variance analysis of repeated measurements is used, and the difference is statistically significant ( $F = 6.06$ ,  $P < 0.05$ ). Preoperative application of 0-6 anti-glaucoma drugs, an average of 5; see Figure 2.

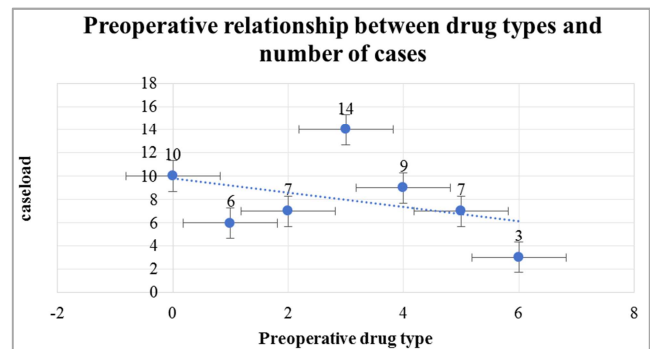


Figure 2. Preoperative relationship between drug types and number of cases.

There are 0-2 kinds of anti-glaucoma drugs applied after surgery, with an average of 1 kind. The difference between before and after the operation is statistically significant ( $Z = 6.764$ ,  $P < 0.05$ ), as shown in Figure 3.

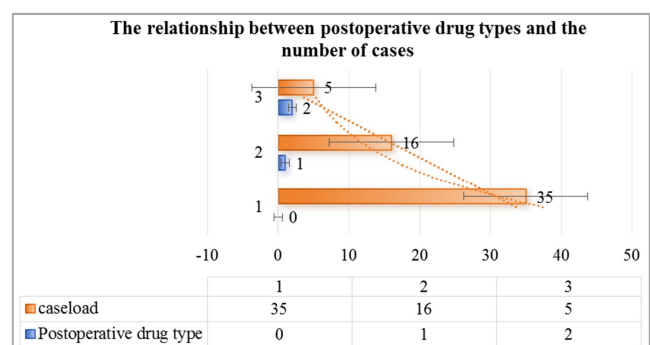


Figure 3. The relationship between postoperative drug types and the number of cases.

The complete success rate of drainage valve implantation is 86.7%, and the conditional success rate is 95.3%. The postoperative complications mainly include 3 eyes of drainage valve tube obstruction, 4 eyes of drainage valve tube exposure, 2 eyes of shallow anterior chamber and wrapped cystic bubbles around the drainage disc, 1 eye of transient shallow

anterior chamber, and 2 eyes of choroid detachment. After active treatment of all complications in the study, intraocular pressure can be controlled.

## 4. Discussion

NVG is a refractory glaucoma characterized by a large number of new blood vessels and fibrous vascular membranes in the iris and atrial angle [8]. The cause is the result of retinal ischemia and hypoxia. Of course, it can also be caused by a variety of diseases, including retinal vascular obstruction, proliferative diabetic retinopathy, ischemic syndrome, etc. [9]. The treatment principle of this disease is to control intraocular pressure. We have conventional treatment with intraocular pressure drugs, but when the treatment is not effective, surgical intervention is often needed. Glaucoma drainage valve implantation is the first choice for the treatment of NVG. The principle of implantation of glaucoma drainage valve to reduce intraocular pressure is to establish a continuous aqueous drainage channel, which diffuses to the orbital tissue and stabilizes intraocular pressure [10].

Clinically, more and more surgeons choose glaucoma drainage valve implantation to treat new glaucoma. Compared with traditional surgical treatment, this surgical treatment method has the following advantages: (1) reduces the risk of surgery [11]; (2) small damage to the sclera [12]; (3) good fixing effect, drainage tube The incidence of prolapse is reduced [13]; (4) The friction between the drainage tube and the conjunctiva is reduced, and the corrosiveness of the drainage tube is reduced. In this study, the intraocular pressure in the last follow-up of all patients decreased significantly, and the eyesight of some patients was higher than that before surgery. The operation is more effective, the postoperative vision is improved, and the intraocular pressure is controlled. Common complications after glaucoma drainage valve implantation include: anterior chamber blood accumulation, low intraocular pressure, malignant glaucoma, choroid detachment, corneal endothelial decompensation, endophthalmitis, and drainage tube detachment and exposure [14]. Postoperative low intraocular pressure is a common complication of drainage valve implantation. The possible reason is that the drainage valve destroys the structure of the drainage valve, resulting in excessive drainage [15]. For patients with low intraocular pressure, wearing a contact lens in the cornea and injecting gas into the vitreous cavity can improve the symptoms, and the operation is simple and effective. The reasons for postoperative high intraocular pressure may be: drainage tube obstruction, displacement, and fibrous tissue around the drainage tube [16]. The fibrous tissue-wrapped drainage tube affects the filtration function, which is the most common complication after surgery and the main reason for the failure of the operation. The principle of surgical treatment of neovascular glaucoma is to reduce high intraocular pressure, reduce the incidence of complications, and improve the success rate of surgery. At present, the best treatment for NVG is drainage valve

implantation surgery.

## 5. Conclusion

Neovascular glaucoma drain valve implantation is safe and effective; and there are few complications [17]. When the conservative treatment of neovascular glaucoma drugs is ineffective, the drain valve implantation operation plan can be the best surgical treatment for patients with neovascular glaucoma.

## Author's Statement

This study is approved by the author, and its case data is used for academic research. The research data is provided by wangtao; all authors have no conflicts of interest. Wang tao: Write a paper. Liu Chao: Statistics, review essays and paper drawing.

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