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GENERAL ARTICLE

Intraoperative and postoperative complications in trabeculectomy, Clinical study

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Abstract

Glaucoma represents a progresive multifactorial optic neuropathy characterised by retinal ganglion cell loss and atrophy of the optic nerve its main cause being high intraocular pressure. [**1,2**] Trabeculectomy is the most used surgical method when it comes to the majority of the ophthalmologists which is why knowing and managing the intraoperative and postoperative complications well is very important. [**3**]

Objective/aim. The study aims to establish the success rate and to evaluate the intraoperative and postoperative complications in a group of 75 patients with glaucoma 1 year after surgery.

Methods. A retrospective study was made on a group of 75 adult patients with different types of glaucoma which were refractory to medical treatment, for whom the treatment option was the trabeculectomy surgical intervention .

Results and discussions. The success rate measured 1 year after the surgery was of 89%.The most complications were found in patients with open angle glaucoma, neovascular glaucoma and glaucoma secondary to vitreo-retinal surgery. Trabeculectomy is a surgical procedure associated with numerous complications, so much so that the follow-up and the management of the aforementioned complications are sometimes more laborious than the surgery itself.

Key words: glaucoma, trabeculectomy, intraoperative and postoperative complications.

The objectives of the study

The present study was meant to determine the following:

- The range of trabeculectomy complications and the frequency of their appearance;
- The type of glaucoma most predisposed to complications;
- The associated pathological conditions which lead to complications;
- How to define the success and insuccess of the trabeculectomy surgery.

To reach these objectives we introduced the following success criteria for trabeculectomy:

- IOT between 5 and 22 mm Hg with or without supplementary medication;

- Pain relief in painful neovascular glaucomas;
- Maintaining visual acuity or losing at most 2 lines on the chart (optotype).

Insuccess criteria:
- The need of another surgery to lower intraocular pressure;
- Visual acuity dropping to "no perception of light".

Study methodology

A retrospective study was made on a group of 75 adult patients with different types of glaucoma which were refractory to medical treatment, for whom the treatment option was the trabeculectomy surgical intervention.

The patient data was collected from their files in the hospital data base and from the presentation files for the postoperative consult. The consultations took place in the first postoperative day, after 3 days, one week, one month, three months, six months and one year after surgery, or if any complications appeared. The postoperative consultations checked the followings: visual acuity, intraocular tension, slit lamp exam of the anterior segment (the local status of the flap and the filtering bleb), gonioscopy, examination of the posterior pole, visual field (at 3 months, 6 months, one year post-op).

Results and conclusions

The majority of the patients were men (61%) and those aged between 60-85 years (61%), in comparison to those between the ages of 40-60 (39%). There was no considerable difference in terms of the percentages of patients living areas, these percentges being almost equivalent.

When analyzing the personal pathology history it came out that most patients (37% =28) had arterial hypertension, followed by those with diabetes (28% = 21) and by those with central retinal vein occlusion (12% = 9). See Diagram 1 for more details.

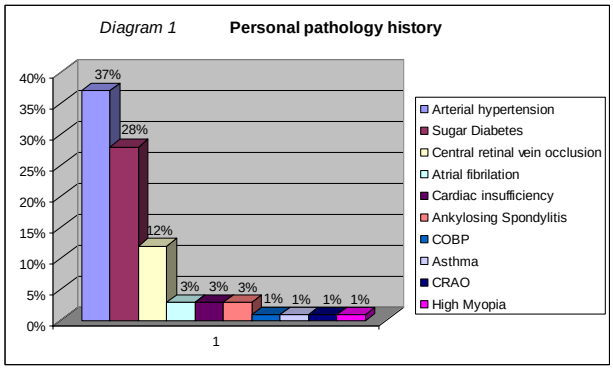

Diagram 1. Personal pathology history

The most common type of glaucoma was open angle glaucoma (39%) followed by neovascular glaucoma (32%), narrow angle glaucoma (13%) and glaucoma secondary to vitreo-retinal surgery (4%). The other types of glaucoma in the study (pigmentary, inflammatory, juvenile) were present in a much smaller percentage. See Diagram 2 for more details.

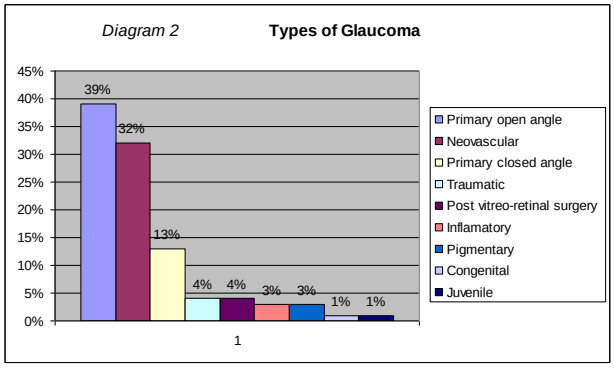

Diagram 2. Types of glaucoma

Some of the patients in the study had had other surgical interventions on the same eye prior to the trabeculectomy.

The data analysis showed the following:

- 19% of the patients had previously had vitrectomy surgery (this percentage also includes retinal detachment surgery)
- 19% had cataract surgery with implantation of an artificial lens (IOL-CP)

All patients who had undergone vitrectomy had silicone oil infusion which was removed prior to the trabeculectomy.

Of the total number of 75 patients, only 5 had intraoperative complications

The main intraoperative complications were:

- **Anterior Chamber Hemorrhage (21%).** This complication appears frequently in patients with neovascular glaucoma, arterial hypertension and diabetes mellitus. We performed an intravitreal injection with Avastin (Bevacizumab) on all patients with neovscular glaucoma in 2 to 10 days prior to the trabeculectomy. We also performed iridectomy on all patients. Some studies indicate good results of the trabeculectomy without the peripheral iridectomy.

- **Conjunctival hole**. One single patient exhibited this complication which was successfully repaired in the same surgical time through conjunctival slide. It is important that the conjunctival detachment should be done delicately using an atraumatic forceps; equally important is covering the scleral flap with an intact conjunctiva.

- **Hypotonia** was present in one single patient with a history of vitrectomy surgery that had inserted a continuous irrigation cannula. We used the continuous irrigation on the cannula for all patients who had undergone a previous vitrectomy for the purpose of maintaining a constant intraocular pressure.

- Complications of the scleral flap were present in 3 patients (2 of them had the flap too thick and one too thin); all of them were adjusted. We recommend to young specialists in glaucoma surgery to make a square flap, since it is easier to control its thickness due to the larger area in comparison to a triangular flap.

- Losing the anterior chamber of the eye or maintaining it with difficulty is a complication that surfaced in 3 of our patients due to hemorrhagic choroidal detachment. To avoid this complication we recommend paracentesis of the anterior chamber and introducing a small amount of methylcellulose before performing the trabeculectomy itself.

The most frequent complications that took place irrespective of the type of glaucoma, the pathological personal history or other individual characteristics were: hyphema, decompression retinopathy, hemorrhagic choroidal detachment, small anterior chamber, high IOP (>21 mm Hg), encapsulated bleb and scleral flap closure.

The most significant complications in the first postoperative day were:

- hyphema (21% of patients);
- decompression retinopathy (4% of patients);
- choroidal detachment (5% of patients).

The complications in the first postoperative month:

- hyphema (4% of patients);
- choroidal detachment (5% of patients);
- High IOP (14% of patients);

Late postoperative complications (more than 1 postoperative month) took place in a smaller percentage but with a major impact over the trab functionality and also over the surgical success of the trabeculectomy. Only 10% of the patients had their scleral flap closed after the surgery: **Table 1**.

Table 1 **Complications**	**Early Postoperative (1 day)**	**Early Postoperative (3days–1 month)**	**Late Postoperative (> 1 month)**
Hyphema	21%	4%	0%
Decompression retinopathy	4%	0%	0%
Coroidal detachment (Small AC)	5%	5%	0%
AC absent	1%	0%	0%
High IOP	1%	15%	27%

Enclosed bleb	0%	11%	0%
Retinal detachment	0%	0%	0%
Mydriasis	0%	0%	1%
Conjunctivitis	0%	0%	1%
Herpetic keratitis	0%	0%	3%
Blood staining of the cornea	0%	0%	1%
Hypotonia	0%	0%	0%
Scleral flap closure	0%	0%	10%

Analyzing the complications and the glaucoma type it came out that the most frequent complications were found in patients with open angle glaucoma, neovascular glaucoma and those who underwent a vitreo-retinal surgery.

The study showed that neovascular glaucoma is a risk factor for postoperative hyphema and for developing late high IOPs (more than 1 postoperative month). It also showed that arterial hypertension and sugar diabetes predispose to hiphema, the bigest risk being the case of the combination of these two.

Scleral flap closure was discovered in 8 patients (of the total of 75): 4 with neovascular glaucoma, 2 with glaucoma after vitreo-retinal surgery (silicone oil secondary glaucoma), 1 with open angle glaucoma and 1 with closed angle glaucoma.

Of the 53% (40 out of 75) patients who presented preoperative opacities of the lens only 2 (5% of those with opacities) underwent a cataract surgery (1 at 7 postoperative months and the other at 1 postoperative year). We can conclude that the trabeculectomy is not a risk factor for speeding up cataract evolution.

Although 28% of the patients had sugar diabetes, no case of postoperative endophthalmitis was encountered. Antibiotic prophylaxis for the prevention of postoperative infection was executed by means of the administration of cefaclor 500 mg x 2/day in the day of the surgery and three postoperative days and betabioptal drops postoperative for a month.

The success of a trabeculectomy is represented by a patent surgical fistula which can maintain a low IOP. The only thing necessary to maintain the fistula open is the constant flow of the aqueous humor.

According to the aforementioned success criteria, of the 75 patients who underwent trabeculectomy and were closely followed 1 year after the surgery it came out that for 89% the surgery was a success. Of all the patients, after trabeculectomy, 73% did not take any antiglaucoma medication, the low IOP being maintained only due to the functional fistula.

The insuccess happened in 11% (8) of the patients.

For the patients registering insuccess, the trabeculectomy failed due to complications:

- Flap closure with high IOP, uncontrolled by antiglaucoma medication and needling or by trabeculectomy revision; patients for whom a second trabeculectomy or an implantation of a shunt was needed (2 patients, both with vitrectomy);
- Falling of the visual acuity to no perception of light.

A part of these patients had to undergo other antiglaucoma surgery interventions due to the failure of the procedure. Two patients underwent a secondary trabeculectomy (at 2 postoperative months and at 7 postoperative months) and 2 other patients had the alternative of an Ahmed valve implantation.

The inconveniences of the study:

Most of the complications appeared in those with glaucoma secondary to vitreo-retinal surgery and in those with neovascular glaucoma. We can say that these types of glaucoma predispose to certain complications more often but they were also among the most frequent glaucomas within the study. The number of patients within our study was too small to point to significant conclusions in terms of the correlation between each type of glaucoma and the complications, or between each personal pathology history and the complications that took place.

The patients were followed up for a relatively short period of time (1 year), which is why potential late complications of over 1 postoperative year could not be noticed.

Conclusions

The study pointed out that trabeculectomy has smaller chances of success in the following situations:

- patients with neovascular glaucoma;
- patients with diabetes;
- patients with vitrectomy before the trabeculectomy.

The main disadvantages of the trabeculectomy are represented by the fact that the efficiency of the intervention is unforeseeable and that there are many complications. The postoperative IOPs can be either too low or too high. The way the wound is healing can be modulated but not always in a sufficient way. Furthermore, the procedure requests high postoperative care in order to obtain favorable results. Some of the surgeons say that half of the work for a trabeculectomy is done in the operating room and the other half is done through the postoperative medical management. Although subspecialised glaucoma surgeons have done huge efforts to modify the surgical technique in order to minimize the number of complications, we should still question the success of this procedure over time. Few studies verified the success rate after 3 and 5 years postoperative. One such study is "The 5-FU Filtering surgery study" which showed a failure rate of 50% at 5 years postoperative. [**4**]

Patients should be notified that the presence of the filtration bleb is normal and not a cause for panic.

Moreover, they should be informed prior to the surgery so that their expectations will match the postoperative events.

Was the trabeculectomy a good surgical option for the management of the glaucoma? [**5,6**]

Yes! The result was favorable for the majority of the patients (89%). Although it was a success in the majority of the patients, this surgical procedure had complications in the intraoperative and postoperative periods in some cases.

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