



# СРПСКИ АРХИВ ЗА ЦЕЛОКУПНО ЛЕКАРСТВО

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## Stage of glaucoma damage before the surgery

Степен глаукомског оштећења пре хирургије глаукома

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## Stage of glaucoma damage before the surgery

### Степен глаукомског оштећења пре хирургије глаукома

#### SUMMARY

**Introduction/Objective** The aim of study was to collect information about factors related to glaucoma damage at the time of surgery in the city of Novi Sad, Vojvodina province, Serbia.

**Methods** Retrospective data collection on filtering procedures of 38 patients (38 eyes) with open-angle glaucoma (OAG) was performed. Study was done at University Eye Clinic, Clinical center of Vojvodina, Serbia in period July 2011 - December 2014. The following variables were collected from a data collection sheet at last visit for each patient: age, sex, best corrected visual acuity (BCVA), visual field indices (MD and PSD), number of active antiglaucoma drugs, glaucoma type and surgical procedures.

**Results** The mean age was  $66.21 \pm 17.92$  years. Among patients 57% were female and 43% were male. Primary open angle glaucoma (POAG) was found in 60% (23/38), pseudoexfoliative glaucoma (XFG) in 37% (14/38) of patients. The median number of active antiglaucoma drugs was 2.73, ranging from 1 to 4. More than 90% of patients were on 2 and more medications before surgery. Mean BCVA was  $0.64 \pm 0.68$  and oscillated from 0.1 to 1.0 (according to Snellen). IOP on last visit before surgery varied from 15 to 42 mmHg (mean IOP  $26.11 \pm 13.20$  mmHg). Visual field index MD showed minor and highest absolute values from -0.82 to -35.25 dB (mean MD -18.00 dB  $\pm$  19.15). All patients had trabeculectomy with Mitomycin C procedures.

**Conclusion** Our survey found that the level of damage is advanced in terms of visual field loss. In most patients (52.63%) visual acuity was well preserved. Primary open-angle glaucoma (POAG) and pseudoexfoliative glaucoma (PXG) are the most frequent diagnosis. Women and elderly population were represented in higher number in our study. Level of IOP suggests a trend to make a surgical decision at higher pressure regardless the stage of glaucoma damage.

**Keywords:** glaucoma; stage; damage; surgery

#### САЖЕТАК

**Увод/Циљ** Циљ истраживања је био да се прикупе подаци о факторима који су повезани са глаукомским оштећењем код пацијената пре хируршке интервенције у Новом Саду; Војводина, Србија.

**Метод** рада У ретроспективној студији анализирано је 38 пацијената са глаукомом отвореног угла (OAG) којима је извршена филтрациона операција на Клиници за очне болести КЦ Војводине у периоду од јула 2011. до децембра 2014. За сваког пацијента на последњој контроли пре хируршке интервенције прикупљени су следећи подаци: године старости, пол, најбоља коригована видна оштрина (BCVA), индекси видног поља (MD и PSD), број лекова у терапији глаукома, врста глаукома и врста хируршке интервенције.

**Резултати** Просечна старост пацијената у овој студији износила је  $66, 21 \pm 17, 92$  година. Од укупног броја пацијената било је 57% жена и 43% мушкараца. Примарни глауком отвореног угла (POAG) је имало 60% (23/38), а псеудоексфолијативни глауком (XFG) 37% (14/38) пацијента. Просечан број коришћених антиглаукомских лекова износио је 2, 73 и кретао се од 1 до 4. Више од 90% пацијената било је на 2 или више антиглаукомска лека пре оперативног лечења. Просечна најбоља коригована видна оштрина износила је  $0,64 \pm 0,68$  у распону од 0,1 до 1,0 (по Снелену). Интраокуларни притисак (IOP) на последњем мерењу пре оперативних лечења кретао се од 15 до 42 mmHg (просечан IOP је  $26,11 \pm 13,20$  mmHg). Индекс видног поља имао је најмање и највеће апсолутне вредности од -0,82 dB до -35,25 dB (просечан MD -18,00  $\pm$  19,15). Сви наши пацијенти имали су трабекулектомију са митомцином C.

**Закључак** Наша студија је пронашла да пацијенти имају висок степен оштећења по индексу видног поља. Код највећег броја испитаника (52, 63%) видна оштрина била је добро очувана. Примарни глауком отвореног угла (POAG) и псеудоексфолијативни глауком (XFG) биле су најчешће дијагнозе. У испитаној групи пацијената већа је заступљеност жена и особа старије животне доби. Висина IOP сугерише тренд да се одлука о хируршкој интервенцији доноси код високих вредности IOP, без обзира на степен оштећења.

**Кључне речи:** глауком; степен оштећења; хирургија

## INTRODUCTION

Glaucoma is the leading cause of irreversible blindness in Europe. There are many risk factors for glaucomatous optic neuropathy, but the two most consistent of which appear to be intraocular pressure (IOP) and age [1]. Controlling IOP has been the primary focus of glaucoma treatment. Increasing age was associated with increasing IOP in most studies [1]. Direct correlation between extent of visual field loss and the level of pre-treatment IOP have been found to be weak for POAG [2, 3]. The probability of developing glaucoma at certain IOP may be different for different types of glaucoma [4]. Stronger correlation between visual field loss and IOP has been seen in pseudoexfoliative glaucoma [2].

Major risk factors for glaucoma blindness are the severity of the disease at presentation and life expectancy [5]. A young patient with mild optic nerve damage is at much higher risk of getting blind in his lifetime than older patients, so the treatment must be individualized to the needs of rate of progression. Patients with severe functional loss or younger patients with manifest disease should have more aggressive treatment including filtration surgery [6, 7].

The goal of glaucoma therapy is to maintain good vision for the patients' lifetime which will sustain quality of life [8]. In making right decision for glaucoma surgery, the surgeon must consider the life expectancy of the patient, the rate of disease progression and the risk-benefit of other therapy. The surgeon must weigh the surgical benefit such as likelihood that surgery will be successful and prevent further visual loss against the risks of surgical failure and complications. Surgery should be used more frequently at an earlier stage, rather than as a last resort [9]. We always need to keep in mind that visual loss from damage to the optic nerve is irreversible, while visual loss from common complication of glaucoma surgery can be corrected.

Filtration surgery is indicated when medical therapy fails to provide adequate control of intraocular pressure or when IOP is too high in spite of maximal tolerated glaucoma medication [10].

The aim of our study was to collect information about factors related to glaucoma disease at the time of surgery in the city of Novi Sad, Vojvodina, Serbia.

## METHODS

This was observational, retrospective clinical case-series study. This study was done at Eye Clinic, Clinical center Vojvodina, Novi Sad in period from July 2011 to December 2014 and was done in accord with standards of the the institutional Committee on Ethics. Thirty-eight patients (38 eyes) who underwent filtration glaucoma procedures were analyzed in the study. Selected cases were those who had diagnosis of any type of open angle glaucoma, either primary or secondary, including primary open angle glaucoma (POAG), normal tension glaucoma (NTG), pseudoexfoliative glaucoma (XFG) and pigment dispersion glaucoma (PG).

Surgeons were provided with a data collection sheet, and asked to collect the following variables from the last visit in medical records for each patients: age ( years), gender, eye, best corrected visual acuity (BCVA), mean deviation of visual field (MD in dB), pattern standard deviation (PSD), IOP on the last visit (mmHg), number of used antiglaucoma drugs, glaucoma type and surgical procedures. Glaucoma was defined as either visual field defect or glaucomatous changes of the optic nerve head (neural rim loss, disc asymmetry, blood vessel changes, peripapillary atrophy). The visual field evaluation was performed using the Humphrey field analyzer- program 24-2 or 30-2 (Carl Zeiss Meditec AG, Jena, Germany) equipped with STATPAC. MD and PSD data was entered for statistical analysis in absolute values.

The data were coded and entered in a database. Statistical analysis was performed using Statistical Package for the Social Sciences. Standard statistical parameters and methods (descriptive statistics and frequency distribution) were used. Numerical data were presented using mean value and standard deviation (SD).

## RESULTS

The mean aged of all analyzed patients was  $66.21 \pm 17.92$  years. Among them 57% were female and 43% were men. Primary open angle glaucoma (POAG) was found in 60% (23/38), pseudoexfoliative glaucoma in 37% (14/38) and pigmentary glaucoma in 3% (1/38) of patients. We recorded that all our patients had trabeculectomy with Mitomycin C as filtering procedure. The median number of used antiglaucoma drugs was 2.73, ranging from 1

to 4. More than 90% of patients were on 2 and more medications before surgery. 2.63% patients were on 1 medication, 38.84% were on two medications, 44.73% were on three medication and 15.78% were on four medications. Mean BCVA was  $0.64 \pm 0.68$  and was oscillated from 0.1 to 1.0. (according to Snellen). 52.63% patients had  $BCVA \geq 0.8$  (Table 1).

IOP on the latest visit before surgery varied from 15 to 42 mmHg (minimum and maximum median values). Mean IOP was  $26.10 \pm 13.20$  mmHg and were higher than 21 mmHg in 29/38 patients (76.31%) (Figure 1).

Visual field index MD showed minor and highest absolute values from -0.82 to -35.25 dB (mean MD  $-18.00 \text{ dB} \pm 19.15$ ). Mean PSD value was  $6.99 \pm 6.27$  and varied from 1.5 to 14.6 (Figure 2).

## DISCUSSION

Our survey found that the level of damage in glaucoma patients before surgery is advanced in terms of visual field loss. Mean visual field index was -18.0 dB which is considered as advanced visual field loss damage according to Hodapp Classification Staging [11]. Open angle glaucoma was classified as primary open angle glaucoma and secondary open angle glaucoma (pseudoexfoliative and pigmentary). Sixty patients had POAG and 37% of patients had pseudoexfoliative glaucoma. Such high number of pseudoexfoliative glaucoma patients explains that patients with XFG had more progression and more difficult to control IOP [12]. Surgery among XFG patients are frequently done earlier in contrast to primary open- angle glaucoma. Nonetheless, studies have shown that the long-term success of trabeculectomy in XFG may be better than that documented with POAG [12].

In our study women and elderly population were presented in higher number. More than 90% of patients were on 2 or more medication having in mind that 3 or more medications consider maximal medical antiglaucoma therapy.

Clinical decision making for glaucoma surgery depends on several factors. There are no general recommendations for glaucoma surgery and for each patient many factors have to be taken into account when choosing surgical treatment. In patients with primary open angle

glaucoma the indications for surgery are documented visual field and optic nerve damage that threatens the patient's vision despite maximal tolerated medication with or without previous laser surgery. Intraocular pressure that is high enough to place the future health of optic nerve at significant risk is the important factor for surgical indication [13].

Theoretically, it will be more frequently indicated when the disease progresses in the context of maximal medical therapy and uncontrolled IOP, but surgeons can also recommend it either in the progressive patients at risk of vision threatening, despite an apparently well controlled IOP, or when IOP is unacceptable high regardless the functional status. Our survey found that more than 90% of patients were on 2 or more medication and only 15.78 % of patients were on maximal medical therapy showing that filtration surgery was not the last resort which is not in correlation with the guidelines [9,10,14]. Analysis of IOP level before surgery also showed that when IOP is too high despite the level of visual function loss, surgeons can decide to perform filtering procedures regardless of stage of the damage [15].

The glaucoma staging applications nowadays allows automated, reproducible and objective classification system for staging glaucoma damage for multiple 24-2 visual functions of Humphrey visual field. Recent publication was a proof-of-concept that could translate into useful tool to analyze and stage visual functions more objectively [16]. Latest results regarding quality of life in glaucoma patients demonstrate that quality of life is impaired in patients with glaucoma and this alteration is greater the more advanced is glaucoma damage in the best or both eyes [17].

In the last few years the authors continued to collect new data of the stage of glaucoma damage before the surgery and the study will be updated in near future.

## CONCLUSION

Our survey found that the level of damage is advanced in terms of visual field loss. In most patients (52.63%) visual acuity was well preserved. Primary open-angle glaucoma (POAG) and pseudoexfoliative glaucoma (PXG) are the most frequent diagnosis. Women and elderly population were represented in higher number in our study. Level of IOP suggests a trend to make a surgical decision at higher pressure regardless the stage of glaucoma damage.

## **ACKNOWLEDGMENT**

This survey was in part presented at EGS meeting in September 2-3, 2011 Malmo, Sweden as retrospective data collection on filtration glaucoma procedures performed in OAG around Europe in 2011.

**Conflict of interest:** None declared

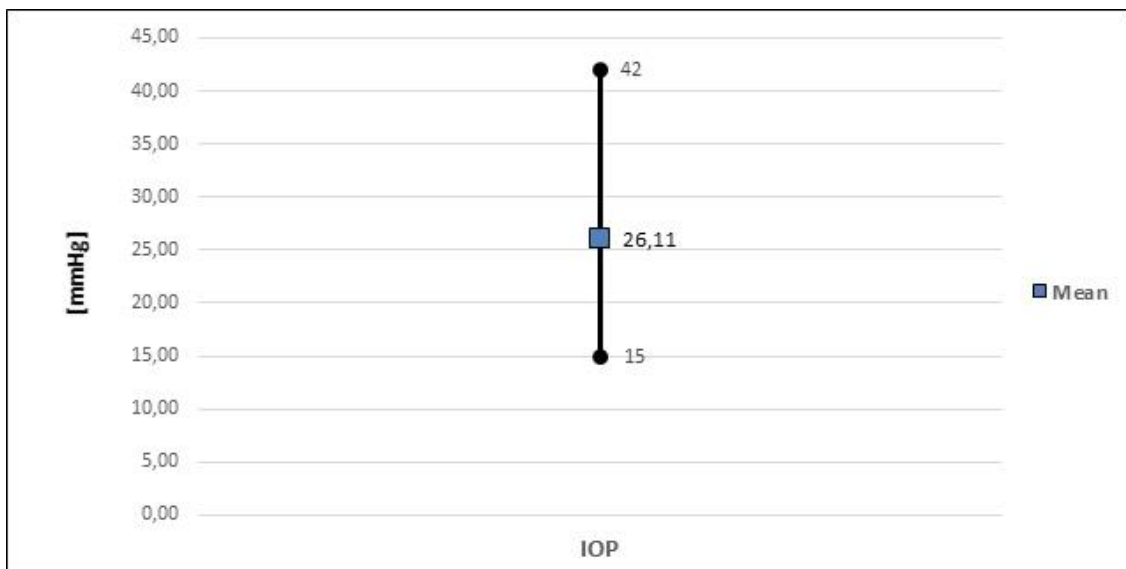
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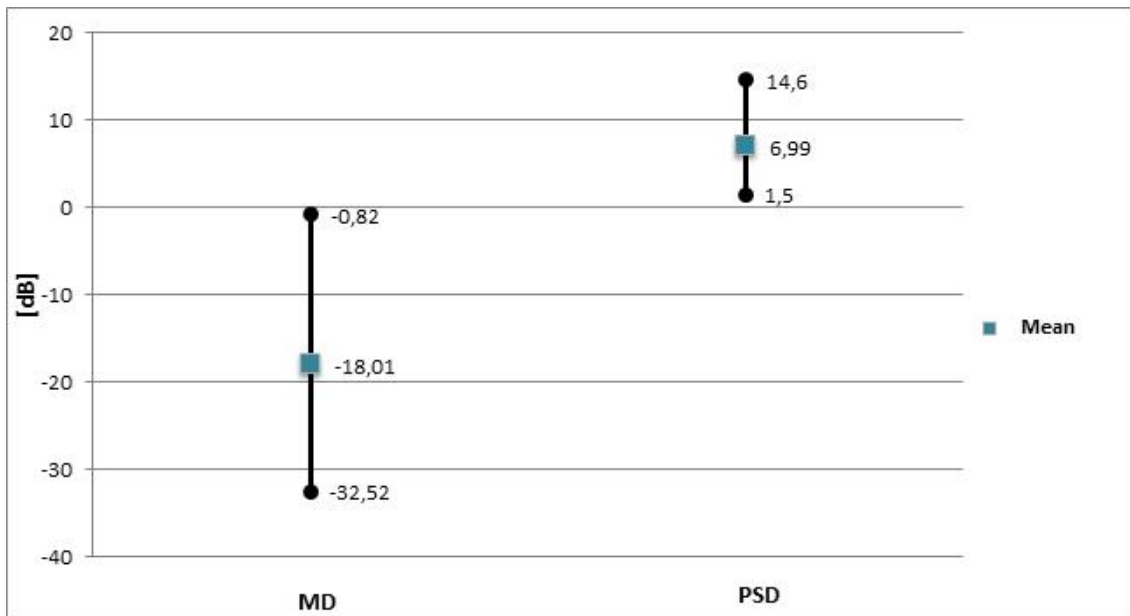
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**Figure 1.** Intraocular pressure at last seen before the surgery



**Figure 2.** Stage of damage- visual function indices.

MD – mean deviation: PSD – pattern standard deviation

**Table 1.** Visual function factors, IOP and preoperative number of drugs.

	Mean±SD	Range ( min-max)
Age ( years)	66.21±18.16	36-81
IOP ( mmHg)	26.11±13.20	15-42
BCVA	0.64±0.68	0.01-1.00
MD (dB)	-18.01±19.5	-35.52-(-0.82)
PSD	6.99±6.27	1.5-14.6
N active drugs	2.74±1.51	1.0-4.0

IOP – intraocular pressure; BCVA – best corrected visual acuity; MD – mean deviation;  
PSD – pattern standard deviation

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