Clinical profile of steroid-induced glaucoma in Bali Mandara Eye Hospital year 2019

Ni Kompyang Rahayu¹, Ardelia Emily²

ABSTRACT

Introduction: Glaucoma is an optic neuropathy characterized by optic disc cupping and visual field loss usually associated with raised intraocular pressure. Glaucoma incidence is rapidly increasing, with global incidence is estimated to reach 76 million in 2020. There are many causes of glaucoma; one of them is corticosteroid use. Unmonitored steroid use can be resulting in undesirable side effects such as steroid-induced glaucoma. This study aims to evaluate the clinical profile of steroid-induced glaucoma in Bali Mandara Hospital year 2019.

Method: A descriptive-cross sectional study was conducted using secondary data involving 35 medical records of patients diagnosed with glaucoma in Bali Mandara Eye Hospital, Denpasar, from January to December 2019. Age, gender, steroid type, routes and duration of steroid administration were recorded from medical records. Obtained data were analyzed descriptively using SPSS version 23 for Windows.

Results: Patient’s characteristics mostly were male 57.14% and 42.86% female, 31.43% were elderly >55 years old. They mostly used eye drops steroid (85.71%), and 14.29% took oral steroids. The most used eye drops were Dexamethasone eye drops (77.14%). For oral steroids, they took Methylprednisolone (8.57%) and Dexamethasone (5.71%). Most of them have symptoms after one year of steroid use (34.39%).

Conclusion: Steroid-induced glaucoma can occur in both males or females in all age groups, which the elderly and children have a higher risk. Most cases occur from topical steroids. Steroid-induced glaucoma is avoidable irreversible blindness. Therefore, the use of steroids must be judicious; self-medication must be avoided. The doctor must provide education to patients who are given steroid therapy.

Keywords: intraocular pressure, glaucoma, steroid, steroid-induced glaucoma

INTRODUCTION

Glaucoma is an optic neuropathy characterized by optic disc cupping and visual field loss usually associated with raised intraocular pressure (IOP).¹² In the last decade, the prevalence of glaucoma has increased rapidly in line with population growth and aging. In 2010, the number of glaucomas reached 60.5 million. Glaucoma incidence globally is estimated to reach 76 million in 2020 and 111.8 million in 2040. Glaucoma is the second leading cause of blindness worldwide after cataract. According to Riskesdas 2007, the prevalence of glaucoma was 0.46% in Indonesia, meaning that as many as 4 to 5 people out of 1000 people suffer from glaucoma.³

There are many causes of glaucoma, one of them is corticosteroid use. The discovery of steroids was a major breakthrough in the treatment of various autoimmune and inflammatory diseases.⁴ Currently, corticosteroids are applied successfully in many medical fields, including ophthalmology and are some of the most frequently prescribed drugs.⁵ But unmonitored use of steroids, especially in eye drop formulations, is common in situations when it is easily available over-the-counter, resulting in undesirable side effects.⁶ One of those undesirable effects is the elevation of intraocular pressure resulting in steroid-induced glaucoma. Steroid-induced glaucoma can occur in people of all ages, although children are less frequently reported to have IOP elevation with steroids. No gender and racial predilection exist for steroid-induced glaucoma. The incidence of steroid-induced glaucoma in patients with systemic corticosteroids is unknown because most of them do not have their IOP checked. These patients may be discovered during a routine eye exam while on medication, or glaucoma may have progressed to the point of causing visual symptoms.⁷

The most common routes of steroid-induced glaucoma are topical and intraocular or periocular administration. It can also occur through systemic steroids, application to the skin, intranasally, or by inhalation.⁸ Commonly used, potent corticosteroids like Betamethasone, Dexamethasone and Prednisolone have a significant tendency to induce glaucoma. Less potent steroids such as Fluorometholone and Medrysone...
are less likely to induce glaucoma. The concentration or dose of a steroid is also related to the likelihood of producing an intraocular pressure elevation. Patients who receive corticosteroid therapy may develop IOP elevations in days, weeks, months or years after initiating treatment. Topical corticosteroids typically produce IOP elevation within 2 to 6 weeks. Systemically administered steroids, however, may take a longer duration to elicit an IOP rise.

This study aims to find out the clinical profile of steroid-induced glaucoma at Bali Mandara Eye Hospital in 2019. We evaluate steroid-induced glaucoma profile based on age, gender, types, routes and duration of steroid administration.

METHODS
The study was done using cross-sectional and descriptive retrospective methods. It was conducted in Bali Mandara Eye Hospital, Denpasar, Indonesia. Samples were obtained from secondary data of patients’ medical records with steroid-induced glaucoma in one year from January to December 2019 through total sampling. The inclusion criteria were all patients who came to Bali Mandara Eye Hospital diagnosed with steroid-induced glaucoma from January to December 2019, while the exclusion criteria were all glaucoma patients that were not caused due to steroid use.

The variables obtained were age, gender, steroid type, routes and duration of steroid administration. The age was classified according to the Indonesian Health Department classification of age groups into child (5-11 years old), teenager/adolescent (12-25 years old), adult (26-45 years old), early elderly (46-55 years old) and late elderly (>55 years old). The type of steroid was recorded based on the steroid used by the patient, which is written in the medical record. The steroid administration route is how the patient uses steroids, either topically, periocular, intravitreal, inhalation, or oral. The duration of steroid administration is the time from the initial use of steroids to cause glaucoma symptoms. The obtained data were analyzed descriptively using SPSS version 23 for Windows.

RESULTS
From January 2019 to December 2019, 35 data were obtained from patients diagnosed with steroid-induced glaucoma. Most of the patients were male (57.14%) and 42.86% female. The patient’s age was ranging from children to the elderly. About 5.71% of patients were categorized as children 5-11 years old, teenager/adolescent (14.29%), adult (22.86%), early elderly (25.71%), and most of them were in the late elderly age group (31.43%). The prevalence of steroid-induced glaucoma based on demographics can be seen in Table 1.

Table 1. The prevalence of steroid-induced glaucoma based on demographics

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child (5-11)</td>
<td>2 (5.71%)</td>
</tr>
<tr>
<td>Teenager/Adolescent (12-25)</td>
<td>5 (14.29%)</td>
</tr>
<tr>
<td>Adult (26-45)</td>
<td>8 (22.86%)</td>
</tr>
<tr>
<td>Early elderly (46-55)</td>
<td>9 (25.71%)</td>
</tr>
<tr>
<td>Late elderly (&gt;55)</td>
<td>11 (31.43%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>20 (57.14%)</td>
</tr>
<tr>
<td>Female</td>
<td>15 (42.86%)</td>
</tr>
<tr>
<td>Total</td>
<td>35 (100%)</td>
</tr>
</tbody>
</table>

Table 2. Route of administration and steroid type

<table>
<thead>
<tr>
<th>Route of administration</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>30 (85.71%)</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>27 (77.14%)</td>
</tr>
<tr>
<td>Prednisolone</td>
<td>3 (8.57%)</td>
</tr>
<tr>
<td>Oral</td>
<td>5 (14.29%)</td>
</tr>
<tr>
<td>Methylprednisolone</td>
<td>3 (8.57%)</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>2 (5.71%)</td>
</tr>
</tbody>
</table>

DISCUSSION
Increased IOP due to steroid use can occur in all age groups, although children are reported less frequently. The previous study shows that older patients have a greater risk of being steroid induced glaucoma. This is consistent with this study’s result, which showed steroid induced glaucoma is most common in the elderly. No gender and racial predilection exist for steroid-responsive glaucoma. The results of this study showed the number of male patients was slightly more than female, 57.14% male and 42.86% female.

Patients with steroid-induced glaucoma have increased IOP due to response to steroids with various steroid administration routes. Most steroid-induced glaucoma cases occur from exogenous steroids, which may be given topically, periocular or systemically. However, endogenous steroids can also cause this condition. In this study also showed that most patients (87.71%) with glaucoma due to steroids experienced an increase in IOP due to local steroids. In general, the pressure inducing effect of a topical steroid is proportional to its anti-inflammatory potency. Commonly used, potent corticosteroids like...
Betamethasone, Dexamethasone, and Prednisolone have a significant tendency to induce glaucoma. Less potent steroids such as Fluorometholone and Medrysone are less likely to induce IOP elevations. Kersey et al. have reported differences in the level of steroid response in known high responders to steroid for different preparations and found that the higher the steroid potency, the greater the ocular hypertensive effect; the study shows that Dexamethasone 0.1% has the highest IOP increase response. This is consistent with the results of this study, where 77.14% of patients experience steroid induced glaucoma after the use of Dexamethasone eye drops.

Patients who receive corticosteroid therapy may develop IOP elevations in days, weeks, months, or years after initiating treatment. Topical corticosteroids typically produce IOP elevation within 2 to 6 weeks. Systemically administered steroids, however, may take a longer duration to elicit an IOP rise. In this study, the increase in IOP varies from 1 week to 5 years. Most patients use steroids for one year. This can happen because, at first, it was asymptomatic, and most of these patients do not have their IOP checked. These patients may be discovered during a routine eye exam while on medication, or glaucoma may have progressed to the point of causing visual symptoms. Steroid-induced glaucoma is a disease that can be prevented. Many ocular or extraocular diseases that require steroid therapy are one cause of excessive use of steroids.

Another thing that causes steroids to be overused is that steroids can reduce symptoms quickly to feel better, and patients continue steroid therapy without the doctor’s supervision. In addition, steroids are very easy to get over-the-counter and relatively cheap, so patients can easily get steroids. This study’s limitation is the small sample size due to the short research period (1 year). Thus further research with a bigger scale is needed to validate these study findings. This study can provide basic data for future studies, especially analytic studies that evaluate the relationship between steroid use and the incidence of glaucoma-induced steroids.

CONCLUSION

In conclusion, data obtained in January-December 2019, there were 35 patients diagnosed with steroid-induced glaucoma. Most of the patients were male, elderly (>55 years) and using local steroids (Dexamethasone eye drops). The duration of administration of steroids to cause symptoms varies from 1 week to 5 years. Steroid-induced glaucoma is avoidable irreversible blindness. Therefore, the use of steroids must be judicious. Self-medication must be avoided. The doctor must provide education to patients who are given steroid therapy. If possible, steroids are replaced with nonsteroidal anti-inflammatory drugs, and patients who receive steroid therapy should be monitored regularly.

ACKNOWLEDGMENTS

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ETHICAL CLEARANCE

This study has obtained ethics approval.

CONFLICT OF INTEREST

We declare that there was no conflict of interest in this study.

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AUTHOR CONTRIBUTION

All authors contributed equally to this study.

REFERENCES