

# Uveitic Glaucoma Patients: The Prevalence and Review of the Condition

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## *Abstract:*

**Background:** uveitic glaucoma is one of the common and serious complications of intraocular inflammation. The purpose of this study was to determine the prevalence of uveitic glaucoma and review its presentation, causes, mechanisms, and its visual effects.

**Patients and Methods:** (76) patients with uveitis presented to Ramadi teaching hospital were included in this study, there were only (14) who had developed secondary glaucoma: (9) males and (5) females.

A full history and thorough ocular examination was done for each patient.

**Results:** Results showed that the prevalence of uveitic glaucoma was (18.42%) of uveitic patients and it affected males more than females of young age group (21-40) years old.

The most common presentation is unilateral (78.5%). The most common cause is Behcet's disease (53.7%), then followed by idiopathic and Fuch's uveitis (14.2%), and then by other less frequent causes.

Pupillary block was found to be the most common mechanism (42.8%) and severe vision loss affected (50%) of the patients.

**Conclusion:** Uveitic glaucoma is a common complication of uveitis. The most common causes of uveitic glaucoma is Behcet's disease and the main mechanism is by pupillary block.

It appears that early diagnosis and early proper management of uveitis is an important factor for preventing it and reducing its complications.

**Key Words:** Glaucoma, Uveitis, Ocular disorders.

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## ***Introduction:***

**Definition:** is an elevated intraocular pressure (IOP) that is associated with uveitis<sup>(1)</sup>, the latter means an inflammation of the uveal tract (the middle vascular coat of the eyeball)<sup>(2,3,4)</sup>. Uveitic glaucoma is one of the common and serious complications of intraocular inflammation, and it is a major cause of blindness in those patients because management is difficult and challenging and blindness is a common consequence.<sup>(5,6,7)</sup>

Elevated IOP may be acute, chronic, or recurrent, and it may be a presenting feature or sign in some entities of uveitis like posner-schlossman syndrome or Fuch's uveitis syndrome, or it may be a secondary complication to intraocular inflammation, or it may be steroid induced<sup>(1,2,5)</sup>.

Studies state that intraocular inflammation accounts for 10% of the visually handicapped in the United States<sup>(8)</sup> and it appears that uveitic glaucoma plays a major role in the pathogenesis of blindness in those patients.

### **Pathology of Uveitic Glaucoma:**

The pathogenesis of elevated IOP in uveitis includes the following mechanisms with their incidences:<sup>(2,5,6,7,9)</sup>

<b><u>Mechanism</u></b>	<b><u>Incidence</u></b>
1-debris blockage of trabeculum	(common).
2-peripheral anterior synechiae	(common)
3-iris bombe	(common).
4-steroid induced	(3-10%)
5-rubiosis iridis	(rare).
6-sclerosis of trabecular meshwork	(rare)
7-Trabeculitis	(rare).

### **Uveitis Entities Associated with Glaucoma:**

The major uveitis syndromes with which secondary glaucoma can be associated include the followings:<sup>(1,2,4)</sup>

- 1-severe iridocyclitis.
- 2-Fuchs' heterochromic iridocyclitis : (glaucoma occurs in 50% of Fuchs uveitis patients).
- 3-Posner-Schlossman syndrome (glaucomatous crisis).
- 4-toxoplasmic retinitis.
- 5-infective uveitis : (Rubella, herpes zoster, and herpes simplex may be accompanied by an elevated IOP).

### **Treatment of Uveitic Glaucoma:**

Treatment of uveitic glaucoma should aim to control the inflammation and IOP through a multimodal approach of both medical and surgical therapy<sup>(1)</sup>.

#### **I-Medical treatment:**

Includes early and constant pupillary dilatation<sup>(9)</sup>, topical and oral anti-glaucoma medications<sup>(9)</sup>, and if steroid-induced glaucoma is suspected, a less potent steroid preparation and / or less frequent administration schedule used to control ocular inflammation may reduce the intraocular pressure<sup>(1)</sup>.

Parasympathomimetic medications (miotics) and prostoglandins should be avoided in uveitic glaucoma.<sup>(1,10)</sup>

## **II-Surgical treatment :**

Surgery for uveitic secondary glaucoma should only be performed if medical treatment of the underlying disease or ocular inflammation does not lower the IOP with presence of glaucomatous damage to the optic nerve<sup>(11)</sup>, and it includes the following procedures :

- i-** standard filtration surgery : It is usually unsuccessful due to post-operative inflammation and bleeding , results may be improved by intra-operative application of 5-flourouracil or mytomyacin c with intensive corticosteroid therapy<sup>(9,12,13)</sup> .
- ii-**non penetrating deep sclerectomy: In a recent study, deep sclerectomy was efficacious with few post-operative complications<sup>(14)</sup> .
- iii-**Peripheral iridectomy , either surgical or by YAG laser and/or argon laser, results in resolution of iris bombe and angle closure<sup>(9)</sup> .
- iv-**Some eyes require molteno tube implantation and studies reported a good success rate. <sup>(15)</sup>
- v-**Argon laser photocoagulation or trans scleral photocoagulation using red krypton or diode laser is effective and well-tolerated procedures for the treatment of therapy-resistant inflammatory glaucoma in adults , but only when retinal non perfusion has been detected on fluorescein angiography. <sup>(16,17)</sup>
- vi-** Cyclo- destructive procedures by cryopexy or laser cycloablation are usually reserved for cases with end-stage inflammatory glaucoma's.<sup>(2,4)</sup>

## ***Patients and Methods :***

**F**rom January 2004 to March 2008 , (76) previously diagnosed uveitic patients presented to the Ophthalmic Department in Ramadi Teaching Hospital were studied.

A full history was taken from each patient followed by a base line distant (snellen chart) visual acuity, an intraocular pressure measurement (using Goldman tonometry and/or schiotz tonometry), thorough slit lamp examination, visual field assessment and fundus examination ( using direct or indirect ophthalmoscope , condensing (+90) lens or Goldmann three mirror lens).

Criteria of uveitic glaucoma((defined as an increased IOP that is associated with intraocular inflammation and causes secondary optic nerve damage)) are applied .These inclusive criteria are also used for definition of uveitic glaucoma in previous studies all over the world. <sup>(11,18,19)</sup>

After establishment of uveitic glaucoma and the cause of uveitis for each patient , the data from each patient were recorded for further study and a proper management was advised for each patient and then the patients followed up for a period ranged from (2 to 12) months .

Unfortunately, (15) patients attended only one or two visits and they were lost before reaching a specific diagnosis. Hence , they were excluded from the study.

## ***Results :***

**R**esults of the study showed that only (14 )patients(18.4%) from a total number of (76) uveitic patients had developed uveitic glaucoma.

There were 9 males (64.2%) and 5 females (35.7%) ,aged between (3) years and (65) years. (Table1).

Age distribution showed that the highest incidence (9 patients) occurred in those between (21-40 ) years old which equals to (64.2% ) , followed by (3 patients) for those between (41 -60 ) years old (21.4%) and then followed by ( 2 patients) for those between (1-20) years old (14.2%) .(Table2 ) .

It was found that uveitic glaucoma was unilateral in (11) cases which equal (78.5%) of the total cases and bilateral in (3) cases which equal to (21.4%) of the total cases.(Table 3).

The Causes of uveitic glaucoma in our study and their prevalence's were found to be as the following : Behcet's disease showed the higher prevalence among other causes affecting (5) patients (35.7%) followed by idiopathic uveitis and Fuchs uveitis with (2) patients (14.2%) for each and then by retinoblastoma, lens induced , vogt -

koyanagi -harada syndrome, toxoplasma retinitis , and ankylosing spondylitis with one patient (7.1%) for each (Table 4 ) .

Pathological mechanism that causes glaucoma was found to be mainly by pupillary block in (6)patients (42.8%), then by inflammatory (trabecular blockage ) in (4) patients (28.5%), then by neovascular glaucoma in (3) patients (21.4%) and only one patient (7.1%) was due to drug (steroid) induced glaucoma. (Table 5).

Regarding visual acuity in uveitic glaucoma patients, it was found that it severely affected (visual acuity is from total vision loss to less than 6/60) in (7) patients (50%) of total patients , while those who have visual acuity between (6/18 to 6/60) were ( 4) patients (28.5%) , and those who have good vision between (6/6 to 6/12) were ( 3) patients (21.4%).(Table6)

***Table(1) : Sex Distribution of the Patients***

SEX	NO.	%
Male	9	64.2
Female	5	35.7
Total	14	100%

***Table(2) : Age Distribution of the Patients***

AGE	NO.	%
1-20 years	2	14.2%
21-40 years	9	64.2%
41-60 years	3	21.4%
Total	14	100%

**Table(3) : Laterality Distribution of the Patients**

TYPE	NO.	%
Unilateral	11	78.5%
Bilateral	3	21.4%
total	14	100%

**Table(4) : Prevalence of Causes of Uveitic Glaucoma**

CAUSE	NO.	%
Behcet's disease	5	35.7%
Idiopathic uveitis	2	14.2%
Fuchs uveitis	2	14.2%
Retinoblastoma	1	7.1%
Lens induced	1	7.1%
V.K.H syndrome	1	7.1%
Toxoplasmosis	1	7.1%
Ankyl. spondylitis	1	7.1%
total	14	100%

**Table(5) : Mechanisms of Uveitic Glaucoma**

ECHANISM	NO.	%
Pupillary block	6	42.8%
Inflammatory g.	4	28.5%
Neovascular g.	3	21.4%
Drug induced	1	7.1%
total	14	100%

**Table(6) : Visual Acuity of the Patients**

VISUAL ACUITY	NO.	%
Less than 6/60	7	50%
6/18 – 6/60	4	28.5%
6/6 -6/12	3	21.4%
Total	14	100%

### ***Discussion :***

The prevalence of uveitic glaucoma in Iraqi uveitic patients is found to be (18.42%) , previous studies in different parts of the world showed great fluctuations in the prevalence of uveitic glaucoma ; a study showed that the prevalence of the condition in Germany ranges between (5% - 20%) of total uveitic patients <sup>(11)</sup> while another study in Germany stated that (8.8%) of uveitic patients suffered from secondary glaucoma or ocular hypertension <sup>(18)</sup>. Another study held in United Kingdom reported that (21.4%) of uveitic patients had IOP elevation; (10.6%) of these cases had glaucoma <sup>(19)</sup> , while in the United States it was reported to range between (20% -25%) <sup>(20)</sup> .This means that the prevalence of uveitic glaucoma in Iraqi patients is in consistency with the prevalence stated in other parts of the world , but unfortunately there is no previous study in Iraq for comparison.

Age and sex distribution showed that the highest incidence 64.2% (9 patients) occurred in those between(20-40) years old and males (64.2%) were more affected than females (35.7%).

This is probably because of the high incidence of Behcet's disease in Iraqi patients <sup>(21)</sup> which usually affects this age group of young adult men <sup>(4)</sup> and usually it is presented as recurrent severe anterior uveitis with hypopyon <sup>(4)</sup> which may be associated with secondary glaucoma<sup>(2)</sup> and also it may cause retinal ischemia and hemorrhages <sup>(2)</sup> which again may be associated with secondary neovascular glaucoma.

Although Behcet's disease is usually bilateral <sup>(2,4)</sup>(the most common cause),the results of our study showed that uveitic glaucoma was unilateral in most cases (78.5%) and the reason for this discrepancy is that all the other causes apart from Behcet's disease (Table4) usually have unilateral character. Hence, it usually causes unilateral glaucoma.

Regarding the prevalence of causes of uveitic glaucoma; results of our study showed that Behcet's disease was the most common cause affecting (35.7%) of cases and this result is quite acceptable since the disease is the most common cause of uveitis in Iraqi patients <sup>(21)</sup> and it is one of the commonest causes of uveitis in different parts of Asia and Mediterranean area<sup>(22,23)</sup> .

On the other hand , this result is not consistent with the results reported in the United States where the common causes of the condition are those which cause trabecular blockage by inflammatory mechanisms which commonly occur with infectious causes of uveitis, such as toxoplasmosis , acute retinal necrosis, herpes simplex, and herpes zoster iridocyclitis where they are common diseases <sup>(9,24,25)</sup> while Behcet's disease ; which is the most common cause of uveitis in Iraq , is a rare disease in the United States affecting only (1.8%-2.5%) of uveitic patients <sup>(9,26)</sup>.

The second most common causes of uveitic glaucoma were found to be idiopathic uveitis and Fuch's uveitis with each affecting about (14.2%) of patients and these results were consistent with fact that idiopathic uveitis is the second most common cause of uveitis in Iraqi patients<sup>(21)</sup>. This might be presented as severe uveitis that may causes trabecular blockage (inflammatory) glaucoma, while Fuch's uveitis is the third most common cause of uveitis in Iraqi patients<sup>(21)</sup> which is usually presented with secondary glaucoma in (50%) of cases<sup>(2)</sup> due to chronic outflow obstruction by peripheral anterior synechiae as well as by direct trabecular damage<sup>(1)</sup>, but it is again a rare cause of uveitis in Western countries where it affects only (1.8% - 2%) of cases. <sup>(2,24)</sup>.

Regarding the remaining other causes of uveitic glaucoma which include retinoblastoma , toxoplasmosis , VKH syndrome, lens induced, and ankylosing spondylitis ,they are rare causes of uveitic glaucoma in Iraqi patients because these diseases (apart from toxoplasmosis) are rare causes of uveitis in Iraqi patients <sup>(21)</sup> and hence rare causes of uveitic glaucoma.

Toxoplasmosis is one of the common causes of inflammatory uveitic glaucoma in Western countries where the disease is common<sup>(25)</sup> and studies showed that elevated IOP occurs in (38%) of ocular toxoplasmosis in the United States <sup>(27)</sup> but usually the IOP elevation is transient <sup>(27)</sup> and concurs with the uveitic episode when there is active inflammation ; a common feature of the acquired toxoplasmosis which is the common type of toxoplasmosis in Western countries, while in Iraq the disease is usually of the congenital type which is usually "quiescent" with minimal inflammation<sup>(21)</sup> and this is probably the reason why the disease is a rare cause of uveitic glaucoma in Iraq and inconsistent with the results mentioned above in the Western countries.

It is reported that trabecular obstruction and peripheral anterior synechiae are the main mechanisms of uveitic glaucoma's in Western countries <sup>(1,2,6,7)</sup> but this is not true for Iraqi patients where the results of our study showed that the main mechanism is by pupillary block due to posterior synechiae formation affecting (42.8%) of cases and this is probably because of delayed and/or improper management of Iraqi uveitic patients due to multifactorial defective processes of diagnosis and treatment of the condition.

Uveitic glaucoma is a common and serious complication because blindness is a common consequence <sup>(5)</sup> .This is also true for Iraqi uveitic glaucoma patients, it is clear from the results of our study that the condition caused severe vision loss for half of the patients and the reason for this high number is that the management of uveitic glaucoma is difficult because of the often chronic course of the underlying disease <sup>(5)</sup> ,



a feature behind the concept that the intraocular inflammation accounts for 10% of the visually handicapped in the United States <sup>(8)</sup> and also accounts for severe vision loss for about 19% of uveitic patients in India. <sup>(28)</sup>

#### *Conclusion and Recommendations:*

**W**e can conclude that uveitic glaucoma is a common feature of uveitic patients and it affects males more than females of young age group.

The most common presentation is unilateral and the most common cause is Behcet's disease, then followed by idiopathic and Fuch's uveitis, and then by other less frequent causes.

Pupillary block is found to be the most common mechanism and severe vision loss affects half of those patients.

We also conclude that early diagnosis and early proper management of uveitis is an important and vital factor in the process of prevention and management of uveitic glaucoma and also for reduction of its complications and visual sequelae.

It is recommended to establish uveitic clinics for the diagnosis, management, and follow up of those patients.

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