

Anterior Chamber Granuloma.  
Conservative Treatment Versus Surgical Intervention.

By

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## **Introduction**

Uveitis affecting children presents a special challenge to the clinician, the causes of uveitis in children vary widely depending upon geographic, cultural, environmental, and socioeconomic factors and upon the prevalence of causative agents (**Kanski et al, 1984**).

Uveitis in childhood is a potentially blinding disease, associated with difficulties in diagnosis, treatment, chronic course, social and economic consequences with high complication rate and surgical intervention (**Mingels 2005 & Sangwan et al , 2005**).

Between 2% and 9% of all patients with uveitis are children. Of these, between 30% and 40% present with anterior uveitis associated with juvenile rheumatoid arthritis (**Pezz et al, 1996**).

Compared with this non granulomatous process, granulomatous uveitis is rare in children. Although granulomatous intraocular inflammation from sarcoidosis, tuberculosis, sympathetic ophthalmia, Vogt-Koyanagi-Harada, and ocular toxoplasmosis is seen in both children and adults, toxocariasis appears to be a more common cause of granulomatous uveitis in children (**Kimura et al, 1964**).

In Fayoum many cases presented with granulomatous anterior uveitis consisting of single or multiple creamy white nodules almost seen in the inferior half of the anterior chamber.

**Amin et al 2016**, found a preponderance of such granulomas in 34.8% of pediatric uveitic population from Egypt. (**Amin et al, 2016**)

### **Aim of the work :**

The aim of this work is to compare the outcome of conservative treatment (Topical treatment + Sub-Tenon injection of Triamcinolone acetonide) to surgical intervention by anterior chamber wash and granuloma excision for the treatment of the anterior chamber granuloma in children.

### **Review of the literature :**

Uveitis in children is associated with difficulties in diagnosis and treatment and large potential social and economic consequences. Early and aggressive anti-inflammatory treatment is the best means to improve long-term outcomes from intraocular inflammation, but drug-related adverse actions may be more troubling and less well tolerated by children. Corticosteroids which are often the mainstay of treatment of non-infectious uveitis cause considerable side effects especially in children. Immunosuppressive drugs used as steroid-sparing agents include antimetabolites, antibiotics and calcineurin inhibitors they all have generalized effects on the patient and are burdened with various side effects. Better alternative treatment with improved efficacy and fewer side effects is desirable. (Sangwan et al, 2005).

### **Patients and methods :**

#### **Patients and methods:**

This is a randomized, interventional and prospective clinical trial (simple randomization) that took place from June 2018 to February 2019 in Ophthalmology department in both Fayoum and Cairo University Hospitals. The study followed the declarations of Helsinki and was approved by Fayoum University Hospital ethics committee.

A written informed consent was signed by all patients or their guardians.

The study included 58 patients, presenting with anterior chamber granuloma. Patients were recruited from uveitis subspecialty clinics in previously mentioned hospitals.

Patients were included, if they had active anterior segment granuloma with presence of flare and cells  $\geq +2$  according to the (SUN) classification ( **Jabs DA et al, 2005**).

**Exclusion criteria:**

Patients with inactive or healed granuloma and ocular trauma were excluded. Similarly, patients with a known cause of uveitis or with previous ocular surgery were not included.

Thorough medical history was taken from each patient, with special focus on place of residence, associated systemic disease, history of trauma, and exposure to canal water.

All patients were subjected to full ophthalmological examination including: corrected visual acuity for far using Snellen's chart, anterior segment examination with slit-lamp, intra-ocular pressure measurement using Goldmannapplanation tonometry, and posterior segment examination with indirect ophthalmoscopy and with slit lamp biomicroscopy in conjunction with a non-contact +90 Diopter fundus lens. Grading of anterior chamber flare and cells was done using SUN classification.

As a routine, chest x-ray, intradermal injection of purified protein derivative (PPD), complete blood picture and erythrocyte sedimentation rate were done for all patients. Other investigations were done as guided by the clinical presentation.

Patients were randomly assigned to either conservative treatment (**Group A**) or surgical treatment (**Group B**).

Patients in group A received topical treatment in form of prednisolone eye drops (5 drops/day to be tapered gradually according to improvement) and cycloplegics (3 drops/day) with sub-Tenon injection of Triamcinolone acetonide (two injections with one week interval).

Patients in group B underwent granuloma excision and anterior chamber wash.

### **Surgical steps of anterior chamber wash:**

41 patients with pearl-like anterior chamber nodules underwent surgical aspiration of the nodules.

Informed consent was obtained from the patients or their parents.

Under general anesthesia, with complete aseptic precaution, corneal incision is done with micro-surgical knife (keratome 3.2mm) followed by injection of visco-elastic to reform the anterior chamber.

Excision of the granuloma from its attachment to the root of iris and cornea with capsule-rhexis forceps or vannis scissor or retina micro-scissor or forceps , then irrigation aspiration of the anterior chamber to wash out any residual particles .

Synechiolysis with spatula was done in cases with posterior synechia.

Closure of the corneal wound by corneal hydration or 10\0 nylon suture according to the age of the patient.

Intra-operative complication (such as hyphema due to iris injury) was reported.

Sub-conjunctival injection of antibiotic, corticosteroids and some patients received atropine to prevent posterior synechia.

All patients received topical corticosteroids (in form of prednisolone eye drops (5 drops/day to be tapered gradually) and antibiotics (moxifloxacin 5 times daily to be tapered) postoperatively for 2-3 weeks.

All patients were followed-up at the first day post injection or postoperative, after 2 weeks, one month and three months. Non-healing

or recurrence of the granuloma and/or intraocular inflammation, occurrence of complications was low

Time	outcome	Surgical (N=41)	Medical (N=19)	P-value
		N (%)		
First day	( cells <+0.5 & no granuloma )	40 (97.6)	1 (5.3)	<0.0001 *
	healed granuloma <sup>1</sup>	0 (0.0)	1 (5.3)	
	Persistent granuloma <sup>2</sup>	1 (2.4)	17 (89.4)	
After 2 weeks	Complete Resolution <sup>3</sup>	40 (97.6)	1 (5.3)	<0.0001 *
	healed granuloma	0 (0.0)	1 (5.3)	
	Persistent granuloma	1 (2.4)	17 (89.4)	
After one month	Complete Resolution	40 (97.6)	2 (10.5)	<0.0001 *
	healed granuloma	0 (0.0)	2 (10.5)	
	Persistent granuloma	1 (2.4)	15 (78.9)	
After 3 months	Complete Resolution	40 (97.6)	2 (10.5)	<0.0001 *
	healed granuloma	1 (2.4)	10 (52.6)	
	Persistent granuloma	0 (0.0)	7 (36.8)	

Pearl like ocular granuloma is a common cause of uveitis in rural pediatric population in Egypt, it's a gross lesion that can be easily identified with naked eye in nearly all of cases and was the complaint that annoyed the parents.

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<sup>1</sup>Healed granuloma (a granuloma that has been transformed into a retro-corneal membrane) and improved inflammation according to SUN classification.

<sup>2</sup> Persistent granuloma and improve inflammation according to SUN classification .

<sup>3</sup> Complete resolution ; 0 cells and disappearance of granuloma .

The River Nile is the main source of water supply in Egypt with a resident agricultural society alongside its Delta and Valley.

The disease apparently has an affinity for pediatric eyes with a characteristic presentation of anterior uveitis with single or multiple pearly white nodules in the AC that eventually evolve into vascularized retro-corneal membranes.

Our study aimed to compare the effect of medical treatment (in the form of topical steroids & sub-Tenon steroid injection) and surgical excision of the granuloma & anterior chamber wash.

This study included 58 patients, of which 56 were males all with previous history of bathing in canal water.

It is not unusual for children from rural areas, particularly boys, to head to the river waters during the day for bathing and recreation because of a typically hot dry climate.

Lesions were almost entirely noted in young boys; as girls in these localities are notably not allowed to publicly bathe or play in ponds for sociocultural considerations.

Similarly, other studies in both India and Egypt have reported that the majority of patients with anterior chamber granuloma were males and all were reporting bathing in local canal waters. (**Rathinam et al in 2002, Arya LK et al, 2016, Amin et al 2016, Amin et al 2018**).

The disease appears to be endemic in Egypt with a wide-spread regional distribution along the river basin. **Amin et al 2016**, in a recent epidemiologic study, reported that cases of pediatric parasitic AC granulomas from Egypt represent 34.8% of pediatric uveitis cases in the study population.

A recent study that was conducted in Aburich Children Hospital during the period from January 2015 to July 2017 pointed out that the most common

uveitis patients Presented to the uveitis clinic during this period were idiopathic (35.7%) followed by anterior chamber granuloma (28.3%), JIA (27.6%), sarcoidosis (2.1%), Behcet's disease (1.4%), rubella (1.4%), sympathetic ophthalmia (1.4%), VKH (1.4%) and traumatic (0.7%)(**A master thesis in Aburich Children Hospital**).Also a recent study was conducted in Kasr-AL Ainy hospitals in 2017 which included 313 patients with uveitis, of which 45 cases presented with A.C. granuloma.(**A master thesis in Kasr-AL Ainy hospitals**).Out of 2432 patients with uveitis in Egypt, Anterior uveitis was found in 112 children (27.1%), affecting both eyes of 78 children, the total number of eyes with anterior uveitis was 190, the most common causes of anterior uveitis were juvenile idiopathic arthritis (JIA), presumed parasitic anterior uveitis, and idiopathic anterior uveitis, where no specific etiology was detected by the end of the study duration (**Abd El Latif E,et al 2017**).

The majority of our patients presented with inferior anterior chamber granuloma.

Unlike other studies, we have not encountered patients with either lid or subconjunctival nodules (**Rathinam et al in 2002, Arya LKet al 2016, Amin et al 2016**).

**Amin and colleagues** reported that Complications at presentation such as cataract, glaucoma, corectopia, phthisis, or retro-corneal scarring were encountered in 16% of study eyes (**Amin et al 2017**). On the contrary, only 5% in our study presented with complications such as cataract and elevated ONH this may be attributed to their long study period in comparison to ours.

Several attempts have been made to determine the cause of such nodules, **Rathinam** and coworkers have been attributed to incidental human infection with *Procerovumvarium*; a trematode of fish-eating birds found in India and other countries of the Far East.(**Rathinam SRet al,**

2000). Similarly, in a recent study by **Amin and associates 2017**, results of molecular testing were positive in 6 of the 14 samples (42.8%) using PCR analysis for trematode DNA.

In our study, 97% of those who were surgically treated showed complete resolution of inflammation and disappearance of granuloma after 2 weeks postoperatively and this was maintained throughout the follow up period. On the other side, complete resolution and disappearance of granuloma was achieved in 5% only of those who were medically treated in the first 2 weeks and reached up to 10 % at 3 months , while the majority 50% achieved resolution of inflammation and healing of granuloma (leaving a retrocorneal membrane) at the end of the follow up period.

Moreover, patients who were surgically treated achieved better BCVA when compared to those who received medical treatment.

No post-operative complications were encountered apart from minimal intra-operative hyphema that was detected in 6 cases and was spontaneously resolved. None of the patients, in either group, experienced worsening of inflammation (according to SUN classification: **Jabs DA et al, 2005**), or recurrence of granuloma or increase of IOP throughout the follow up period.

We believe that surgical treatment is a safe option and might be better than medical treatment as regards resolution of inflammation and speed of recovery post-treatment.

Preventive measures need to be in effect in known endemic areas and these can entail public health education, evading exposure to the host fresh water habitats (**Amin et al 2018**).