Demographic and clinical characteristics of uveitis for adult patients with Vogt-Koyanagi-Harada disease attending Mansoura Ophthalmic Center

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Received: 23-11-2021, Accepted:28-2-2022, Published online:16-3-2022.

EJO(MOC) 2022;2:36-45.

Short title: Vogt-Koyanagi-Harada syndrome characteristics of adult patients attending Mansoura Ophthalmic Center

Abstract:

Purpose: This study was to evaluate the demographic characteristics, clinical features of uveitis of adult patients with Vogt-Koyanagi-Harada (VKH) disease uveitis in Mansoura Ophthalmic Center (MOC).

Methods: This was a descriptive cross sectional prospective study conducted on adult patients attending uveitis outpatient clinic of MOC. Entire cases were exposed to full history taking, ophthalmic history, ocular examination which included assessment of visual acuity, slit lamp examination, in addition, optical coherence tomography (OCT) and fundus fluorescein angiography (FFA) were performed for selected cases.

Results: from 254 uveitic patients attending **uveitis** outpatient clinic, 41 VKH cases (81) eyes were examined. Mean age was 33.88 ± 9.3. Male to female (M/F) ratio was 29.3/70.7. The mean BCVA among the studied cases was 0.839±0.74 LogMar in which most of cases had severe vision loss (≤6/60) (41.9%) at presentation and most of the causes of vision loss were reversible. Among causes of vision loss, macular oedema represented the commonest cause 43.2% followed by neurosensory detachment 28.4% that was documented by OCT and FFA. All of cases received systemic prednisolone as initial treatment.

Conclusions: VKH-related uveitis is more common in the female gender in Egypt. VKH is a common cause of bilateral vision loss with a favourable visual outcome if intensive therapy with systemic steroids is initiated early. In addition, early management of cases of unilateral VKH prevents disease process in the other eye.

Keywords: uveitis, demographic characteristics, Vogt–Koyanagi–Harada disease, serous retinal detachment, prednisolone.

INTRODUCTION

Vogt–Koyanagi–Harada (VKH) syndrome is a multisystem disease of presumed autoimmune etiology. The Vogt-Koyanagi-Harada (VKH) disease is a bilateral granulomatous panuveitis with potential systemic involvements: neurological disorders (cerebrospinal fluid analysis shows pleiocytosis in about 80% of cases), otological disorders (hearing loss, dizziness (70%) and tinnitus (42%)) and dermatological disorders such as vitiligo, poliosis and alopecia (10 to 63%)[1].

Th1 cells target melanocytes, which causes the disease. People with darker skin are more likely to get the disease. The most vulnerable groups are Asians, Native Americans, and Hispanics. It mostly affects people between the ages of 20 and 50, and women are more likely to be affected than men[2].

The stages of VKH syndrome are as follows. The first stage is the prodromal stage, which is marked by nonspecific symptoms such as malaise, fever, nausea, headache, dizziness, and orbital pain, and lasts 3–5 days. Patients with neuro-otological symptoms may also appear at this stage[3]. Then, there's the acute uveitic stage which is marked by vision impairment and is characterized by bilateral posterior uveitis in the majority of patients[4]. Following the acute stage, patients may enter the convalescent stage, which results in integumentary and/or uveal depigmentation[3]. The convalescent phase is characterised by a "sunset glow fundus"

caused by choroid depigmentation[5]. Patients who are left untreated may develop a chronic recurring condition that might lead to vision loss[3]. In the chronic recurrent phase, recurring attacks of anterior uveitis are common[5]. After a few weeks or months, integumentary symptoms occur. The syndrome can manifest as isolated ocular involvement (probable VKH), ocular, CNS, and integumentary involvement (complete VKH), or ocular involvement with either CNS or integumentary involvement (incompleteVKH)[6].

Clinical features are used to make the diagnosis of VKH syndrome. The American Uveitis Society (AUS) in 1978 and Sugiura's Criteria in 1976 were two of the first to establish criteria to demonstrate VKH diagnosis[4].

Fundus fluorescein angiography (for multifocal leakage), ultrasonography (for choroidal thickness), and lumbar puncture (for cerebrospinal fluid pleocytosis) may be used to support the diagnosis. The typical first-line treatment for VKH is a high-dose of systemic steroids, followed by a switch to immunomodulatory medications for long-term control[5].

The aim of the study was to evaluate the demographic and clinical characteristics of VKH in adult uveitic patients attending MOC.

PATIENTS AND METHODS

The clinical data of adult VKH patients suffering from uveitis and attending uveitis outpatient clinic of MOC over a period of two years were recorded from July 2019 to June 2021 after obtaining the approval from Institutional Research Board (IRB), Faculty of medicine, Mansoura University (**code number:MS**:19.07.743). This study also was performed in accordance with the Helsinki Declaration.

Inclusion criteria involve all Egyptian adult patients above 18 years old who were diagnosed as uveitis by using the Standardization of Uveitis Nomenclature (SUN) Working Group diagnostic criteria that was set in 2005.(7)In addition, VKH diagnostic criteria were recognized according to AUS criteria. (4) Exclusion criteria involve patients younger than 18 years old, patients with previous history of any trauma and other causes of uveitis .

Methodology

The following were done for all studied cases including general ophthalmic history with special attention to history of ocular trauma as well as history of ocular surgery or use of medication. In addition, systemic history was assessed as well. Full ophthalmic examination including, visual acuity measurement with Landolt's broken ring chart then converted to LogMAR for statistical issues, evaluation of BCVA and degree of vision loss was also assessed as following mild vision loss(≥6/12 or 0.3 LogMAR) causes of moderate vision loss (6/18–6/36 or 0.48 - 0.78 LogMAR), and severe vision loss (≤6/60 or ≤1 LogMAR) (8) , slit lamp examination to assess anterior segment including: corneal clarity, pupil, lens, examination of anterior chamber for signs of inflammation according to SUN criteria.(9) Intraocular tension was measured using Goldmann applanation tonometer. Posterior segment examination using indirect ophthalmoscope and slit lamp biomicroscopy with auxillary contact lens.

Anterior segment photography was done by a camera mounted on slit lamp. Optical coherence tomography (OCT), spectral domain OCT 2000 [Topcon, Inc., Paramus, NJ, USA], was used to asses macular lesions. Fundus fluorescein angiography was used when possible to asses posterior segment lesions.

Statistical analysis and data interpretation:

Data were fed to the computer and analyzed using IBM SPSS Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. Qualitative data were described using number and percent.

Quantitative data were described using mean, standard deviation for parametric data after testing normality using Kolmogrov-Smirnov test. Significance of the obtained results was judged at the (0.05) level.

RESULTS:

From 254 uveitic patients attending uveitis outpatient clinic, 41 VKH cases with 81 eyes were examined. Most of the studied cases had age from 18 to 40 years (80.5%), while only 19.5% of which had age more than or equal to 40 years. Mean age was 33.88 ±9.3. Seventy five percent of the study cases were from Dakahlia governorate followed by Damietta (9.8%) then Gharbia (7.3%) with minor percentages from other Egyptian cities as demonstrated in table (1)**.** Male to female (M/F) ratio was 29.3/70.7. Most of cases presented with bilateral eyes involvement while one case that presented with unilateral affection. The most common anatomical type of

uveitis was anterior uveitis (35.8%) followed by panuveitis (33.3%) and posterior uveitis (30.9%). **table (1)**

Table (1): Demographic data of the studied patients

Demography		
	n=41	**%**
Age/years		
<40 (18-40)	33	80.5
≥40	8	19.5
Mean age	33.88 ±9.3	
Gender		
Male	12	29.3
Female	29	70.7
Residency		
Dakahlia	31	75.6
Damietta	4	9.8
Gharbia	3	7.3
Kafr ELsheikh	2	4.9
Cairo	1	2.4
Laterality	**n=41**	**%**
Bilateral	40	97.6
Unilateral	1	2.4
Type of uveitis	**n=81**	**%**
Anterior uveitis	29	35.8
Posterior uveitis	25	30.9
Panuveitis	27	33.3

Mean BCVA among studied cases was 0.839±0.74 LogMAR. Most of cases presented with severe vision loss (≤1 LogMAR) (41.9%), followed by cases with vision ≥0.3 LogMAR (38.3%), then moderate vision loss (0.47-0.77 LogMAR) (19.8%). Most of the studied cases had a reversible cause of vision loss (82%), while only (18%) of cases had non-reversible causes of vision loss. Macular edema (60.0%), neurosensory detachment (46.0%), cataract (16.0%) and Inflammatory CNV (8.0%) were the most prevalent causes of vision loss, other causes are represented in **table (2)**.

Table (2): Visual loss among the studied cases

Vision		
	Median (range)	**Mean±SD**
BCVA	0.6	0.839±0.74
Visual loss degree	**n=81**	**%**
Mild vision loss (vision ≥6/12)	31	38.3
Moderate vision loss (vision between 6/18 to 6/36)	16	19.8
Severe vision loss (vision ≤6/60)	34	41.9
Reversibility of vision loss	**n=50**	**%**
Non-reversible	9	18.0
Reversible	41	82.0
Cause of vision loss(VL)	**n=50**	**%**
Macular edema	30	60.0
Neurosensory detachment (NSD)	23	46.0
Cataract	8	16.0
Inflammatory CNV	4	8.0
Glaucoma	3	6.0
Retinal detachment (RD)	2	4.0
Macular scar	2	4.0
hypotonus maculopathy	1	2.0
phthisis bulbi	1	2.0

Regarding uveitis signs. Corneal signs, 19.8% of cases had KPs and 1.2% had band keratopathy. Anterior chamber signs, most of cases had AC cells (49.4%) and AC flare (32.1%). Iris signs, posterior synechiae was (43.2%), while there were two eyes presented with anterior synechiae and one eye with iris atrophy patches. Lens signs, pseudophakic eyes and cataract were reported in 23.5%, 16.0% of cases respectively. Intra ocular tension, open angle uveitic glaucoma, closed angle uveitic glaucoma, steroid induced ocular hypertension and hypotony were found in 11.1%, 5.0%, 2.5%,1.2% of cases respectively. Vitritis was recorded in 11.1% of cases. Optic nerve signs, hyperemic optic disc and glaucomatous optic changes were found in 2.5% and 3.7% of cases respectively.

Retinal signs, Sunset glow fundus (64.2%) followed by Macular edema (43.2%), CNV (5.0%) and other signs revealed in **table (3)**

Table (3): clinical signs of studied cases

Signs of uveitis	**n=81**	**%**
Corneal signs		
KPs	16	19.8
band keratopathy	1	1.2
Anterior chamber signs		
AC cells	40	49.4
AC flare	26	32.1
Iris signs		
posterior synechiae	35	43.2
iris atrophy	1	1.2
anterior synechiae	2	2.5
Lens Signs:		
Pseudophakia	19	23.5
Cataract	13	16.0
IOP		
open angle uveitic glaucoma	9	11.1
closed angle uveitic glaucoma	4	5.0
steroid induced ocular hypertension	2	2.5
Hypotony	1	1.2
Posterior segment manifestations		
Vitritis	9	11.1
Sunset glow fundus	52	64.2
Macular edema	35	43.2
Dalen Fuchs nodules	19	23.5
CNV	4	5.0
Subretinal fibrosis	4	5.0
Glaucomatous optic changes	3	3.7
optic disc hyperemia	2	2.5
RD	2	2.5
vasculitis	2	2.5
Macular scar	2	2.5
Peripheral Chorioretinal scar	2	2.5

Regarding treatment history, all cases received systemic prednisolone. Concerning IMT, 7.4% of cases received it,4.9%received one agent (Azathioprine) while 2.5% received two agents (Azathioprine &Methotrexate). Concerning biological therapy, 12.4% of cases received it, 9.9%received one agent (Adalimumab) while 2.5% received two agents (Adalimumab& Infliximab) **table (4)**

Table (4): Systemic treatment history among studied cases

Treatment history			
		n=81	**%**
Systemic prednisolone	Yes	81	100
IMT (immune modulatory therapy)	No	75	92.6
	Azathioprine	4	4.9
	Azathioprine &Methotrexate	2	2.5
Biological therapy	No	71	87.6
	Adalimumab (Humira)	8	9.9
	Adalimumab& Infliximab	2	2.5

47 cases have done oct that revealed macular lesions as macular oedema (35/47; 74.5%), neurosensory detachment (NSD) (25/47; 53.2%), CNV (3/47; 6.4%), ERM (2/47; 4.3%) and hypotonus maculopathy (1/47; 2.1%). **table (5) figure (1)**

FFA findings reported in 24 patients were multiple NSD (11/24; 45.8.7%), CNV (4/24; 16.7%), vacuities (2/24; 8.3%) and Choroiditis (2/24; 8.3%). **table (5) figure (2,3)**

Table (5): OCT and FFA findings of studied cases

OCT	**n=47**	**%**
Macular oedema	35	74.5
Neurosensory detachment	25	53.2
CNV	3	6.4
ERM (Epiretinal membrane)	2	4.3
Hypotonus maculopathy	1	2.1
FFA	**n=24**	**%**
Free	5	20.8
Multiple NSD	11	45.8
CNV	4	16.7
Vasculitis	2	8.3
Choroiditis	2	8.3

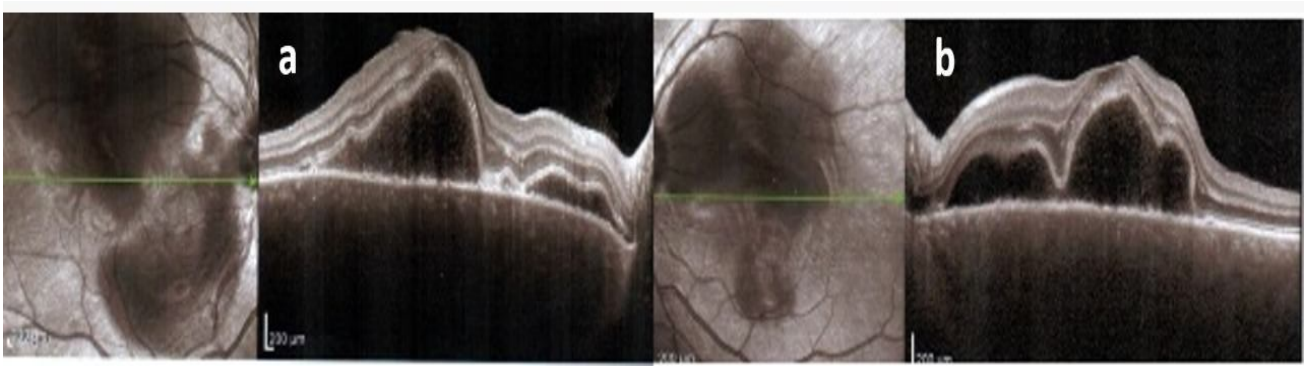


Figure (1): Baseline OCT of 18 years old female patient diagnosed with VKH multiple locular serous effusion, marked serous elevation that obscures the choroidal appearance.

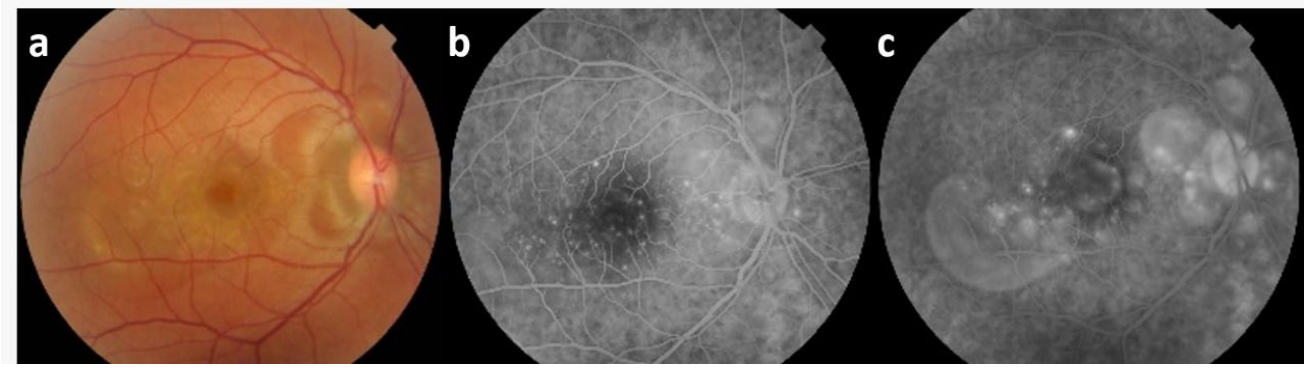


Figure (2): female patient 18 years old presenting with visual impairement in both eyes preceded by flu-like illness, tinnitus and headache. Color photo (a) shows multiple area of serous retinal detachment around the discs and involving the foveae. Early and late frames fluorescein angiography of right eye (b&c) shows multiple pinpoint leaks confirming the diagnosis of Harada disease.

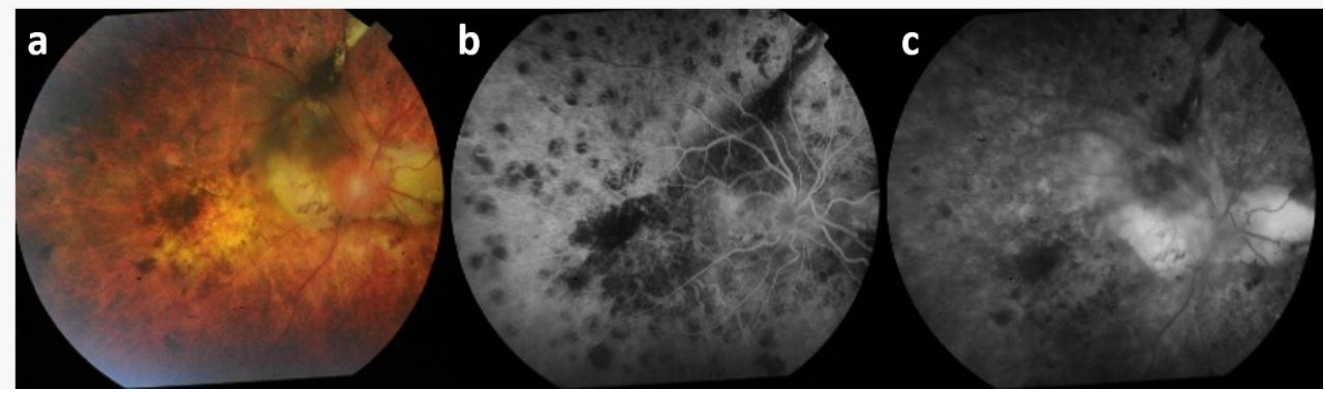
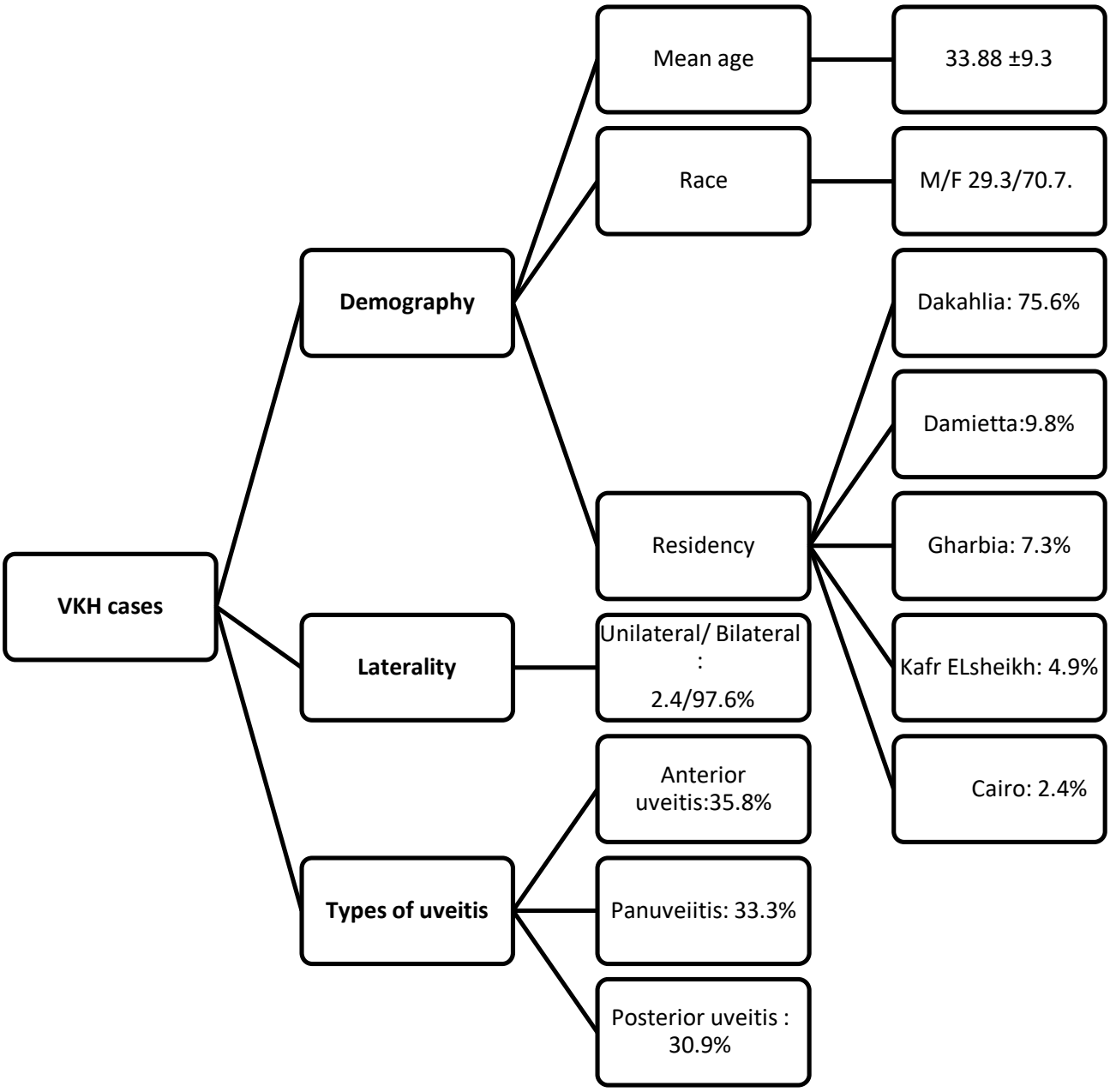
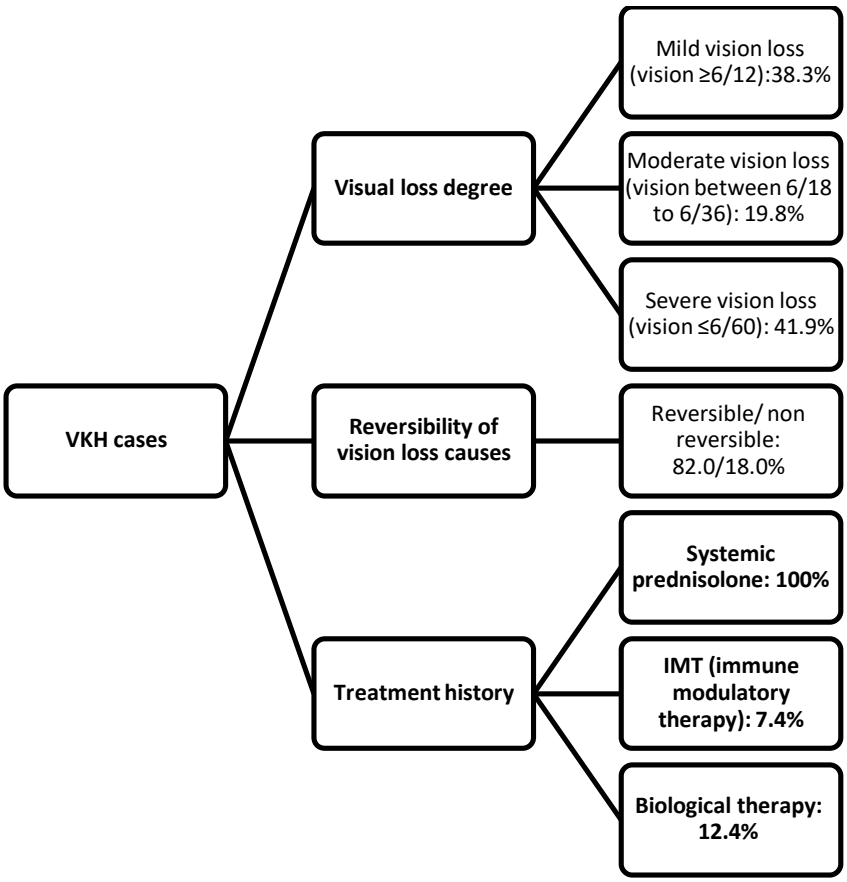


Figure (3): female patient 40 years old. Color photo (a) shows picture of chronic VKH disease with peripapillary and subretinal fibrosis. Early and late frames fluorescein angiography of right eye (b&c) show area of early blocked fluorescence corresponding to scarring and late peripapillary hyperfluorescence due to staining.



Schematic diagram (1) illustrates demography, laterality and types of uveitis in VKH cases.



Schematic diagram (2) illustrates visual loss degree, reversibility of vision loss causes and traetment history of VKH cases.

Discussion :

VKH is a multisystem autoimmune disorder and the diagnosis is established in its complete form on the basis of bilaterality, no history of penetrating ocular trauma or surgery, no other ocular disease, presence of auditory or neurological findings with typical integumentary changes[10].

VKH accounted for 16.1% of all uveitic patients presented to our clinic in MOC during the period of two years, from July 2019 to June 2021. It is the second most prevalent cause of identified uveitic entity after Behcet's illness, according to earlier research.

There was female predominance in the current study which came in agreement with several international surveys such as in Turkey,South india,Spain and Thailand[5,11-13]. Mean age of studied cases 33.88 ±9.3 years .In the same line, Pinar Ozdal et al conducted their study on 32 patients and the average age at the time of presentation was 33.6 ± 10.4 years[12]. Alireza Hedayatfar et al in Iran conducted their study on 88 patients and the average age of the participants was 32.1 ± 12.6 years at the time of the presentation[14].

Regarding laterality, all studied cases were bilateral except one case that presented with unilateral eye affection. Mahendradas, et al in south India in their study found that one case presented with unilateral affection while 34 cases presented with bilateral affection[15]. Also, Abhinav Dhami who presented a case report in 2019 of unilateral atypical case of VKH[16].

With regard to anatomical location of uveitis in studied cases, the current study demonstrated that, anterior uveitis was the most frequent kind of uveitis (35.8%) followed by panuveitis (33.3%) and posterior uveitis (30.9%). On the contrary , one study was carried in South India on 71 eyes revealed that 56 eyes (78.9%) presented with panuveitis while 15 eyes (21.1%) presented with posterior uveitis[15]. Also in Tunisia , study conducted on 49 patients revealed that 51% had panuveitis and 49% had posterior uveitis[17].

The mean BCVA was 0.839±0.7٤LogMAR and 41.9% presented with severe vision loss (≤ 6/60), 38.3% presented with vision better than 6/12 and 19.8% presented with moderate vision loss (6/18 to 6/36). Lodhi, et al in their study found that mean BCVA in acute stage 1.1148±0.56576 and

73.8% (31/42) of cases presented with severe vision loss while in chronic cases mean BCVA 1.3125±0.57140 and 81.3% (13/16) presented with severe vision loss[5].

Regarding slit lamp examination of anterior segment, 16 eyes (19.8%) of studied cases had KPs while (49.4%) of cases had AC cells, (32.1%) had AC flare and (43.2%) of cases presented with posterior synechiae. Mahendradas, et al.[15] found that keratic precipitates was in (49.2%) of cases and iris nodules in (17.1%) with the presence of anterior chamber flare and cells. Other study in India found that (17%) of eyes had keratic precipitates and flare and cells in (17%) of eyes[5].

On posterior segment examination, we found (11.1%) of eyes had vitritis, 43.2% presented with macular oedema as demonstrated with OCT, OCT of 25 eyes revealed multiple neurosensory detachment. (64.2%) of eyes developed sunset glow fundus and (23.5%) of eyes had dalen fuchs nodules. Lodhi et al found that (65%) of eyes had vitreous cells ,(91%) multiple serous detachment, (41%) developed sunset glow fundus and (29%) had dalen fuchs nodules[5]. Other study conducted by Shrestha, et al revealed that posterior segment findings included exudative retinal detachment in 66.7%, and choroiditis in 33.3%. Half of the participants acquired hypopigmented fundus with a sunset glow during the period of the study[18].

Regarding treatment history, all cases had systemic prednisolone, 7.4% had IMT (Azathioprine &Methotrexate) and concerning biological therapy, 12.4% of cases received it. This agreed with Shrestha, et al. who proved in their study that a satisfactory visual outcome was achieved by combining immunomodulatory treatment with tapering systemic and topical corticosteroid administration[18]. Yang, et al proved that in most Chinese VKH patients, a lower dose of corticosteroids mixed with immunosuppressive drugs successfully controlled intraocular inflammation and got better visual acuity[19]. Couto, et al in their study found that Adalimumab medication is an effective and safe alternative to oral corticosteroids and traditional immunosuppressive therapy[20].

47 cases have done oct that revealed macular lesions as macular oedema (35/47; 74.5%) and neurosensory detachment (NSD) (25/47; 53.2%). Li et al have demonstrated that subretinal fluid and serous retinal detachment appears in SD-OCT of all studied eyes , with highly reflective signals in detached area[21].

FFA performed in 24 patients showed multiple hyperfluorescent pinpoint leaks (multiple NSD) (11/24; 45.8.7%). Rao et al, in their multiethnic diverse study, reported one or more angiographic findings (choroidal delay, multifocal leaks, subretinal pooling of dye) in 83% of VKH cases[22].

CONCLUSION

VKH-related uveitis is more common in the female gender in Egypt. VKH is a common cause of bilateral vision loss with a favourable visual outcome if intensive therapy with systemic steroids is initiated early. In addition, early management of cases of unilateral VKH prevents disease process in the other eye.

Abbreviations:

AC: anterior chamber; BCVA: best-corrected visual acuity; ERM: epiretinal membrane; IMT: immunomodulatory therapy; IOP: intraocular pressure; KPs: keratic precipitates; LogMAR: Logarithm of the Minimum Angle of Resolution; MOC: Mansoura Ophthalmic Center; NSD: neurosensory detachement; RD: retinal detachement; VKH: Vogt-Koyanagi-Harada.

Consent for publication: Not applicable.

Availability of data and materials: All the data supporting our findings is contained within the manuscript.

Competing interests: The authors declare that there is no conflict of interest in the current research work.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial or not for profit sectors.

Authors' contributions: The work presented here was carried out in collaboration between all authors. All authors have contributed to, seen and approved the manuscript.

Ethics approval and consent to participate:

The study was approved, prior to initiation, by Institutional Research Board (IRB), Faculty of medicine, Mansoura University following the tenets of the Declaration of Helsinki. Written informed consent was obtained from each

study participant, prior to clinical examination and data collection. Information was kept confidential throughout the study.

Acknowledgments:

None

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