International Journal of Medical and Health Research
ISSN: 2454-9142; Impact Factor: RJIF 5.54
Received: 23-12-2019; Accepted: 24-01-2020
www.medicalsciencejournal.com
Volume 6; Issue 2; February 2020; Page No. 86-89

Ocular manifestation in patients with chronic kidney disease- A hospital based study

Sunita Chaudhary[1*], Ashok Kumar Bairwa[2]

[1] Junior Resident, Department of Ophthalmology, Ravindra Nath Tagore medical college and hospital, Udaipur, Rajasthan, India

[2] Senior Head and unit head, Department of Ophthalmology, Ravindra Nath Tagore medical college and hospital, Udaipur, Rajasthan, India

Abstract

Aims and objectives: to study the occurrence of various ocular manifestations exhibited by patients with Chronic Kidney Disease patients.

Material and methods: A Cross Sectionalstudy was conducted from August 2018 to July 2019. Patients diagnosed with chronic kidney disease were involved in the study.

Results: The most common sign was macular edema which was found in 6 eyes. Other common findings in the macula were age related macular degeneration changes and clinically significant macular edema in diabetic patients. PED, subretinal precipitates and macular hole

Conclusion: Ocular findings that were present more in stage IV & stage V grades of CKD were cataract, lid edema, conjunctival pallor, hypertensive retinopathy, diabetic retinopathy, macular edema and CSME.

Keywords: chronic kidney disease, cataract, retinopathy

Introduction

Chronic kidney disease (CKD) is a worldwide health problem. There is a rising incidence of renal failure due to chronic kidney disease and this phenomenon is common in both the developed and under developed countries. There is a significant mortality and morbidity associated with this condition and it drastically reduces the quality of the patient's life [1].

Normal functions of the kidneys can be affected by a variety of diseases and medical conditions. These cause a reduction in GFR, metabolic imbalances and retention of harmful waste products. A majority of patients progress to end stage kidney disease and may require dialysis or renal transplantation [2].

Chronic kidney disease leads to a lot of systemic effects that affects a variety of systems in the body [3]. The eye also shows changes due to long standing kidney disease [4]. Some systemic diseases such as diabetes, hypertension and auto immune disorders affect the kidneys as well as the eye. Ocular manifestations may arise as a result of the primary diseases causing renal failure or as a result of the secondary effects of renal failure itself.[3] It is thus very difficult to ascertain whether the systemic effects are due to the disease which caused the renal failure or secondary to the changes caused by the kidney disease unless the patient is monitored continuously throughout the course of the disease [5].

The aim of the study was to conduct a thorough ocular examination and to study the occurrence of various ocular manifestations exhibited by patients with Chronic Kidney Disease and to analyse the findings.

Material and methods

Study Design and Duration

It was a Cross Sectional, Descriptive, Non interventional, Hospital based study. The period of study was 12 months, from August 2018 to July 2019.

Source of Data

Patients presenting to Department of Nephrology, RNT Medical College diagnosed with Chronic Kidney Disease and also referred case from Nephrology ward were examined for ocular manifestations at the Department of Ophthalmology, RNT Medical College, Udaipur.

Sample Size

Sampling technique was consecutive and 50 patients (100 eyes) were enrolled in this study. Importance of ocular evaluation was explained to the patients. Evaluation procedures were explained and an informed consent was obtained. After obtaining consent of the 50 enrolled patients were examined thoroughly. Results of blood and urine investigations were collected.

The following ocular evaluation was conducted

1. Relevant ocular history
2. Visual acuity
3. Detailed slit lamp examination of anterior segment
4. Posterior segment evaluated with direct and indirect ophthalmoscope and Slit lamp biomicroscopy using 78D.
5. Posterior segment evaluates with optical coherence tomography was done whenever indicated.
6. Intraocular pressure was measured with Non contract tonometer.
7. Visual field analysis using Humphrey perimeter, B scan ultra-sonography wherever indicated.

Inclusion criteria

1. All stages of chronic kidney disease.
2. Renal transplant recipients.
3. Duration of renal disease for more than 3 months
4. Age group between 20 years to 70 years.

Exclusion criteria

1. Cases with renal disease of unknown etiology
2. Cases with acute fulminant disease
3. Cases with known pre-existing ocular disease

Statistical analysis

The results thus obtained were tabulated and analysed. Statistical analysis was done using the chi-square test and SPSS software version 20.

Observations

The age distribution in the study group was more or less even with the patients in the age group 30 – 39 slightly more than the rest of the cohort.

Male patients formed 76% of the total patients in the study group. The average male: female ratio was 3.16: 1.

The study group consisted of 6 patients with Stage I disease, 8 patients with Stage II disease, 10 patients with Stage III disease, 11 patients

Ocular Symptoms in Patients with CKD

With regards to the ocular complaints in patients screened, 54% of patients had no ocular complaints and only 46% complained of some form of ocular discomfort.78.26% of patients with ocular complaints, had defective vision, 13.04% of patients had ocular irritation, 4.35% of patients had pain and redness each. Most of the patients with ocular complaints were having their eyes checked for the first time which showed the lack of awareness about the potential ocular complications in CKD.

Table 1: Best corrected visual acuity

BCVA	Stage I	Stage II	Stage III	Stage IV	Stage V	Total Eyes	Percentage
>/=6/18	6	11	14	16	20	67	67
6/24-6/60	4	2	4	3	6	19	19
<<6/60	2	3	2	3	4	14	14
Total	12	16	20	22	30	100	100

P value=<0.05 (NS)

With 67% of the total patients enrolled were with vision 6/18 or better. In this study, according to WHO criteria, 19% were visually impaired (6/24 – 6/60) and 14% were in the category of legally blind (vision <6/60). Patients with visual acuity less than 6/60 were significant with p value<0.05.

Table 2: Anterior Segment Findings in Different Stages of CKD

Anterior segment findings	Stage I	Stage II	Stage III	Stage IV	Stage V	Total Eyes	Percentage
Conjunctival Pallor	6	4	2	4	4	20	25
Lid Edema	0	2	4	2	2	10	12
Pingecula	1	0	0	1	1	3	3.25
Catract	2	5	8	11	16	42	52.5
EOM Restriction	0	0	0	0	1	1	1.25
Proptosis	0	0	0	0	1	1	1.25
Band Shaped Keratopathy	0	0	2	1	0	3	3.75
Total	9	11	16	19	25	80	100

Out of 100 eyes, 80 eyes showed changes in the anterior segment. 52.5% of eyes had cataract, 12.5% of eyes showed lid edema and 25% of eyes had conjunctival pallor. The other ocular findings that were noticed were Band Shaped Keratopathy (BSK), defective extraocular movements (EOM) and pingecula. When the incidence of these symptoms in different stages of Chronic Kidney Disease was studied it was found that cataract was found in 15 eyes of patients with end stage or Stage V renal disease. Stage V group patients also exhibited the most number of anterior segment signs (25 eyes). In patients with stage IV and Stage III renal disease 19 and 16 eyes showed signs.

Cataract in Presenile Patients

An observation of the incidence of cataract in the presenile age group (<=50) was done. This showed that of the 31 patients (62 eyes), 13 eyes had some form of cataract and 5 eyes have undergone cataract extraction with a posterior chamber intraocular lens in place.

Incidence of Ocular Surface Disease in CKD

A reduced Schirmer's value was noted in 17 eyes and was normal in 83 eyes. The incidence of ocular surface disease in this study was found to be in 17%.The presence of ocular surface disease in this study was significant with p value <0.01.

Table 3: Incidence of various Macular Lesions in CKD patients

	Stage I	Stage II	Stage III	Stage IV	Stage V	Total Eyes	Percent
Age-related macular degeneration	2	0	1	0	2	5	29.41
Clinically Significant Macular Edema	0	0	0	0	3	3	17.65
Macular Edema (DM & HT)	0	0	1	1	4	6	35.29
PED	0	1	0	0	0	1	5.88
Sub Retinal Precipitates	0	0	0	1	0	1	5.88
Macular Hole	1	0	0	0	0	1	5.88
Total	3	1	2	2	9	17	100

With 17 eyes from the study group showed changes in the macula. The most common sign was macular edema which

was found in 6 eyes (35.29%). Other common findings in the macula were age related macular degeneration changes and clinically significant macular edema in diabetic patients. PED, subretinal precipitates and macular hole were found 5.88% each.

Table 4: Other Posterior Segment Findings

	Stage I	Stage II	Stage III	Stage IV	Stage V	Total Eyes	Percent
BRVO	0	0	0	1	0	1	16.67
CRAO	0	0	0	0	2	2	33.3
Raised CD Ratio	1	0	0	0	0	1	16.67
Disc Pallor	0	0	1	1	0	2	33.3
Total	1	0	1	2	2	6	100.00

When diabetic and hypertensive retinopathies as well as macular symptoms were excluded there were some posterior segment findings exhibited by 6 eyes from the study group. 2 eyes had disc pallor, 1 eye has a raised CD ratio, 1 eye had BRVO and 2 eyes have CRAO. One patient had raised CD ratio. IOP and fields were normal in both the patients. B scan was done in patients with media opacities did not show any positive findings. Old CRAO was found bilaterally in one patient. The patient was a hypertensive patient and had grade IV hypertensive retinopathy along with findings of old CRAO.

Discussion

Stages of CKD in Study Population

In the current study it was found that majority of patients belonged to Stage V of CKD. In contrast to the current study, Thulasidas and Amin (2018) [6] found that majority of patients i.e. 36 patients belonged to stage II CKD. 51.5% of patients had stage V disease and 24.23% had stage IV disease as per 5-year Cumulative report of Chronic Kidney Disease Registry of India 2015 [7].

Causes of Chronic Kidney Disease

In this study, out of 50 patients 26 patients suffering from Hypertension, 14 patients had both hypertension and diabetes, 4 patients had diabetes and 6 patients were suffering from CKD due to other causes like Glomerulonephritis, Analgesic nephropathy, IgA nephropathy etc.

Hypertension was the single main cause of Chronic Kidney Disease in this study contributing to 52.0%. 28.0% of patients had both diabetes and hypertension. In the study of Thulasidas and Amin (2018)[6] the commonest cause of chronic kidney disease was hypertension.

In the Study of Ocular evaluation in patients with chronic renal failure published in Nepal Medical College Journal in 2008 by BajracharyaL *et al*. [8] the commonest cause of Chronic Kidney disease was hypertension (36.1%).

Ocular Symptoms in Patients with CKD

With regards to the ocular complaints in patients screened, 54% of patients had no ocular complaints and only 46% complained of some form of ocular discomfort.78.26 % of patients with ocular complaints, had defective vision, 13.04% of patients had ocular irritation, and 4.35% of patients had pain and redness each.

In the study done by Easterbrook and Mortimer, [9] published in the British journal of Ophthalmology (1970), all patients had excellent visual acuity. Whereas BajracharyaL *et al*. [8] study of ocular evaluation in patients with chronic renal failure published in Nepal Medical College Journal in 2008 claimed that 62% of patients had defective vision and 29% had ocular irritation.

Best Corrected Visual Acuity

67% of the total patients enrolled were with vision 6/18 or better. In this study, according to WHO criteria, 19% were visually impaired (6/24 – 6/60) and 14% were in the category of legally blind (vision <6/60).

This finding is comparable to the Study of Ocular evaluation in patients with chronic renal failure published in Nepal Medical College Journal in 2008 by Bajracharya L *et al*. [8] which showed that 76.6% of patients had good vision and patients with impaired vision were 11.7% and those who were legally blind were 11.7%.

Incidence of Ocular Surface Disease in CKD

A reduced Schirmer's value was noted in 17 eyes and was normal in 83 eyes. The incidence of ocular surface disease in this study was found to be in 17%.In the study of Ocular evaluation in patients with chronic renal failure published in Nepal Medical College Journal in 2008 byBajracharyaL *et al*.[8] the presence of dry eye was not a significant finding as only 7.5 % of the Chronic Kidney Disease patients had dry eye as compared to 27% in this study.

Incidence of hypertensive retinopathy in CKD

In this study, 40 (80 eyes) patients with hypertension, 43 eyes showed hypertensive changes. 19 eyes had Grade III retinopathy making it the most common hypertensive retinopathy. Higher grades of hypertensive retinopathy was found in stages of CKD i.e. 12 eyes in stage IV and 12eyes in stage V. 43 eyes out of 100 under study showed hypertensive retinopathy.

In the study by Thulasidas and Amin (2018) [6], 142 patients had hypertensive retinopathy and retinopathy was more common in patients in stage IV and Stage V disease which is comparable to this study.

Incidence of Diabetic Retinopathy in CKD

In the study it was found that severe NPDR was the most common stage of diabetic retinopathy which was found in 8 eyes. Second most common diabetic retinopathy was Very Severe NPDR which was found in 6 patients and the third most common is moderate NPDR which was found in 5 eyes. Clinically significant macular edema was present in 6 eyes in various grades of Diabetic retinopathy. All of them belonged to stage V CKD. In the Wisconsin Epidemiologic study of Diabetic Retinopathy (WESDR) [10] the presence of gross proteinuria suggestive of CKD was associated with increased risk of developing Diabetic Macular Edema so also in this study most of the patients with clinically significant macular edema belonged to advanced kidney disease group. Thulasidas and Amin (2018) [6] found that majority of eyes are having high risk NPDR.

Conclusion

In the light of the current study it was found that CKD occurs as a result of multiple systemic diseases. CKD affects different parts of the body including the eye. As a conclusion of the study it was found that ocular pathology is the most common among the patients suffering from chronic kidney diseases. Defective vision was found to be the most common

symptom of CKD. Other symptoms of CKD include pain, redness and irritation in the eye. Most of the patients having complaints of blurring of vision were examined for the first time indicating the lack of knowledge about the potential ocular complications. Significant visual loss was due to cataract followed by Proliferative Diabetic retinopathy and macular edema.

Ocular findings that were present more in stage IV & stage V grades of CKD were cataract, lid edema, conjunctival pallor, hypertensive retinopathy, diabetic retinopathy, macular edema and CSME.

References

1. National Kidney Foundation. About Chronic Kidney Disease: A Guide for Patients 2014 [cited on 23rd Dec 2019]. Available from: https://www.kidney.org/sites/default/files/11-50-0160_patientguideCKD.pdf
2. Anna M. Chronic Kidney Disease 2018 [cited on 23rd Dec 2019]. Available from: https://www.msdmanuals.com/ professional/ genitourinary-disorders/chronic-kidney-disease/chronic-kidney-disease.
3. Sanyaolu A, *et al*. Epidemiology and management of chronic renal failure: a global public health problem. Biostatistics and Epidemiology International Journal. 2018; 1(1):11-16.
4. Kazancioglu R. Risk factors for chronic kidney disease: an update. Kidney International Supplements. 2013; 3(4):368-371.
5. Johns KJ. Ocular Manifestations of Systemic Disease. American Academy of Ophthalmology, 2009.
6. Thuasidas M, Amin, H. Ocular Evaluation in Patients with Chronic Kidney Disease- A Hospital Based Study. Open Access Journal of Ophthalmology. 2018; 3(5):2-9.
7. 5 year Cummulative Report Ckd Registry Of India, Indian Society Of Nephrology: Presented During: 41 Annual Conference of ISN (Trivandrum, December 2nd–5th 2015).
8. Bajracharya L, Shah DN, Raut KB, Koirala S. Ocular evaluation in patients with chronic renal failure – a hospital based study – Nepal Medical college journal. 2008: 10(4):209-214.
9. Easterbrook M, Mortimer CB. Ocular signs in chronic renal failure – Brit. J. Ophthalmology. 1970; 54:724.
10. The Wisconsin Epidemiologic Study of Diabetic Retinopathy published in Ophthalmology 2009; 116(3):497-503.
11. Hussein HS, Ibrahim NA. Impact of valsartan on some renal function parameters in hypertensive patients. Age (Year). 2019;43:7-4.