

Eye Findings in Chronic Renal Failure Patients Undergoing Hemodialysis

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ABSTRACT

Introduction: Chronic renal failure is a condition, which is irreversible and requires dialysis or renal transplantation for survival of the patient. It involves each organ system of the body. Study was done with the aim to evaluate the ocular findings in patients with chronic renal failure (CRF) undergoing haemodialysis (HD).

Material and methods: This study was conducted in Gandhi Hospital, Hyderabad over a period of 12 months i.e. from 12/03/2015 - 5/03/2016. Total 64 patients with chronic renal failure undergoing haemodialysis (23 females and 41 males) aged 22- 65 years (mean age of 43) were examined. Complete ocular examination with visual acuity, IOP, biomicroscopic examination and funduscopy and fundus photography was done.

Results: Visual acuity ranging from 6/6 to perception of light was found in both the eyes. IOP was between 15 – 20 mm Hg in both the eyes. Pterygium was found in 9 (14%) patients, pingecula in 2 patients (3%), conjunctival congestion in 4 patients (6%) and cataracts in 24 patients (38%). Hypertensive Retinopathy was found in 28 patients (44%) of various stages ranging from stage 1-4 of Keith Wegener's classification and BRVO in 1(2%) patient. Diabetic retinopathy was found in 20 patients (31%), 13 with NPDR (20%), and PDR in 4 patients (6%), diabetic maculopathy in 3 patients (5%). Glaucomatous optic atrophy in 2 patients (3%).

Conclusions: Chronic kidney disease is a progressive disease and goes undetected and undiagnosed until disease is advanced. Diabetes and Hypertension are the leading causes for renal failure. Most common vision threatening problems in CRF are retinopathy and cataract. Hence it is mandatory to screen all the patients with renal failure to prevent loss of vision.

Keywords: Chronic renal failure, retinopathy, maculopathy and optic atrophy.

INTRODUCTION

Chronic renal disease, or chronic kidney failure, is a slow progressive loss of kidney function over a period of several years. Chronic kidney disease goes undetected and undiagnosed until the disease is well advanced and kidney failure occurs. As kidney failure advances and the organs function are seriously impaired, the patient will not survive without dialysis or a kidney transplant. The study of ocular findings in CRF patients undergoing hemodialysis¹ can reduce the ocular morbidity.

The following chronic diseases can result in progressive renal damage:

1. **Diabetes**
2. **Hypertension**
3. **Kidney diseases-** Polycystic kidney, pyelonephritis or glomerulonephritis, renal stones, renal arterial stenosis and tumours.
4. **Certain toxins-** Certain solvents such as carbon tetrachloride, and lead (and lead-based paint, pipes, and

soldering materials) are toxic to the kidneys. Some types of jewellery have toxins which can lead to chronic kidney failure.

5. **Systemic lupus erythematosus**
6. **Malaria and yellow fever**
7. **Wegener's Granulomatosis**
8. **Drugs -** Overuse of NSAIDs, such as aspirin and brufen can cause renal failure

GFR refers to how many milliliters (ml) of waste the kidneys are able to filter per minute. Normal kidneys can filter waste of 90 ml – 120 ml / minute. GFR rate can give an estimate of the progression of the kidney disease. In ESRD the patient requires dialysis or renal transplantation. Dialysis is a process where the blood moves across the membranes in the dialyser that filters the waste and excess water and again returned to the patient vein.

Some of the most common eye problems that occur in CKD patients

Anterior segment: Lid oedema, conjunctival pallor; and xanthasma due to increased serum lipids. Corneal and conjunctival calcification due to secondary hyperparathyroidism. Cohen Etal explained the association of pingecula with CRF. Its due to degenerative changes in the conjunctiva in CRF.² Inflammatory reactions of conjunctiva and episclera due to marked rise in serum calcium.³⁻⁵ Cataract due to metabolic changes and calcium deposits in the lens.

Posterior segment: Retinopathy, CRVO, BRVO, CRAO, disc oedema and glaucomatous optic atrophy were noted in CRF patients. Retinopathy is a condition where changes in retinal blood vessels causes bleeding and distort vision. Retinopathy is often asymptomatic in its early stage. Delay in diagnosis can result in significant loss of vision. Hypertensive retinopathy changes can be severe in CRF. The fundus findings can reflect the efficacy of antihypertensive drugs. Thus the retina findings may be of help to monitor status of blood pressure control.⁶ The condition of the eye reflects the control of the blood sugar levels and in turn the progress of the disease. This study shows the ocular status and complications associated with chronic renal failure.⁷⁻¹⁰ Schmechel H Etal studied the frequency of retinopathy in diabetic nephropathy in patients treated with insulin.¹¹ Diabetic retinopathy worsens with reduced renal function and poor control of hypertension.^{12,13} It is intended to

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highlight the importance of screening patients for any potential visual threat, so that necessary treatment or advice can be given before they become irreversibly visually impaired.

Glaucoma: Hypertension and diabetes are common risk factor for glaucoma.

Symptoms of blurring or decrease of vision, floaters or flashing lights should alert the physician for ophthalmologist referral.

So the present study was done with the aim to evaluate the ocular findings in patients with chronic renal failure (CRF) undergoing haemodialysis (HD).

MATERIAL AND METHODS

This study was conducted in Gandhi medical college/ Gandhi Hospital, Hyderabad over a period of 12 months i.e. from 12/03/2015 - 5/03/2016. This is a cross sectional, non-interventional, hospital based study. Total 64 patients referred from nephrology ward with chronic renal failure undergoing haemodialysis were examined. There were 23 females and 41 males; aged between 22- 65 years (mean age of 43). Complete case history of the patient was taken and the laboratory data was noted.

Criteria for selection of patient: Patients with chronic renal failure undergoing haemodialysis.

Inclusion criteria: Patients referred from nephrology unit with CRF undergoing hemodialysis.

Exclusion criteria: Cases of reversible renal failure.

Each patient was subjected to Visual acuity using Snellen's chart, IOP measurement by Goldman's Applanation tonometer, Anterior segment examination by Slit lamp Biomicroscopy, Posterior segment examination by Direct and Indirect ophthalmoscopy, Fundus Photographs were taken.

STATISTICAL ANALYSIS

Microsoft office 2007 was used to make tables. Descriptive statistics including mean and percentage were used to interpret results of the study.

RESULTS

Visual acuity was ranging from 6/6 to perception of light in both the eyes as shown in table-1. IOP was between 15 – 20 mm Hg in both the eyes. Pterygium was found in 9 (14%) patients, pingecula in 2 patients (3%), conjunctival congestion in 4 patients (6%), cataracts in 24 patients (38%).

Fundus examination with direct and indirect ophthalmoscopy revealed Hypertensive Retinopathy changes in 28 patients (44%) from stage 1-4 of Keith Wegener's classification. Diabetic retinopathy was found in 20 patients (31%), 13 with NPDR (20%), and PDR in 4 patients (6%), diabetic maculopathy in 3 patients (5%). BRVO in 1(2%) patient. Glaucomatous optic atrophy was found in 2 patients (3%).

Hypertension was diagnosed in 34 Patients (53%). Hypertensive Retinopathy changes was found in 28 patients out of 34 hypertensive patients (44%). BRVO diagnosed in 1(2%) patient. Diabetes was diagnosed in 28 patients (44%). Diabetic retinopathy was found in 20 patients (31%) out of 28 diabetic patients. 13 patients had mild to moderate NPDR (20%), 4 patients had PDR (6%), 3 patients had diabetic maculopathy (5%). Glaucomatous optic atrophy was found in 2 patients

WHO criteria	Visual Acuity	Number	Percentage
Good Vision	6/6	4	6%
	>6/18	20	31%
Impaired Vision	6/24 to 6/60	12	19%
Legally Blind	<6/60	26	41%
	PL+/-	2	3%
Total eyes		64	100

Table-1: BCVA in the eyes of CRF

Ocular Findings	Number of cases	Percent
Normal	13	20%
Diabetic Retinopathy	20	31%
a)NPDR	13	20%
b)PDR	4	6%
c)Maculopathy	3	5%
HTN Retinopathy	28	44%
Glaucomatous Optic Neuropathy	2	3%
BRVO	1	2%

Table-2: Posterior segment findings in patients with CRF

Cause of visual impairment	Number of cases	Percent
Cataract	24	38%
HTN Retinopathy	28	44%
Diabetic Retinopathy	20	31%
Maculopathy	3	5%
Glaucomatous Optic Neuropathy	2	3%
Others	3	5%

Table-3: Causes for visual impairment in CRF

(3%). Fundus findings in our study were shown in table-2.

DISCUSSION

Conjunctival and corneal calcification which is frequently found in other studies was not found in our study.¹⁴ De Marchi S et al studied the IOP changes during hemodialysis.¹⁵ Significant IOP changes was not recorded compared to other study.³⁻⁹ Thirty-seven percent of the total eyes had visual acuity of 6/18 or more. However, visual acuity is not the only indicator of the ocular condition. Advanced DR and HR, may have good central vision until macula is involved. In this study, hypertensive retinopathy accounts for cause of visual loss in the majority, 28 cases (44%). Cataract was the cause for visual impairment in 24 eyes (38%) as shown in table-3.

The most important and vision threatening findings were in the posterior segment. Forty-four percent of total patients had hypertensive retinopathy. It was more prevalent as the renal disease progressed. The findings correlated well with other studies. Diabetic retinopathy was the cause of visual impairment in 20 cases (31%). In total 31% of diabetic retinopathy, NPDR was seen in 20%, PDR in 6%, maculopathy in 5% of the cases. Glaucomatous optic neuropathy was seen in 2 cases. BRVO was seen in 1 case which was not seen in other studies.¹⁰⁻¹²

CONCLUSION

In conclusion, this study shows the importance of detailed ocular examination in patients with CRF. If the patient has positive history of abnormal renal status, he should be monitored frequently for any visual abnormalities. The patient should be

alerted of the symptoms of visual abnormalities. Patients should be made aware of the ocular complication associated with CRF. Appropriate treatment at appropriate time will prevent loss of vision.

REFERENCES

1. L Bajracharya,1 DN Shah, 2 KB Raut3 and S Koirala4 Ocular evaluation in patients with chronic renal failure - a hospital based study, *Nepal Med Coll J.* 2008;10:209-214.
2. Cohen SL, Gorchein A, Hayward JA et al. Pingueculae an association with renal failure. *Queensland JournalMed.* 1974;43:281-91.
3. Klaassen-Broekema N, van Bijsterveld OP. Red eyes in renal failure. *Brit J Ophthalmol.* 1992;76:268-71.
4. Klaassen-Broekema N, van Bijsterveld OP. The role of serum calcium in the development of the acute red eye in chronic renal failure. *Eur J Ophthalmol.* 1995;5:7-12.
5. Pahor D, Hojs R, Gracner B. Conjunctival and corneal changes in chronic renal failure patients treated with maintenance Hemodialysis. *Ophthalmologica.* 1995;209:14-6.
6. Dahal P. et al., Ocular findings in the chronic renal failure, *Journal of College of Medical Sciences-Nepal,* 2014;10:2.
7. Huynh SC, Kifley A, Strippoli GF, Mitchell P.: Is renal impairment a predictor of the incidence of cataract or cataract surgery? Findings from a population-based study. *Ophthalmology.* 2005;12:293–300.
8. Stibor V, Lachmanova J, Tomasek. Changes in the ocular fundus in patients with chronic kidney failure on regular dialysis therapy. *Cesk Oftalmos.* 1989;45:241-52.
9. Evgrafov Vlu, Mamaeva GG, Bishele NA, Liudina LI.Clinical and epidemiological aspects of diabetic retinopathy and its relationship with diabetic nephropathy. *Vestn Oftalmol.* 1996;112:40-3.
10. Grunwald JE, Alexander J, Maguire M, et al. Prevalence of ocular fundus pathology in patients with chronic kidney disease. *Clinical Journal American Society Nephrology.* 2010;5:867.
11. Schmechel H, Heinrich U. Retinopathy and nephropathy in 772 insulin-treated diabetic patients in relation to the type of diabetes. *Diabetes Metabol.* 1993;19:138-42.
12. Leys AM. Eye fundus of the diabetic patient with nephropathy and hypertensive retinopathy. Macroangiopathic complications. *Bull Soc Belge Ophtalmol.* 1995;256:49-59.
13. Friberg TR, Eller AW. Serous retinal detachment resembling central serous chorioretinopathy following organ transplantation. *Graefes Arch Clin Exp Ophthalmol.* 1990;228:305-9.
14. Michaud PA. Corneal and conjunctival deposits in the eyes of patients treated with periodic haemodialysis: Study of 47 patients. *Klin Monatsbl Augenheilkd.* 1978;172:523-6.
15. De Marchi S, Cecchin E, Tesio F. Intraocular pressure changes during hemodialysis: prevention of excessive dialytic rise and development of severe metabolic acidosis following acetazolamide therapy. *Ren Fail.* 1989;11:117-24.

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