



PREVALENCE OF OCULAR CHANGES IN PATIENTS WITH END STAGE RENAL DISEASE

Ophthalmology

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ABSTRACT

End Stage Renal Disease (ESRD) is stage 5 of chronic kidney disease with GFR < 15 ml/minute.

OBJECTIVES: To measure the prevalence of ocular involvement in ESRD in a tertiary care center in South India.

METHODS: Cross sectional observational study of 200 eyes of 100 ESRD patients.

INCLUSION CRITERIA: ESRD patients aged ≥ 18 years.

EXCLUSION CRITERIA: Patients with preexisting ocular diseases. Detailed ophthalmic examination and statistical analysis were done.

RESULTS: Mean age 56.15 ± 11.47 years. M: F 3.5:1. 90% prevalence of ocular changes in patients with ESRD. 67% had cataract, 79% had hypertensive retinopathy, 57% had diabetic retinopathy and 38% had macular edema.

DISCUSSION: Hypertensive retinopathy was the commonest ocular manifestation and cataract was the commonest cause of defective vision. Irreversible loss of vision was due to diabetic retinopathy aggravated by ESRD.

CONCLUSION: This shows the need for detailed ophthalmic examination even in asymptomatic ESRD patients.

KEYWORDS

ESRD, Macular edema, Hypertensive retinopathy

INTRODUCTION

Ocular abnormalities are common in chronic renal disease. Visual loss can occur from primary cause of renal disease and renal insufficiency and its complications. Most of the kidney disorders rarely directly affect vision or change the anatomical integrity of the eyes, but ocular diseases particularly cataract, microvascular retinal abnormalities like diabetic and hypertensive retinopathies etc. are common in End Stage Renal Disease (ESRD). Many inherited renal diseases also have characteristic retinal features. This is because the inner retina and glomerular filtration barrier share common developmental pathways and structural features [1]. An estimated glomerular filtration rate (eGFR) less than 30 mL/min/1.73 m² was associated with a three times higher risk for retinopathy than a normal GFR. [2] End stage Renal Disease is defined as stage 5 of chronic kidney disease with glomerular filtration rate less than 15 mL/minute. [3] Our study aims to highlight the importance of ocular examination in patients with end stage renal disease so that necessary intervention can be done when indicated before irreversible visual impairment occurs.

OBJECTIVE OF THE STUDY

To measure the prevalence of ocular involvement in patients with end stage renal disease (ESRD) attending a tertiary care Center in South India.

MATERIALS AND METHODS

The cross-sectional observational study included 200 eyes of 100 ESRD patients. End stage Renal Disease is defined as stage 5 of chronic kidney disease with glomerular filtration rate less than 15 mL/minute [3]

INCLUSION CRITERIA: Patients with ESRD aged 18 years and above.

EXCLUSION CRITERIA: Patients with preexisting ocular diseases were excluded from study. Selected patients were evaluated at the Department of ophthalmology, Govt. Medical College, Thrissur from January 2015 to June 2016.

All patients with ESRD underwent complete ophthalmic examination including review of medical history, visual acuity using Snellen's chart for distance vision and Jaeger's chart for near vision, slit lamp examination, intraocular pressure measurement by Goldmann Applanation Tonometer, dilated fundus examination by 90D lens and indirect ophthalmoscopy. Diabetic retinopathy changes were graded

by ETDRS classification and Hypertensive retinopathy by Keith & Wagner classification.

Statistical analysis was done with MS Excel and Epi Info software. The frequency and percentage of all relevant variables were calculated.

RESULTS

200 eyes of 100 patients were included in this study of which 78% were males. Age of patients in our study ranged from 21 to 77 years with mean age of 56.15 ± 11.47 years (chart 1).

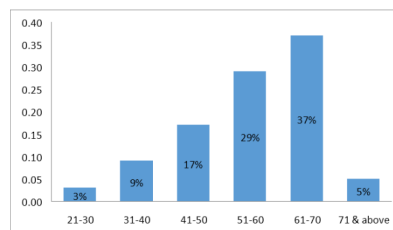


Chart-1 Age distribution for end stage renal disease patients

Patients included in this study had significant association with diabetes (71%), hypertension (81%) hypercholesterolemia (12%). Only 5% patients were not having any systemic disease (chart 2).

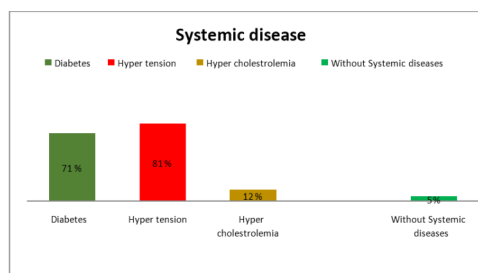


Chart-2 Association of Systemic disease in ESRD patients

Majority of patients did not have any ocular complaints. When specifically asked for ocular complaints 25% had defective vision and 12% had foreign body sensation. Out of 200 eyes of 100 patients, 10% had 6/6 vision, 68% had 6/9 – 6/36 vision and 21 % had 6/60 to PL+ vision. One patient had no perception of light in both eyes.

Intra ocular pressure was normal in 98% of patients. 2 patients had Ocular Hypertension. 67% had cataract. 30 % had clear lens and 3% were pseudo phakic. Vitreous hemorrhage was present in 12%. Pallor of the disc was noted in one and bilateral disc edema seen in 2 patients. Among 200 eyes, diabetic retinopathy changes were noted in 57% (chart 3).

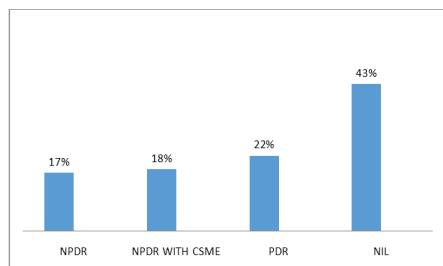


Chart 3: Diabetic Retinopathy changes in ESRD Patients

Hypertensive retinopathy changes were noted in 79%. 15% were in stage 1, 56% in stage 2, 6% in stage 3 and 2% were in stage 4 by Keith - Wagener classification.

Tractional retinal detachment was noted in 5%. Macular edema was present in 38%. 18% had clinically significant macular edema (CSME).

DISCUSSION

Several ocular changes have been identified in patients with end stage renal disease. Renal microvascular pathology plays an important role in the development of renal insufficiency which requires invasive procedures for diagnosis. The retinal vasculature can be observed noninvasively by ophthalmoscopic examination. The renal and retinal vascular changes run parallel with each other. This offers a unique opportunity to explore the association between systemic microvascular disease and renal function by retinal examination. Studies have shown correlations between retinopathy and nephropathy changes in diabetes mellitus and systemic hypertension, and in individuals without these two conditions.^[4]

In this cross-sectional study majority of the patients were in 61-70 years age group with mean age of 56.15 $\pm$ 11.47 years. The median age of patient at the time of initiation of hemodialysis was 64.4 years in USRDS study^[5].

In our study, the male to female ratio was 3.5:1. The sex ratio according to worldwide data is of 2.3:1. The reason for this could be faster deterioration of kidney function in males^[6].

Majority of our patients did not have any ocular complaints. When specifically asked for ocular complaints 25% had defective vision and 12% had foreign body sensation.

According to Dahal P et al study, 68 % patients presented with defective vision and 32 % with foreign body sensation⁸. This disparity may be due to the fact that our patients belonging to a low socioeconomic status were bogged down by their renal condition and were not paying attention to their ocular problems.

Visual acuity was better than 6/18 in 50% of patients in our study. According Dahal P et al study visual acuity was > than 6/18 in 64.33% of patients.

However, visual acuity is not the only indicator of ocular status because even in severe form of diabetes and hypertension there could be good central vision if the macula is healthy⁸. Our results show that there is 90% prevalence of ocular changes in patients with ESRD. Hypertensive retinopathy (79%) was the commonest ocular manifestation in our study. The important causes of irreversible loss of vision were due to ocular manifestation of diabetes aggravated by ESRD. Cataract was the main cause of visual loss in 67% cases. This was similar to other study where 60% of patients had cataract. However irreversible causes for visual loss were mostly found in the posterior segment. CSME caused visual impairment in 18% of cases. Vitreous hemorrhage was noted in 12 % of patients. Disc pallor was observed in 1% and disc edema in 2% of patients. This is comparable with the study by Mary *et al* which showed Disc pallor in 5% and

vitreous hemorrhages in 4%^[10].

Prevalence of retinopathy in hypertensive patients was 39.9% according to the study by Besharati M R et al^[11]. 79% of our patients with ESRD showed features of hypertensive retinopathy of which 64% had moderate to severe changes. Branch retinal vein occlusion was observed in 3% as a complication of hypertension. In India, hypertensive retinopathy and non-proliferative diabetic retinopathy are the most common pathologies as reported by Panda^[12]. In a hospital-based study conducted by Bhajracharya^[6]

et al Hypertensive retinopathy was present in 56 out of total 119 cases (47.1%).

In India, the prevalence rates of diabetic retinopathy in NIDDM patients have been reported to range from 17.6% to 37%.^[13] In our study the prevalence rate was 57% which can be attributed to increased prevalence of diabetes mellitus in Kerala.^[14] Diabetic retinopathy was also more common and more severe in renal failure (Fig 1).

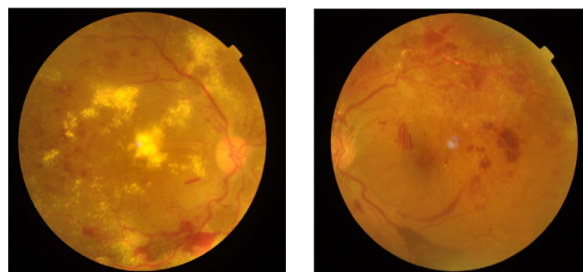


Fig. 1. Diabetic retinopathy in a 52-year-old patient with longstanding diabetes and end-stage renal disease. RE showing NPDR with CSME & LE showing PDR. Note optic disc and retinal new vessels, diffuse retinal edema, CSME and numerous hemorrhages

The increased severity of retinal complications in diabetic renal failure emphasizes the need for regular monitoring because the retinopathy is asymptomatic, may progress rapidly if untreated, and visual loss can be prevented or limited with treatment. New vessels on the disc did not cause early vision loss but later on can lead to sudden deterioration in vision. The presence of a diabetic retinopathy is also a marker of increased risk of cardiac disease and death^[15]. D Ji Wong Jung *et al* also mentioned macular edema as the most common cause of poor visual acuity in diabetics which gets exaggerated in renal failure and is not improved after hemodialysis^[16].

CONCLUSION

Our results demonstrates high prevalence of retinal pathology in ESRD suggesting shared causative pathways between kidney and retinal disease. It is necessary to prevent ocular pathology because every deterioration in visual system can have great implication in everyday life and social ability of patients. Significant percentage of asymptomatic patients had undetected vision threatening complications like macular edema and proliferative diabetic retinopathy which were detected only by detailed ocular examination. Early recognition, monitoring and intervention will result in a better visual outcome and quality of life for ESRD patients.

LIMITATION OF THE STUDY: Our study could not include ESRD due to systemic autoimmune disease like systemic lupus erythematosus, polyarteritis nodosa, Wegener's granulomatosis etc. as such patients were unavailable during the period of study.

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