Ocular changes in patients on maintenance hemodialysis

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ABSTRACT

BACKGROUND*:*
Patients with end-stage renal disease (ESRD) are at risk for development of eye disease; in the conjunctivae, cornea, retina, and macula, related to the comorbid conditions as well as to the unique effects of hemodialysis and the uremic state.
We performed a cross sectional study to document the frequency of ocular changes in patients of end stage renal disease (ESRD) on maintenance hemodialysis.

METHODOLOGY:
Patients with chronic kidney disease on hemodialysis for more than 6 months were enrolled in the study. Visual acuity was done at bedside with snellen chart at 6 meter distance. Torch light, slit lamp and direct ophthalmoscopy was also done using hand held direct ophthalmoscope. The findings were documented by the ophthalmology consultant.

RESULTS
In our study, out of 72 cases of end stage renal disease, 26.39%(n=19) were between 18-50 years of age while 73.61% (n=53) were between 51-85 years of age, mean+sd was calculated as 57.03+9.4 years, 56.94% (n=41) were male and 43.06% (n=31) were females, frequency of ocular changes in patients of ESRD on hemodialysis was recorded as 45.83% (n=33) for hypertensive retinopathy, 4.17%(n=3) had conjunctival calcification and 44.44%(n=32) had cataracts.

CONCLUSION
Frequency of ocular changes is higher among patients of ESRD on hemodialysis in our targeted population, however, some other multi-center studies are required to validate our results.

KEYWORDS: *End stage renal disease, hemodialysis, ocular changes*

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INTRODUCTION

Hemodialysis and uremic state in end stage renal disease (ESRD) patients leads to changes in conjunctiva, cornea, retina and macula. Eye findings associated with end stage renal disease include conjunctival erythema, metastatic calcification, diabetic retinopathy, hypertensive retinopathy, glaucoma, age-related macular degeneration (AMD) and cataracts [1-3].
The most common are hypertensive retinopathy (73.7%), cataract (60.3%), and conjunctive calcification (24.1%) in chronic kidney disease patients on hemodialysis as given by Pakdel F et al[4]. However Bajracharya L et al found different frequencies [hypertensive retinopathy (47.1%), cataract(5.9%)[5]. Diabetic and hypertensive retinopathies are also a frequent finding in end stage renal disease patients owing to the leading causes of ESRD [6-7].
Severity of conjunctival and corneal calcification, which is easily obtained at bedside, acts as an independent predictor for all-cause 1-year mortality in maintenance hemodialysis patients[8].
Current study was done to document the frequency of ocular changes in diagnosed cases of ESRD on hemodialysis since no local data is available.

Materials And Methods:
We conducted a cross sectional study of maintenance hemodialysis patients presenting to hemodialysis unit of nephrology department in Fatima Memorial Hospital, Lahore.

Inclusion Criteria: ESRD patients with Age: 18-85 years and undergoing hemodialysis for more than six months.
Exclusion Criteria: Previous history of eye trauma or previous history of blindness with visual acuity less than 6/60 or pre-existing eye pathology (for example cataract) before the onset of chronic kidney disease (on medical record/history).
Subjects included were given an informed consent form and ensured confidentiality. Demographics (name, age, gender, duration of dialysis) was also noted. Visual acuity was done at bedside with snellen chart at 6 meter distance. Torch light, slit lamp and direct ophthalmoscopy was also done using hand held direct ophthalmoscope (Hiene, Hambueg, Germany). All findings were confirmed by consultant ophthalmologist.

STATISTICAL ANALYSIS:
Sample size of 72 cases was calculated with 95% confidence level, 10% margin of error and taking expected percentage of conjunctive calcification i.e. 24.1% in patients of kidney failure on hemodialysis.
We used SPSS version 20 (Illinois, USA). Mean and standard deviations were calculated for quantitative variables like age and duration of disease. Frequency and percentage was used to present qualitative variables like gender, hypertensive retinopathy, cataract and conjunctival calcification. Data was stratified for age, gender, duration of end stage renal disease, sessions of hemodialysis per month, visual acuity, hypertension and diabetes mellitus to deal with effect modifiers. Chi-square test was also used and P-value ≤ 0.05 was considered significant.

RESULTS
A total of 72 cases fulfilling the inclusion/exclusion criteria were enrolled to document the frequency of ocular changes in patients of ESRD on hemodialysis.
Patient baseline characteristics are shown in **Table 1**.
Frequency of ocular changes in patients of ESRD on hemodialysis was recorded as 45.83%(n=33) for hypertensive retinopathy, 4.17% (n=3) had conjunctival calcification and 44.44% (n=32) had cataracts, Table 2.
The data when assessed according to duration of dialysis, age ranges and gender did not reveal any statistical significance, p>0.05.

Table 1: Baseline characteristics of patients undergoing hemodialysis for 6 months.

Parameters	n (%)
Age	
18-50	19 (26.39)
51-85	53(73.61)
Mean Age Years	57.03± 9.4
Gender	
Male	41(56.94)
Female	31(43.06)
Diabetes (all Type II)	67 (93.05)
Hypertension	69 (95.83)
Mean duration of Hemodialysis (months)	34.56± 18.7

TABLE 2: Frequency of ocular changes in patients of end stage renal disease (ESRD) on hemodialysis(n=72)

Occular changes	N (%)
Diabetic Retinopathy	19(26.3)
Hypertensive retinopathy	33 (45.83)
Conjunctival calcification	3 (4.17)
Cataract	32 (44.44)

DISCUSSION

In our study, out of 72 cases of end stage renal disease, 26.39%(n=19) were between 18-50 years of age while 73.61% (n=53) were between 51-85 years of age, mean age was 57.03+9.4 years, 56.94% (n=41) were male and 43.06% (n=31) were females, frequency of ocular changes in patients of end stage renal disease (ESRD) on hemodialysis was recorded as 45.83%(n=33) for hypertensive retinopathy, 4.17%(n=3) had conjunctival calcification and 44.44%(n=32) had cataracts.

A previous study revealed that the most common are hypertensive retinopathy (73.7%), cataract (60.3%), and conjunctive calcification (24.1%) in chronic kidney disease patients on hemodialysis as given by Pakdel F et al[4]. Our findings are close to our results except the frequency of conjunctive calcification.

On the other hand, Bajracharya L et al found frequencies of hypertensive retinopathy similar to ours and cataract among fewer patients 5.9% [5]. Diabetic and hypertensive retinopathies are commonly seen in diabetic and hypertensive patients. It is also a frequent finding in end stage renal disease patients owing to the leading causes of end stage renal disease are diabetes and hypertension[6-7]. The findings of our study are not in-line with the above study.

Romano Vrabec [10] and others evaluated the ocular findings in patients with chronic kidney disease undergoing hemodialysis, and recorded that hypertensive vascular changes were seen in 44 (68%) patients and in 6 (7%) patients age-related macular degeneration. They had small number of diabetic patient's contrary to our larger population of diabetic patients, still we had only 19(26.3%) diabetic retinopathy changes, suggesting lack of correlation between diabetic retinopathy and nephropathy.

Dahal P and colleagues[11] evaluated the ocular signs in chronic kidney disease among patients with diabetes and hypertension. The commonest cause of CRF were HTN in 41% and diabetes in 32.67% of their 300 CRF cohort. They noted significant visual loss due to various presentations and suggested proper health education could help in decreasing the chances of high frequency of blindness.

Another study[12] evaluated the presence of secondary hyperparathyroidism among maintenance hemodialysis patients and conjunctival and corneal calcification. A positive correlation was noted with CaxPhos product and high i-PTH levels and corneal calcifications. We however, did not collect data regarding calcium, phosphorus and i-PTH levels.

It is clear that different ocular changes with different magnitude of presentation are associated with end stage renal disease. However, frequency of these complications in different regions may be different due to various effect modifiers.

CONCLUSION

In conclusion, frequency of ocular changes is higher among patients of end stage renal disease (ESRD) on hemodialysis in our targeted population. Further multi-center studies including the data in regards to control of hypertension, adequacy of dialysis, calcium, phosphorus and iPTH are required to validate and evaluate the possible causes of ocular findings.

DISCLOSURE

No disclosure declared.

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