

# To Determine Mean Changes in Intraocular Pressure during Hemodialysis in patients of End Stage Kidney Disease

SALMAN MEHMOOD<sup>1</sup>, MUHAMMAD AHMAD<sup>2</sup>, IJAZ NABI<sup>3</sup>, NOUMAN HAMEED SHEIKH<sup>4</sup>, BILAL JAVED<sup>5</sup>, RANA ZAHID HAFEEZ<sup>6</sup>

<sup>1</sup>Senior Registrar Nephrology, Allied Hospital, Faisalabad

<sup>2</sup>Consultant Nephrologist, Allied Hospital, Faisalabad

<sup>3</sup>Assistant professor, Faisalabad Institute of Cardiology, Faisalabad

<sup>4</sup>Senior Registrar Nephrology, DHQ Teaching Hospital/ Medical College, Gujranwala56.

<sup>5</sup>Assistant Prof. Nephrology, Allied Hospital, Faisalabad

<sup>6</sup>Nephrologist, Mustashfa Alnoor, Mecca

Correspondence to Dr. Nouman Hameed Sheikh

## ABSTRACT

**Aim:** To determine mean changes in intraocular pressure (IOP) during hemodialysis (HD) in patients of chronic renal failure

**Study design:** Descriptive case series

**Place and duration of study:** Department of Nephrology, Allied Hospital, Faisalabad, from 15/06/2016 to 15/09/2016

**Methodology:** End stage renal patients meeting the inclusion criteria on hemodialysis were included in the study. Written informed consent was obtained. After taking detailed history and clinical examination, intraocular pressure was measured just before and one hour after the initiation of HD using perkin's hand held tonometer.

**Results:** The mean± SD age of patients was 53.8±8.81. The minimum IOP was 11.20mmHg before hemodialysis and maximum was 16.80mmHg. Mean±SD was 14.08±1.38. Similarly minimum IOP after dialysis was 12 mm Hg and maximum was 19.0mm Hg, with a mean of 15.3. IOP in males before HD was 14.09±1.33. However after dialysis was 15.56±1.7. Thus the change in IOP seen in males was 1.6 ± 0.89 and in females was 14.08±1.46 and after dialysis was 15.13±1.45. Thus the calculated IOP change in females was 1.37±0.98. Chi square value was 2.67. p value observed was 0.263.

**Conclusion:** There is significantly increased IOP during hemodialysis.

**Keywords:** CRF, end-stage renal disease (ESRD), IOP, hemodialysis (HD).

## INTRODUCTION

End stage renal disease is an economic and health problem worldwide. Hemodialysis causes many effects on visual system including rise in IOP. The most widely proposed mechanism for IOP rise during dialysis is reduction in total serum osmolarity. This reduction in serum osmolarity favors net water movement in the direction of aqueous production. As the osmolar gradient intensifies, water flows into the aqueous fluid compartment thus causing increase in IOP.<sup>1</sup>

At the time of HD, IOP elevation may cause injury of optic nerve causing progressive visual loss. Hemodialysis appears to raise the IOP to levels that could exacerbate already existing glaucoma<sup>2</sup>. Numerous factors affecting IOP i.e. smoking, older age, race, H/o myopia, blood pressure, family H/o glaucoma, DM<sup>2</sup>.

The objective of the study was to determine mean changes in intraocular pressure (IOP) during hemodialysis (HD) in patients of chronic renal failure

## METHODOLOGY

This study was carried out in Nephrology Unit, Allied Hospital, Faisalabad after approval of institutional ethical review committee (IERC). End stage renal patients meeting the inclusion criteria on hemodialysis were included in the study. After taking detailed history and clinical examination, IOP was measured just before and one hour after the initiation of hemodialysis using perkin's hand held tonometer.

## RESULTS

The detail of results is given in tables 1,2,3,4,5.

Table1: Intraocular pressure changes of patients

Variables	n	Min.	Max.	Mean	SD
IOP before HD	60	11.20	16.80	14.08	1.38
IOP after HD	60	12.00	19.00	15.34	1.57
Change in IOP	60	0.00	3.30	1.49	0.94

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Table 2: Age distribution

Age	n	%age
≤ 50 years	23	38.3
>50 years	37	61.7
Total	60	100

Table 3: Sex distribution

Gender	n	%age
Male	30	50
Female	30	50
Total	60	100

Table 4: Stratification of mean change in IOP with regards to age

Variable	Age in years		P value
	< 50 (n=23)	>50 (n=37)	
IOP before HD	14.06±1.37	14.09±1.4	0.928
IOP after HD	15.28±1.7	15.38±1.5	0.802
Change in IOP	1.43±0.74	1.52±1.04	0.718

Table 5: Stratification of mean change in IOP with regards to gender

Variable	Gender		P value
	Male (n=30)	Female(n=30)	
IOP before HD	14.1±1.3	14.1±1.46	0.978
IOP after HD	15.6±1.7	15.1±1.45	0.288
Change in IOP	1.6±0.9	1.4±0.98	0.339

Chi-square value = 2.67 p-value = 0.263

## DISCUSSION

In this study, 60 patients of ESRD on HD were included and changes in IOP during dialysis were noted. The IOP before and after hemodialysis did not vary significantly. Jennifer Hu et al<sup>3</sup> studied the effect of HD on IOP and ocular perfusion pressure on 49 patients. There is 3.1mmHg rise in IOP in both eyes. They concluded that among hemodialysis patients rise in intraocular pressure is common problem which favors the results of my study. Tawara A<sup>4</sup> conducted a study on mechanism of IOP elevation during HD. They concluded that mean %age of IOP increased significantly after 90 min. The result of their study also favors the results of my study. Sitprija V<sup>5</sup> conducted a study on IOP changes during artificial kidney therapy. They demonstrated a rise in IOP when the plasma osmolarity was -11 mosm/L/h.

Gafer U et al<sup>6</sup> studied IOP in patients of HD. Low IOP of 11.4 +/- 2.7 and 11.5 +/- 3.1 mm Hg was found in the left and right

eye respectively. Following hemodialysis osmolality, BP and body weight decreased significantly but there is no rise of IOP. The results of this study are not consistent with my study.

Doshiro A<sup>7</sup> conducted a study on IOP change during hemodialysis. IOP significantly decreased after hemodialysis and increased in patients with H/o hemodialysis >12 years. Patients having HD for a long period are mostly showing raised IOP after HD. T. Tokuyama<sup>8</sup> studied colloid osmotic pressure on IOP at the time of HD. The study showed that IOP was inversely correlated with rise in colloid osmotic pressure. This may be due to removal of fluid during HD with no significant change in IOP.

Barbosa CP<sup>9</sup> conducted a study on IOP and ocular perfusion at the time of HD with no significant change in IOP. They also observed that some cases showed lower diastolic perfusion pressure which is a poor prognostic sign patients with H/o glaucoma. Hojs R<sup>10</sup> conducted a study on IOP in CRF patients with HD and found no significant differences in IOP before and after HD.

## CONCLUSION

There is increased IOP significantly at the time of HD.

**Conflict of interest:** Nil

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