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Prevalence of Sensorinueral Hearing Loss among Chronic Kidney Disease Patients Undergoing Dialysis in a Tertiary Care Hospital

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Abstract:-

- ***Introduction:***

Sensorinueral hearing loss has been said to occur in chronic renal failure patients with a prevalence of 20 to 40%[2]. But the exact association of sensorinueral hearing loss and chronic kidney disease is not known.

- ***Aim:***

To determine the prevalence and degree of hearing loss in chronic kidney disease patients on hemodialysis.

- ***Methodology:***

This was a case control study which comprised of 30 adult chronic renal failure patients and 30 controls. Pure tone audiometry was performed on each individual. Prevalence and degree of hearing loss was determined using descriptive statistics. Chi-square test was used to determine association between variables. The differences were considered significant if the *p* value was less than 0.05.

- ***Result:***

This study found that 76.67% chronic kidney disease patients experienced sensorinueral hearing loss. Of the chronic kidney patients with hearing loss, 52.17% patients had bilateral hearing loss. All of these patients experienced mild hearing loss.

- ***Conclusion:***

Mild sensorinueral hearing loss is common in chronic kidney disease patients. It is found that there is no association between the duration of the disease, the number of sessions of hemodialysis and hearing loss in chronic kidney disease patients. High frequency hearing loss is found to be more prevalent.

Keywords:- *Sensorinueral Hearing Loss,Chronic Kidney Disease,Hemodialysis.*

I. INTRODUCTION

Hearing loss is defined as impairment of hearing and its severity may vary from mild to moderate or profound. Sensorineural hearing loss is due to damage to pathway of sound impulses from the hair cells of the inner ear to the auditory nerve and the brain. Chronic kidney disease is defined as glomerular filtration rate less than 60ml/min/1.73 m^2 for 3 months or more irrespective of the cause.

Sensorinueral hearing loss has been said to occur in chronic renal failure patients with a prevalence of 20 to 40%[2] There is similarity in the antigenicity between the basement membrane of glomeruli in kidney and the stria vascularis present in the inner ear. This explains the association of sensorinueral hearing loss occurring in chronic kidney disease patients.[1]Chronic kidney disease might also contribute to sensorineural hearing loss through factors like hemodialysis, uremic neuropathy and ototoxins.[4]Hemodialysis may result in complications such as acute hypotension, reduction in blood osmotic pressure, acute clearance of urea, increased RBC mass , and immunological reaction to dialyzer which can lead to hearing loss.[5]The exact role of haemodialysis in hearing loss is unclear. These studies have produced different results. Some of them say there is contribution to hearing loss in chronic kidney disease, there are other studies which say there is no relation.

The incidence of sensorinueral hearing loss in chronic kidney disease patients exceeds that of age and sex matched controls in normal population, but this has not been clinically evident.So this study focuses on the prevalence of hearing loss in CKD patients and the association between hearing loss and the factors affecting it.

II. AIM

To determine the prevalence and degree of hearing loss in chronic kidney disease patients on hemodialysis.

III. OBJECTIVES

- To determine the prevalence of hearing loss
- To determine the degree of hearing loss
- To identify the association between hearing loss and factors like duration of the disease and number of dialysis sessions

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IV. METHODOLOGY

This was a hospital based case control study conducted in Saveetha Medical College and Hospital, Thandalam. The study comprised of 30 adult chronic renal failure patients, who have undergone at least one session of haemodialysis. 30 controls were also enrolled. All patients were interviewed using a uniform proforma containing information on age, sex, risk factors, duration of the disease and the number of sessions of dialysis. None had history of hearing loss prior to the development of the disease or exposure to excessive noise.

Pure tone audiometry was performed on each individual in a soundproof room by a trained audiologist. Prevalence and degree of hearing loss was determined in the chronic renal failure patients and controls. Written informed consent was obtained from the patients and the controls. Approval of the institute ethics and research committee was obtained prior to the study.

Prevalence and degree of sensorinueral hearing loss was determined using descriptive statistics. Chi-square test was used to determine association between variables. The differences were considered significant if the *p* value was less than 0.05.

V. RESULTS

30 chronic renal failure patients treated with hemodialysis and 30 controls were included in the study. This included 25 females and 35 males , age range was from 20 -60 years, mean of 40.8. The duration of illness was 4 months to 10 years.

Hearing loss was present in 23 out of 30 patients (76.67%) and 10 out of 30 controls (33.33%). All the patients were found to have high frequency hearing loss.

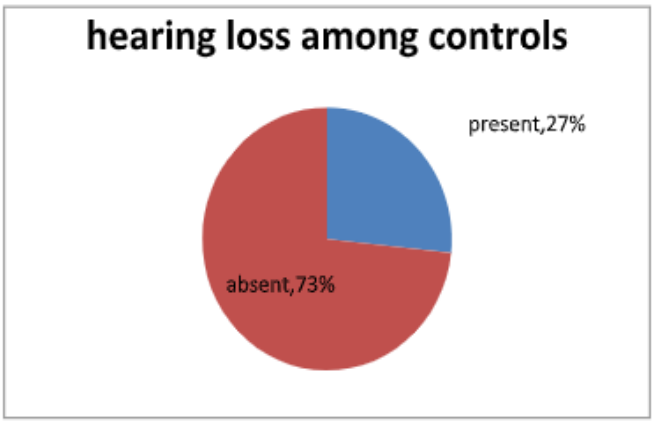

Fig 1

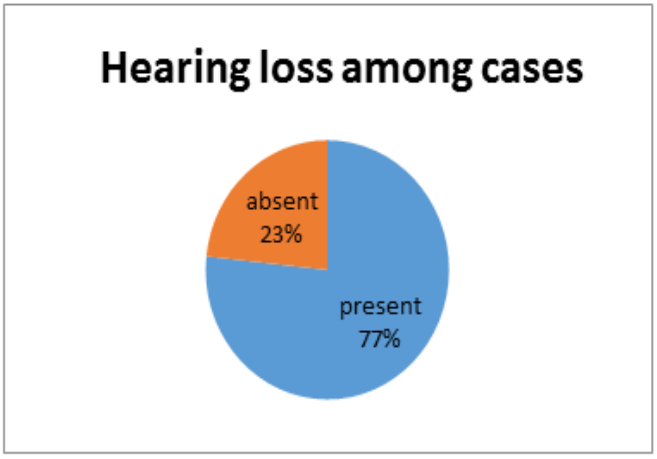

Fig 2

The sensorinueral hearing loss was mild in all the patients. Of the 23 CKD patients with hearing loss 12 had bilateral hearing loss , of the 8 controls with hearing loss 4 had bilateral hearing loss.

Chi square tables showed no association between the duration of the disease and the number of haemodialysis sessions(*p* value was more than 0.05).

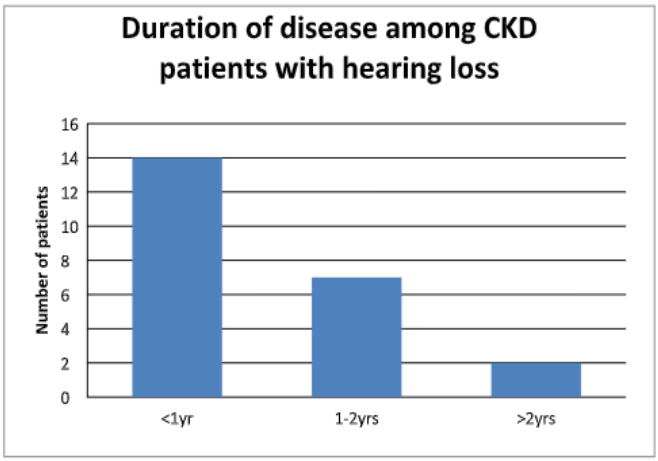

Fig 3

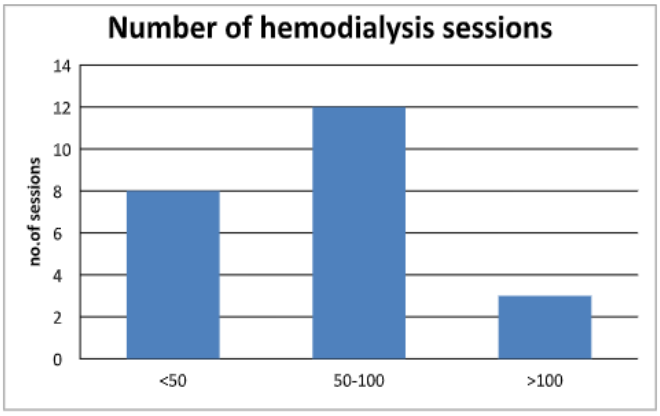

Fig 4

VI. DISCUSSION

Sensorinueral hearing loss results from lesions of the cochlea ,vestibulocochlear nerve or central auditory pathway. It is said that sensorinueral hearing loss is prevalent in chronic kidney disease patients.[2]

WHO classifies hearing loss as mild(26-40 dB),moderate(41-55 dB),moderately severe(56-70dB),severe(71-91 dB) and profound(>90 dB).

This study found that 76.67% of CKD patients on haemodialysis had hearing loss, considerably higher than the normal population. Of the chronic kidney patients with hearing loss 52.17% patients had bilateral hearing loss.

Reddy EK et al found a significant correlation between duration of disease and degree of hearing loss.[2]

Jamaldeen J et al found that 41.7 % chronic kidney disease patients experienced sensorinueral hearing loss,it was mild in majority of the cases. Their study also showed that high frequency hearing loss (77.5%)was the most common hearing impairment among chronic kidney disease patients. It also showed that duration of CKD had no association with hearing loss but showed that CKD patients with hearing loss received significantly fewer haemodialysis sessions compared to those without hearing loss.[1]

Similarly in this study we have found that 76.67% chronic kidney disease patients experienced sensorinueral hearing loss, it was mild in all the cases and that high frequency hearing loss was the most common hearing impairment. This study also showed that duration of disease and number of sessions of dialysis had no association with hearing loss(p>0.05). This is contradictory to the study done by Jamaldeen J et al which found association between number of sessions of dialysis and hearing loss.

VII. CONCLUSION

Mild sensorinueral hearing loss is common in chronic kidney disease patients. It is found that there is no association between the duration of the disease,the number of sessions of hemodialysis and hearing loss in chronic kidney disease patients. High frequency hearing loss is found to be more prevalent. A prospective study is needed to confirm these results.

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