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Original Article

Cognitive impairment in Vestibular dysfunction

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ABSTRACT

The present study was undertaken to observe spatial and verbal memory scores in elderly women with vertigo. 20 elderly females' age of 50-55 years old and vertigo for past 5 years were recruited for the study after written informed consent by convenient sampling. 20 ages matched elderly females without vertigo were selected as control group. Spatial and verbal memory test and MMSE was used to assess cognitive functions. Significant decline in spatial, verbal memory and MMSE scores was observed in vertigo patients when compared with control group. We conclude that, vestibular dysfunction has negative impact on cognitive functions. So, we recommend the clinicians to consider cognitive impairment also while treating vertigo.

Key Words: Cognitive functions, vertigo, vestibular dysfunction.

INTRODUCTION

It was reported that, that vestibular disorders occur in more than 35% of adults aged 40 or older; between the ages of 60 and 69, the prevalence increases to almost 50% and between 70 and 79, it is 69%.[1,2] Earlier studies reported that vestibular system influences memory through hippocampus. In fact, hippocampus place cells responds to vestibular stimulation.[3,4] It was reported that, the interpretation that what appeared to be spatial memory impairment following vestibular damage might be a direct result of oscillopsia, due to VOR deficits, or ataxia, due to VSR deficits.[5] The present study was undertaken to observe cognitive functions in elderly women with vertigo.

MATERIALS AND METHODS

Study design: Observational study

Participants: 20 elderly females' age of 50-55 years old and vertigo for past 5 years were recruited for the study after written informed consent by convenient sampling. 20 ages matched elderly females without vertigo were selected as control group. Unwilling participants and patients with severe complications were excluded from the study. Permission was obtained from the Institutional Ethics Committee of GEMS Hospital.

Lab**oratory setting:** The present study was carried out at GEMS Hospital, Srikakulam, Andhra Pradesh.

Verbal and spatial memory test: Verbal and spatial memory test is a standardized test to assess cognition levels by assessing spatial and verbal memory scores.[6,7]

Mini Mental State Examination (MMSE): It is a tool that can be used to systematically and thoroughly assess mental status. It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30. A score of 23 or lower is indicative of cognitive impairment. The MMSE takes only 5-10 minutes to administer and is therefore practical to use repeatedly and routinely.[8,9,10,11]

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Statistical analysis: Data analysis was done using SPSS version 20.0. All the data were expressed as mean ± standard deviation. The pre and post data were analyzed using paired t-test. P < 0.05 was considered significant.

RESULTS

Results were presented in table no 1. Significant decline in spatial, verbal memory and MMSE scores was observed in vertigo patients when compared with control group**.**

Parameter	Control (n=20)	Vertigo(n=20)	P value
Spatial Memory	4.70±2.41	2.44±1.42	0.025*
Verbal Memory	5.15±2.38	1.93±0.730	0.0001**
MMSE score	23.9±1.36	19.4±1.77	0.0001**

Data was presented in mean ±SD. (* P value<0.05 was significant, **P value<0.01 was significant, ***P value<0.001 was significant).

DISCUSSION

Vestibular dysfunction involves a complex syndrome characterized not only by reflex deficits but also by attention and memory deficits and anxiety disorders.[3] It was reported that, Vestibular lesions may also lead to cognitive deficits, including deficits in attention, learning and memory.[12] Vestibular impairment have demonstrated difficulty in counting backwards by twos and sevens and exhibit deficits in short-term and working memory on standard psychological tests.[13] It was reported that, Vestibular stimulation modulates cognition through its connections with concerned brain structures.[13] In the present study we have observed significant decrease in both spatial and verbal memory and MMSE scores in vertigo patients, when compared with control group. Hence, our study supports earlier studies.

Conclusion

We conclude that, vestibular dysfunction has negative impact on cognitive functions. So, we recommend the clinicians to consider cognitive impairment also while treating vertigo.

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