Original Article

Evaluation of Zinc Levels in Stroke Patients

Zinc Levels in Stroke Patients

Syed Qaiser Hussain Naqvi[1], Shamsuddin Shaikh[2] and Jawaid Hussain Lighari[3]

ABSTRACT

Objective: To evaluate the role of Zinc in patients of stroke.
Study Design: Observational study
Place and Duration of Study: This study was conducted at the Medical Ward and Out Patient's Department of Peoples Medical College Hospital, Nawabshah from January 2016 to December 2016.
Materials and Methods: The current observational study was conducted on 200 cases comprising of 100 control cases and 100 consecutive patients suffering from stroke fulfilling the criteria. The patients were collected from medical ward and out patient's department of Peoples Medical College Hospital as well as private clinic. After taking informed consent, the demographic and clinical data were collected on a proforma designed for the study. Serum Zinc level was evaluated in all cases of both groups and results were tabulated.
Results: Out of 100 cases of stroke, 68 (68%) were male, the mean age of patients was 62 + 16 years, among these 100 cases 73 (73%) having ischemic stroke and 27 (27%) having haemorrhagic stroke. The control group consists of 100 cases of normal healthy population having serum Zinc level in normal range, comprising of 70 males and 30 females with a mean age of 58+14 years. The serum Zinc level was evaluated in all cases of stroke. In ischemic stroke group 34 (46.6%) patients, and in haemorrhagic group 9 (33.3%) cases show serum Zinc level < than 65mcg/dl. The normal serum level (reference range) considered was 65-150 mcg/dl.
Conclusion: A low Zinc level was observed in 43 (43%) of cases, among these majority belongs to ischemic stroke group, suggesting that hypozincemiais a possible contributing factor in patients of stroke.
Key Words: Serum Zinc Level, Hypozincemia, Ischemic Stroke, Hemorrhagic Stroke

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INTRODUCTION

Stroke is a major cause of mortality worldwide especially in developed countries[1]. WHO has estimated that in the year 2002, about 5.5 million peoples died because of stroke and the South East Asian countries shares about 20% of these death[2]. The treatment of stroke is expensive[3] with high mortality or with major or minor morbidity and the disease has a psychological, functional and financial impact not on the family but also on the society[4,5].

A reduction in the incidence of stroke is possible by prevention of various modifiable risk factors[6]. The deficiency of Zinc (Hypozincemia) is one of these modifiable risk factors resulting in stroke[7], the Zinc deficiency results in thickening of blood vessel wall, hypertension, aneurysms, cerebrovascular accidents and other problems of cardiovascular system[8,9].

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The hypozincemiaalso contributes atherosclerosis and increasing the risk of stroke[10,11]. The integrity of the blood brain barrier is contributed by Zinc, protecting the brain from various toxic agents and hazardous foreign compounds[12], so hypozincemia results in injury to neurons and can exaggerates the injury caused by ischemia and metabolic insult[13]. It is also documented that elevated Zinc levels in blood are harmful for health and can result in neuronal death during brain ischemic injury and neuronal apoptosis[14,15].

MATERIALS AND METHODS

The current observational study was conducted during January 2016 to December 2016, on 200 cases comprising of 100 control cases and 100 consecutive patients suffering from stroke.The patients were collected from medical ward and out patient's department of Peoples Medical College Hospital and also private clinic. The inclusion criteria was all male and female patients of age >40 years willing for participation and had sustained stroke confirmed on CT scan. Patients having any neurological disorder, psychiatric illness, haematological disorder, history of head injury, intracranial space occupying lesion were excluded from the study. Patients on Zinc containing nutritional supplement were not recruited.

After taking informed consent, the demographic and clinical data were collected on a proforma designed for

the study. The CT scan of brain was performed in all cases to rule out any comorbidity and to determine the type and extent of the lesion. Serum Zinc level was evaluated in all cases and results were tabulated.

RESULTS

The study was conducted on 200 cases, comprising of 100 cases as control group and 100 cases of stroke, out of which 68 (68%) were male, the mean age of patients was 62 + 16 years (Table.1), among these 100 cases 73 (73%) having ischemic stroke and 27 (27%) having haemorrhagic stroke. The control group consists of 100 cases among normal healthy population having serum Zinc level in normal range, comprising of 70 males and 30 females with a mean age of 58+14 years. The serum Zinc level was evaluated in all cases of stroke. The normal serum level (reference range) considered was 65-150 mcg/dl[16]. In ischemic stroke group 34 (46.6%) patients, and in haemorrhagic group 9 (33.3%) cases show serum Zinc level < than 65mcg/dl.

Table No. I: Serum Zinc Level in Study Population

Group	Total No of Cases		Age (yrs)	Male/ Female n=100	No. of Cases Having Zinc Level > 65mcg/ dl	No. of Cases Having Zinc Level < 65mcg/ dl
Control	100		58+ 14	70/30	100 (100%)	00 (00%)
Ischemic	100	73	62+ 16	68/32	39 (53.4%)	34 (46.6%)
Haemorrhagic		27			18 (66.7%)	09 (33.3%)

DISCUSSION

In this study serum Zinc level was evaluated in 100 cases of stroke patients compared with control. Among these cases of stroke majority were of ischemic attack. The mean age of these patients was 62+16, this finding was in consistent with the results of Toth et al, who describes that in the walls of cerebral vessels there is exacerbation of hypertension based production of reactive oxygen species with activation of matrix metalloproteinases (MMPs), due to this fact the blood vessels are more prone to develop high pressure induced injury[17]. Out of these 100 cases of stroke, hypozincemia (low serum Zinc level) was present in 43 (43%) cases that show serum Zinc level <65mcg/ dl, among these 34 belongs to ischemic group that also show poor functional status at discharge. This finding was also claimed by other workers[18]. In haemorrhagic stroke cases we found low Zinc serum concentration in 09 patients, which was in agreement with the study of Kardaset al, who indicated that the serum concentration levels of Zinc and heavy metals leads to acute haemorrhagic stroke[19]. Alteration of Zinc level in brain may influence neurotransmission in Zinc containing glutaminergic synapses. Therefore, dietary Zinc deficiency may influence Zinc homeostasis in the brain, resulting in brain dysfunction such as stroke[20].

CONCLUSION

We observe low Zinc levels in 43 (43%) of cases, among these majority belongs to ischemic stroke group, suggesting that hypozincemiais a possible contributing factor in patients of stroke. Further Zinc supplements and fortified food material should be promoted to reduce the risk of stroke. This is a limited study needs further workup in support of the conclusion.

Author's Contribution:

Concept & Design of Study:	Syed Qaiser Husain Naqvi
Drafting:	Shamsuddin Shaikh
Data Analysis:	Jawaid Hussain Lighari
Revisiting Critically:	Syed Qaiser Husain Naqvi, Shamsuddin Shaikh
Final Approval of version:	Syed Qaiser Husain Naqvi

Conflict of Interest: The study has no conflict of interest to declare by any author.

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