Section: General Medicine

Original Research Article

PREVALENCE AND OUTCOME OF CVA WITH ACUTE ISCHEMIC STROKE IN CHRONIC KIDNEY DISEASED PATIENTS: A RETROSPECTIVE STUDY FROM A TERTIARY CARE CENTRE

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Abstract

Background: Chronic kidney disease (CKD) is a growing health concern worldwide, and its prevalence is increasing in parallel with the aging population. The prevalence of cerebrovascular accidents (CVA) with acute ischemic stroke in CKD patients is a critical issue that needs to be addressed, as it can lead to significant morbidity and mortality. This study is a retrospective study to evaluate the prevalence and Functional outcome by NIH stroke scale score among adults with age 45 to 65 years with known CKD for 3 years. **Materials and Methods:** The study was retrospective observational research conducted at the Department of General Medicine, Government Medical College, Ongole, spanning eight months from May 2024 to October 2023. The study included patients aged 45-65 years, known CKD patients in the last three years, and hospital stays up to 12 days. **Result:** The study found no mortality in stroke patients with good NIHSS score, while mortality was observed in a minor proportion of moderate NIHSS score participants. However, mortality was highest in stroke patients with poor NIHSS score. Most participants were males, aged >55 years, and had hypertension. There was no significant association between NIHSS score and diabetes mellitus or hyperlipidemia. Hypertension and hyperlipidemia were significantly associated with CKD, with X2 4.04 and X2 8.11, respectively. **Conclusion:** The NIHSS score significantly correlates with mortality in chronic renal disease patients following acute stroke, aiding clinicians in deciding treatment options. Further research is needed for validity.

INTRODUCTION

Commonly referred to as strokes, cerebrovascular accidents (CVA) rank among the main causes of disability and death globally.[1,2] A subset of CVA, acute ischemic stroke (AIS), results from a blood clot blocking a cerebral artery, therefore depriving brain tissue of oxygen and nutrients.[2] To maximize brain damage prevention and restore blood flow, this disorder requires quick medical attention.[3] Among the populations susceptible to AIS, patients with chronic kidney disease (CKD) form a sizable portion.[4] The renowned condition CKD, marked by a slow decline in renal function over time, increases the risk of cardiovascular illnesses like strokes.[3,4]

There are several ways that CKD and AIS interact. CKD is one of the risk factors for ischemic stroke, as CKD is contributing to the development of atherosclerosis and hypertension.[5] Furthermore, a pro-inflammatory and pro-thrombotic condition associated with CKD increases the likelihood of thromboembolic events.[6] AIS is rather more common in CKD patients than in the general population.[7] Research has shown that the degree of kidney dysfunction influences the increasingly higher risk of stroke.[5-7] Particularly at great risk are patients with end-stage renal disease (ESRD), partly because of the concomitant diseases and consequences related to advanced kidney disease.[8]

AIS results in CKD patients are worse than in those without CKD and these patients are defined by higher rates of in-hospital mortality, longer hospital stays, and greater impairment following a stroke.[9] AIS management in CKD patients is even more difficult because of the complexity of balancing anticoagulant treatment, which is essential for preventing more ischemic episodes but can be dangerous in those with compromised renal function.[10] Furthermore, the comorbidities of CKD patients, such as diabetes and heart disease, can complicate their treatment and recovery.[7,10]

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The development of targeted efforts to enhance stroke prevention, early detection, and management in this high-risk group depends on an awareness of the frequency and results of AIS in CKD patients.[3,4] Improved clinical guidelines and tailored treatment approaches are necessary to minimize the negative effects of AIS in CKD patients and therefore increase their quality of life and survival rates. Hence, this study is a retrospective study to evaluate the prevalence and Functional outcome by NIH stroke scale score among adults with age 45 to 65 years with known CKD for 3 years.

MATERIALS AND METHODS

The present study was retrospective observational research spanning eight months (May 2024 – October 2023). The manner of the sampling was intentional Sampling. The site of the present study was Department of General Medicine, Government Medical College, Ongole. The inclusion criteria were age 45 to 65 years, known CKD patients in the last three years, and hospital stay time up to 12 days as IP records. Patients on dialysis, those with CVA with acute ischemic stroke with midline shift, and those age group below 45 years and over 65 years were excluded.

The patients' case files provided the data for collecting. On day one, the NIH stroke scale helped one to determine the patients' functional level. For the 12th day, NIH stroke scale was also used in line with history and test results. In case of discharge, LAMA or death, the NIH stroke scale was used that specific day.

Statistical Analysis: Descriptive statistics on demographic information, risk factors, length of illness were recorded; Student's t-test was conducted for the NIH stroke scale results of day 1 and day 12. The chi-square test was used to find relationships between demographic information and risk factors and NIH stroke scale day 1 score.

RESULTS

[Table 1] shows the demographic details, risk factors, eGFR rate of the study population. Average eGFR (≤ 48 ml/min) was calculated by taking the lower levels of the all the types in the grading system of the CKD. Out of a total of 70 participants, nearly three-quarters (n=50/70, 72%) were males while the rest (n=20/70, 28%) were females. The mean age of study participants was 54.4±9.72 years. More than half (n=41/70, 59%) of our participants were aged > 55 years. With regards to clinical factors, more than two-third (n=48/70, 68%) of the participants had hypertension while less than one-third (n=21/70, 30%) had diabetes mellitus. Additionally, nearly two-fifth (n=26/70, 37%) of the study participants had hyperlipidemia. Out of these eGFR ≤ 48 ml/min was exhibited by 16 patients each with hypertension and Diabetes mellitus and 13 patients with hyperlipidemia.

[Table 2] shows the association of NIHSS with mortality, demographic, and risk factors of the study population on day 1. There was no mortality in stroke patients on the day 1 with good, moderate and poor NIHSS score. Furthermore, there was no significant association of NIHSS score with age, hypertension, diabetes mellitus ($p>0.05$) and hyperlipidemia ($p>0.05$).

[Table 3] shows the association of NIHSS with mortality, demographic, and risk factors of the study population. There was no mortality in stroke patients with good NIHSS score (n=10/10, 100%) while mortality was observed in a minor proportion (n=2/21, 10%) of participants with moderate NIHSS score. In contrast, mortality was observed in the highest proportion (n=27/39, 69%) of stroke patients with poor NIHSS score. Most of the participants with good NIHSS score (n=6/10, 60%), moderate NIHSS score (n=16/21, 76%) and poor NIHSS score (n=28/39, 72%) were males in comparison to females, however this difference did not reach statistical significance ($p >0.05$). Half of the participants (n=5/10, 50%) with good NIHSS score were aged >55 years while more than one-third (n=7/21, 37%) of those with moderate NIHSS score were aged ≤55 years, and a higher proportion (n= 22/39, 56%) of participants with poor NIHSS score were aged >56 years, this difference again was not statistically significant ($p> 0.05$). A higher proportion of participants with good NIHSS score (n=7/10, 70%), moderate NIHSS score (n=15/21, 71%), and poor NIHSS score (n=26/39, 67%) belonged to the hypertensive group ($p>0.05$). Furthermore, there was no significant association of NIHSS score with diabetes mellitus ($p>0.05$) and hyperlipidemia ($p>0.05$).

The association of hypertension and hyperlipidemia with CKD mortality (eGFR ≤ 48 ml/min) was observed to be significantly associated with the values of X2 4.04; P=0.04 and X2 8.11; P=0.004 respectively.

Table 1: Demographic details, risk factors, eGFR rate of the study population.

Parameters		Number (%)	eGFR ≤ 48 ml/min	eGFR ≥ 49 ml/min
Gender	Male	50 (72%)	23	37
	Female	20 (38%)	8	12
Age (years)	45 – 55	30 (43%)	16	14
	56 - 65	40 (57%)	22	18
Hypertension	Yes	48 (68%)	16	32
	No	22 (32%)	2	20
Diabetes mellitus	Yes	21 (30%)	16	5
	No	49 (70%)	1	48

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Hyperlipidemia	Yes	26 (37%)	15	11
	No	45 (63%)	10	35

Table 2: Association of NIHSS with mortality, demographic, and risk factors of the study population on day 1.

Parameters		Good score (0-6 points) N=2	Moderate score (7-15 points) N=31)	Poor score (≥16 points) N=37
Mortality	Yes	0	0	0
	No	2	27	37
Gender	Male	2	22	26
	Female	0	9	11
Age (years)	45 – 55	0	13	17
	56 – 65	2	18	20
Hypertension	Yes	2	18	26
	No	0	13	11
Diabetes mellitus	Yes	2	9	10
	No	0	22	27
Hyperlipidemia	Yes	2	11	13
	No	0	20	24

Table 3: Association of NIHSS with mortality, demographic, and risk factors of the study population on day 12.

Parameters		Good score (0-6 points) N=10	Moderate score (7-15 points) N=21)	Poor score (≥16 points) N=39
Mortality	Yes	0 (0%)	2 (10%)	27 (69%)
	No	10 (100%)	19 (90%)	12 (16%)
Gender	Male	6 (60%)	16 (76%)	28 (72%)
	Female	4 (40%)	5 (24 %)	11 (28%)
Age (years)	45 – 55	5 (50%)	7 (37%)	17 (44%)
	56 - 65	5 (50%)	14 (63%)	22 (56%)
Hypertension	Yes	7 (70%)	15 (71%)	26 (67%)
	No	3 (30%)	6 (29%)	13 (33%)
Diabetes mellitus	Yes	3 (30%)	7 (37%)	10 (26%)
	No	7 (70%)	14 (63%)	29 (74%)
Hyperlipidemia	Yes	4 (40%)	9 (44%)	13 (33%)
	No	6 (60%)	12 (56%)	26 (67%)

DISCUSSION

NIHSS is a valid assessment tool utilized to predict multiple stroke functional outcomes,[12,16] including CKD patients. NIHSS can be utilized to assess stroke severity that is a powerful predictor of mortality following AIS,[13-15] in CKD patients. A study conducted in hospitalized patients with AIS at the time of hospital admission after three months' duration of stroke demonstrated NIHSS to be a strong predictor of mortality.[22] Another study found older age and a higher NIHSS score to be the only predictors of 30-days mortality after stroke.[15] Further a study reported NIHSS score to be a prominent predictor of 100-days survival within the initial six hours of hospital admission.[23] A study reported NIHSS to be a strong variable in predicting in-hospital mortality.[24]

In our study, the mean age of AIS subjects was 54.4 ±9.72 years with more than half (n=41/70, 59%) of our participants were aged > 55 years. Another study reported a large proportion (86%) of the participants to be >45 years of age with an average of 64 years.[11] A study demonstrated stroke to be a disease of the geriatric population.[10,12] Elderly age has been reported to demonstrate higher baseline NIHSS score (> 16 points) and a poor outcome on Glasgow coma scale (a score of 3-5 points) while younger age is associated with low NIHSS score (a score of 0-6 points) at admission and a better outcome (a score of 1-2 points on Glasgow coma scale).[11] There was an equal distribution of males and females in a local study.[11] In contrast, a study reported a male to female ratio of 1:05:1.[8, 13] In our study, the male-to-female ratio was found to be comparative with these studies.

A study was done to determine clinical outcomes in diabetic patients suffering from ischemic stroke. According to the findings of the study, good recovery was displayed in diabetic and non-diabetic patients who were less than 40 years of age. A higher mortality rate was observed in the diabetic subgroup aged > 40 years and ≥60 years in comparison to non-diabetic patients.[14] In our survey, diabetes was reported as a comorbidity in 31% of ischemic stroke subjects. A study reported the mean baseline NIHSS score to be 18.20 (2-39) points. Nearly three-fifth of the patients (59.3%) had a baseline NIHSS score of > 16 points and displayed severe neurological deficit on hospital admission, and poorer clinical outcomes on the seventh day of admission as measured by the Glasgow outcome scale.[11] Our study showed that the mean score of NIHSS in the study patients was 16.68±6.72 with the lowest score being four and the highest being 30. In our study, it was observed that those who had a score of > 16 had a higher mortality rate, i.e. 70 %.

A study observed an excellent outcome was defined as a score of 1 on the Glasgow outcome scale and a score of 19 or 20 using the Barthel index.[2] A similar study was conducted to assess neurological impairment using the NIHSS and functional

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outcomes on the seventh day of admission using the Barthel index. NIHSS scores ranged from 2-28 points and 0-80 points, respectively.[15] The findings of a study conducted to determine functional outcomes in ischemic stroke subjects concluded that subjects had poorer outcomes with predictors being advanced age, previous stroke history, and a higher NIHSS score.[16] However, this study has a few limitations. Firstly, it was conducted was retrospective study. Secondly, the sample population was small which limits the generalizability of the findings. Hence, more studies conducted at multiple primary care settings involving a larger sample size and a variety of ethnic populations are required to further potentiate the results of the current study.

CONCLUSION

The first NIHSS score exhibits a significant correlation with mortality following AIS in individuals with CKD. It can assist clinicians in determining whether to administer thrombolytic therapy, rehabilitation, or a mix of both to these patients, thereby reducing the death rate. Nevertheless, further research is required to enhance the validity of these findings.

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