

# Aetiology and Prognostic Factors of Patients admitted for Stroke

Ejaz Ahmed Vohra, Waquar Uddin Ahmed ( Department of Medicine, Ziauddin Medical University Hospital, Karachi. )

Masood Ali ( Abbasi Shaheed Hospital, Karachi. )

## Abstract

**Objective:** To see the etiology and prognostic factors related to mortality of patients with stroke.

**Methods:** Retrospective analysis of patients admitted with stroke in two hospitals of same locality over 8 years.

**Results:** Of the 12454 cases admitted in medical units of hospital 796 (6.4%) had stroke. Majority of cases were between 4th and 6th decades of life. Fifty percent (304/606) were hypertensive, 19% (113/606) had cardiac disease and 18% (112/606) diabetes mellitus. Four percent (27/606) had previous history of stroke and 17% (102/606) were smokers. Of the 144 cases who had CT Scan 99 (69%) had infarct and 45 (31%) haemorrhage; overall mortality was 30% (288/971) and it was significantly high in cases over 60 years of age, cases with history of unconsciousness at the onset and those with severe hypertension. Mortality rate in the community hospital was significantly higher (33%) as compared to private hospital (13%) (p 0.001).

**Conclusion:** Cardiac disease is one of the precipitating factors of stroke with infarct being the major cause. Mortality increased with the advancement of age (JPMA 50:234, 2000).

## Introduction

Stroke is the third most common cause of death in most Western population after coronary heart disease and cancer<sup>1</sup>. Stroke in the developing world is less well documented, although it shares more than half of the world's population. The demography and the poverty of national health resources contribute to the difficulty in conducting neuroepidemiological studies. Paucity of local data prompted us to analyze the data of two hospitals to identify the pattern of stroke, risk factors and mortality rates of stroke patients during hospital stay.

## Patients, Methods and Results

Retrospective analysis of patients admitted with stroke<sup>2</sup> in medical units of a community hospital (Abbasi Shaheed Hospital) from 1982 to 1990 and of a private hospital (Ziauddin Hospital) was done. From the medical records of patients demographic data like age, sex, duration of stroke, associated disease, symptoms, risk factors and level of consciousness at the time of onset and at admission was noted. Level of consciousness was graded as: grade I when patient was drowsy but responding to vocal commands; grade 2 - unconscious but responding to minimal stimuli; grade 3 - unconscious and responding only to maximal stimuli and grade 4 - unconscious and no response at all. Hypertensive patients were graded as mild, moderate and severe according to the reading of diastolic blood pressure (mild hypertension 95-104 mmHg, moderate hypertension - 105-119 mmHg and severe hypertension >120 mmHg. CT scan was performed in 144 cases - who were admitted in Ziauddin Hospital. All patients were admitted in the hospital and were

followed till their hospital stay to find out the mortality rate.

A total of 12454 cases were admitted in medical units of the hospitals, of whom 796 (6.4%) had stroke. Of 796 cases 448 (56%) were male and 348 (44%) females. Age ranged from 20 to 90 years. Majority of the cases were between fourth and sixth decades of life (Table 1).

**Table 1. Age distribution frequency of stroke and mortality rate of patients with stroke.**

Years	Stroke %	Mortality %
<31	3.5	10.7
31-40	8.0	21.8
41-50	22.6	30.6
51-60	28.6	30.3
61-70	21.6	46.5
71-80	11.18	29.2
>80	4.27	55.9

Frequency of admission of stroke patients between October to March was 342 (43%) and between April to September was 454 (57%).

Level of consciousness at the time of admission was known in 762 cases of whom 372 (49%) were fully conscious, 115 (15%) were in grade 1, 45 (6%) in grade 2, 120 (16%) in grade 3 and 110 (14%) in grade 4 conscious level. Data regarding other risk factors was available in 606 cases. Three hundred and four (50%) were hypertensive, 112(18%) diabetic, 77(13%) were having cardiac diseases other than ischemic heart disease. 25 (4%) ischemic heart disease, 11(2%) had rheumatic heart disease, 27 (4.4%) had cerebrovascular accident in the past. Of the total 102 (17%) cases were smokers.

Of the 304 cases with hypertension 115 (38%) had mild hypertension, 79 (26%) moderate and 110 (35%) severe grade of hypertension. CT scan was performed in 144 cases who were admitted in a private hospital of these 99 (69%) had infarct and 45 (31%) had haemorrhage. Detail of these cases according to the age group is given in Table 2.

**Table 2. Pathological lesion of brain on C.T scan of 144 cases according to age groups.**

Infarction				99 (69%)
Site	Age range in years			Total No.
	20-40	40-60	>60	
Cerebral hemisphere	9	28	19	56
Basal ganglia	7	14	8	29
Internal capsule	0	9	3	12
Thalamus	0	1	1	2
Haemorrhage				45 (31%)
Cerebral hemisphere	7	4	7	18
Basal ganglia	1	7	0	8
Thalamus and Internal Capsule	2	2	8	12
Cerebellum	0	0	1	1
Brain stem	2	0	0	2
Intra ventricular	2	2	0	4

Overall mortality rate was 29.7% (288/971). Among the patients admitted in community hospital mortality was 33.3% (265/796), amongst male 36.2% (12/448) and females 29.6% (103/348). Mortality rate rose with increase in age and it was maximum above the age of 60 years ( $p < 0.001$ ) (Table 1).

Mortality rate amongst the patients admitted in private hospital was 13% (23/175). Male 9.3% (9/96) and female 17.7% (14/79). No significant difference in mortality rate was found among the different age groups.

Level of consciousness was an important determinant of the mortality rate. Mortality rate increased with the deterioration of conscious level at the time of examination. It was significantly higher (47.5%) among patients with grade 1-3 conscious level ( $p < 0.001$ ) and 81% among patients with grade 4 conscious level ( $p < 0.001$ ) as compared to the patients with grade 0 conscious level (Figure 1).

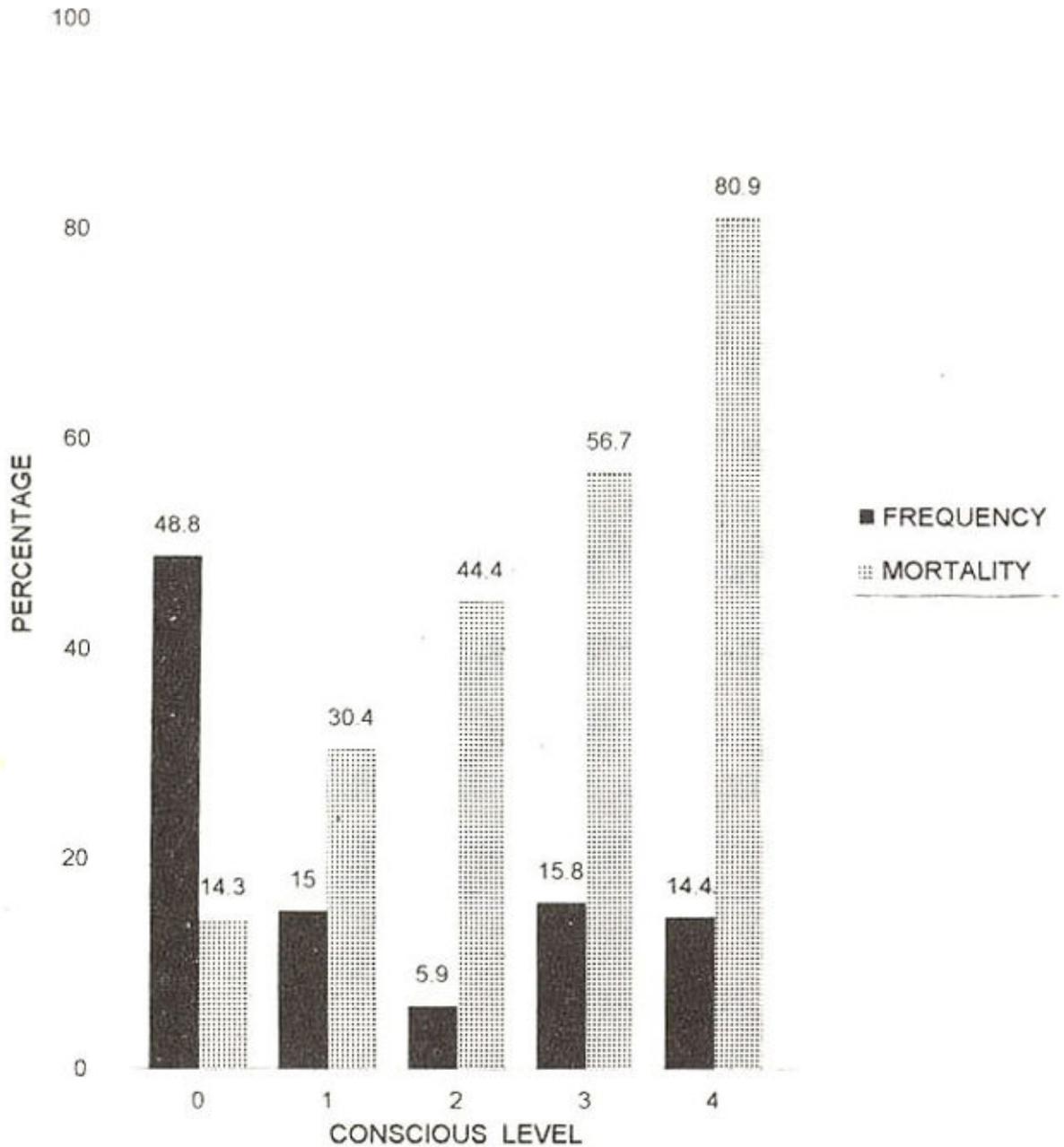


Figure 1. Conscious level of stroke patients at admission (grade 0 to grade 4) with frequency in percentage vs mortality rates in percentage.

Mortality rate was also higher among the patients with history of unconsciousness at the time onset 57.2% as compared to those with impairment of consciousness (34.8%) ( $p < 0.01$ ). No significant difference in mortality rate was found among the patients of stroke having different risk factors. However patients with hypertension had 37.8% (115/304) mortality as compared with others (30.8%) (93/302). The grade of hypertension was again an important determinant of mortality rate. Those who were having severe hypertension had significantly higher mortality rate (47.3%) (52/110) as compared to patients with moderate (36.7%) (29/79)

and mild hypertension (26.1%) (30/115)  $p < 0.01$  (Figure 2).

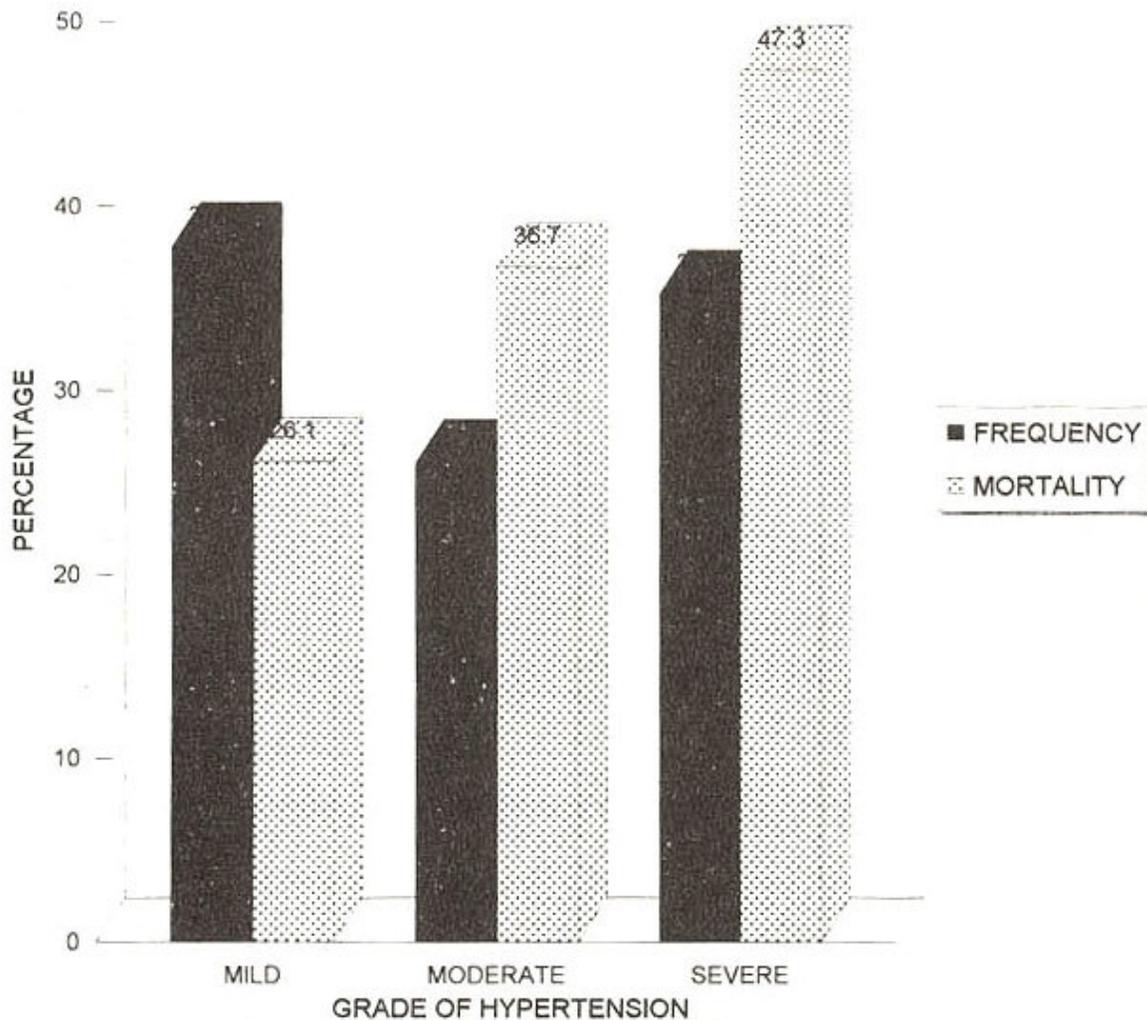


Figure 2. Figure of hypertension according to grade (mild, moderate and severe) in percentage vs mortality rates in percentage.

### Comments

Present study provides a hospital based data and not a population based data; but this can be utilized to have some idea about the magnitude of the problem and pattern of disease with some reservations. Present study reveals that almost 6 out of 100 hospitals admissions are due to stroke. Males are slightly more affected (56%) than females (44%) as reported earlier. The frequency of stroke increases as the age advances but the maximum frequency is seen between 40 and 70 years of age, after that the frequency drops probably because of the less number of survivors in that group in our population.

There are a few published studies recently conducted to compare stroke sub types and the association of subtype with established risk factors among different Asian countries. One of the hospital based study conducted in different countries (China, India, Indonesia, Malaysia and Korea<sup>4</sup> shows that hypertension is the major risk factor accounting for 64% of cases with stroke. Ischemic stroke, intra cranial hemorrhage and subarachnoid hemorrhage accounted for 73%,

23% and 4% of all strokes with known subtypes, respectively.

In this study hypertension is appearing as one of the major risk factors for stroke. It is evident that more than 50% of the stroke patients were hypertensive followed by cardiogenic thrombi emboli in 19% and diabetes mellitus in 18%. Smoking was present in 17% of cases. Major contribution of hypertension could be due to its poor control and lack of awareness of the disease in the population as has been reported by the National Health Survey of Pakistan<sup>5</sup>. This reports that 63-85% of the population was totally unaware of hypertension, 17% of the cases were aware of the disease but had not been treated and only 14% cases were treated but their blood pressure was not controlled. Only 6% hypertensives were taking medication and blood pressure was well controlled.

In spite of changes in the criteria of diagnosis of hypertension<sup>6</sup> and gradings of coma, we used the old gradings of coma which was in clinical use at the commencement of this study. Similarly hypertension was graded according to the diastolic blood pressure and was analyzed as such to maintain the validity of data.

Majority of the cases of stroke reported in this study had infarct (69%) which is similar to the data presented from West and one of our neighboring country India where infarction was found up to 83% of cases and haemorrhage was a cause of stroke in only 17%. In this study haemorrhage was found in 31% of cases which is higher than the Western reported series but it is very much similar to the studies reported from other third world countries like Singapore and Indonesia - 26%, Taiwan - 28%, Thailand, Hong Kong and Philippines - 30%, Korea - 31% and Malaysia - 33%, which shows that intracerebral haemorrhage is more common amongst stroke patients in Asia<sup>7</sup>.

Stroke mortality correlated well with the severity of hypertension, mortality increased with rise in the grade of hypertension. Mortality amongst the patients with severe hypertension was significantly higher as compared to patients with mild to moderate hypertension. Overall mortality rate was similar to that reported earlier from other Asian countries<sup>8</sup>. Mortality rate in the community hospital where facilities are limited were significantly higher (33.1%) as compared to the private hospital (13.1%) ( $p < 0.001$ ). However justification of this comparison is difficult because number of patients were not similar in both groups. Further studies will be needed to evaluate this fact in depth.

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