

# Cerebrovascular Disease, Increasing Incidence of Primary Intracerebral Hemorrhage: A Preliminary Report Of A 100 Cases

Nadir Zafar Khan, Zafar Iqbal

Department of Neurology and Medicine, Shaikh Zayed Hospital, Lahore.

## SUMMARY

*A prospective study was carried out on 100 patients presenting as a first ever stroke. The cases entered into the study underwent a CT brain scan to classify their disease into cerebral infarction, primary intracerebral hemorrhage or subarachnoid hemorrhage. In our study we found cerebral infarction occurred in 66% of cases, primary intracerebral hemorrhage in 28%, subarachnoid hemorrhage 3% and normal CT scan in 3%. The alarmingly high incidence of primary intracerebral hemorrhage prompted us to bring out a preliminary report. The most common predisposing factor in both cerebral infarction and hemorrhage was hypertension. Primary cerebral hemorrhage occurred more frequently in males and had a poor prognosis.*

## INTRODUCTION

Cerebrovascular disease is the commonest acute neurological disorder requiring hospitalization<sup>1</sup>. Strokes of all types rank third as cause of death, surpassed only by heart disease and cancer<sup>3</sup>. It is not only an important cause of mortality but also prolonged disability, particularly affecting active and earning members of families. Proper diagnosis, evaluation and management of stroke continues to be an important part in the practice of neurology<sup>2,3</sup>.

The term cerebrovascular disease designates any abnormality of the brain resulting from a pathological process of the blood vessels. This pathological process can be thrombosis, embolism or rupture of a vessel.<sup>4</sup> Cerebral thrombosis and embolism predispose to cerebral infarction and the rupture of the cerebral vessels predisposes to hemorrhage. Clinically, the presentation is so distinct, with sudden, non-convulsive focal neurological deficit that the diagnosis is seldom in doubt<sup>3,5</sup>.

With the availability of computerized tomography, classifying cerebrovascular disease into cerebral infarction, primary intracerebral

hemorrhage and subarachnoid hemorrhage has become easier. This study was undertaken to evaluate the incidence of the underlying pathology in stroke patients at Shaikh Zayed Hospital, Lahore.

## PATIENTS AND METHODS

100 cases who presented with acute cerebrovascular event from October 1997 to April 1998 were included in the study. These patients developed symptoms 2 to 24 hours (mean + 9) prior to admission and survived the first 48 hours. All cases underwent medical and neurological assessment. Routine hematological and biochemical investigations were carried out to exclude patients suffering from hematological disorders and chronic liver disease, who might be predisposed to bleeding diathesis.

All patients underwent computerized tomography (CT scan) with and without contrast of the brain at the time of presentation and if found normal were repeated in 24 to 48 hours. Topography of cerebral infarct was classified according to vascular territories into anterior cerebral, middle cerebral and posterior cerebral infarcts. Primary intracerebral hemorrhage was also

classified according to the site of hemorrhage into internal capsular, parietal lobe, temporal lobe and cerebellar hemorrhage.

For all patients risk factors such as age, sex, hypertension, diabetes mellitus and ischemic heart disease were recorded.

Patients in different disease categories identified on CT scan were reported as percentage. Correlation between CT scan findings and hypertension were evaluated with chi square test. A  $p \leq 0.05$  was considered significant.

## RESULTS

Analysis of CT brain scan of the 100 cases revealed cerebral infarction in 66 cases (66%), primary intracerebral hemorrhage 28 cases (28%), subarchnoid hemorrhage 3 cases (3%) and normal CT scans in 3 cases (3%) (Table 1).

Out of the 66 cases of cerebral infarction, 62 cases (93.9%) were due to the involvement of anterior circulation and 4 cases (6.1%) showed involvement of the posterior circulation. Anterior circulation infarction were further sub-divided into middle cerebral artery involvement in 58 cases (93.5%) and anterior cerebral artery involvement in 4 cases (6.5%) (Table 2).

Of the 28 cases of primary intracerebral bleed, the sites of involvement were as follows: Internal capsule, 15 cases (53.6%), parietal lobe 7 cases (25%), temporal lobe 4 cases (14.3%) and cerebellar hemisphere 2 cases (7.1%) (Table 3).

**Table 1: CT scan brain scan : analysis of 100 cases of stroke.**

| Pathology                         | Number | Percent |
|-----------------------------------|--------|---------|
| Cerebral infarction               | 66     | 66%     |
| Primary intracerebral haemorrhage | 28     | 28%     |
| Sub-archnoid haemorrhage          | 3      | 3%      |
| Normal                            | 3      | 3%      |

Hypertension was the major predisposing factor for both cerebral infarction and bleed. It was present (either diagnosed first time or past medical history of hypertension) in 74 patients (74%). In

primary intracerebral hemorrhage (28 cases), hypertension was present in 25 cases (89.2%) and two cases of subarchnoid hemorrhage had hypertension (66.6%). In 66 cerebral infarctions, 47 were hypertensive (71.2%) (Table 4).

**Table 2: Topography of cerebral infarcts according to vascular territory (n=66)**

| Blood supply             | Number | Percent |
|--------------------------|--------|---------|
| Anterior circulation:    | 62     | 93.9%   |
| Middle cerebral artery   | 58     | 93.5%   |
| Anterior cerebral artery | 4      | 6.5%    |
| Posterior circulation    | 4      | 6.1%    |

**Table 3: Sites of involvement in primary intracerebral bleeding (n=28)**

| Site                  | Number | Percent |
|-----------------------|--------|---------|
| Internal capsule      | 15     | 53.6%   |
| Parietal lobe         | 7      | 25%     |
| Temporal lobe         | 4      | 14.3%   |
| Cerebellar hemisphere | 2      | 7.1%    |

**Table 4: Hypertension; Predisposing factor for cerebrovascular diseases (n=100)**

| All cerebrovascular accidents (n=100)   | Hypertensive (74%) | Normotensive (26%) |
|---|--------------------|--------------------|
| Primary intracerebral hemorrhage (n=28) | 25 (89.2%)         | 3 (10.8%)          |
| Subarachnoid haemorrhage (n=3)          | 2 (66%)            | 1 (34%)            |
| Cerebral infarction (n=66)              | 47 (71.2%)         | 19 (28.8%)         |

Correlation with hypertension and CT scan findings reveals a higher prevalence of hypertension between all three categories and was statistically significant ( $P \leq 0.05$ ). But hypertension failed to



achieve statistical significance as being more responsible for either one category of cerebrovascular event ( $P \geq 0.05$ ).

Male patients had a higher prevalence of hypertension as compared to females & this was statistically significant ( $A p < 0.05$ ). There was a significant difference in the prevalence of CT scan findings between male & females with males predominantly suffering from primary intracerebral bleed and females having higher percentage of cerebral infarction ( $p < 0.05$ ). The sex distribution in subarachnoid hemorrhage and normal CT scan findings were not statistically significant ( $P \geq 0.05$ ) (Table-5).

**Table 5: Sex distribution in the incidence of cerebrovascular diseases**

| Disease category                 | Total | Males      | Females    |
|----------------------------------|-------|------------|------------|
| Primary intracerebral hemorrhage | 28    | 22 (78.5%) | 6 (21.5%)  |
| Subarachnoid hemorrhage          | 3     | 1 (33%)    | 2 (67%)    |
| Cerebral infarction              | 66    | 39 (59.1%) | 27 (40.9%) |

Incidence of cerebral infarction was slightly higher in females 39/66 cases (59.1%) as compared to males 27/66 cases (40.9%), but statistical analysis did not show any significant difference ( $p \geq 0.05$ ) (Table 5).

The incidence of both cerebral infarction and bleed increased with age, though the rise was more marked for cerebral infarction. Also cases suffering from cerebral infarction showed a high incidence of both diabetes & ischemic heart disease.

## DISCUSSION

Cerebrovascular disease is a major cause of disability and death.<sup>2</sup> Increased availability of neuro-imaging with CT brain scan and MRI brain help to localize and identify the underlying pathological lesions. Primary intracerebral hemorrhage can be seen immediately on CT brain scan while cerebral infarction is usually visible within 24 to 48 hours. Atherosclerosis is the predominant pathology seen in cerebral vascular disease<sup>6</sup>.

Cerebral infarction usually results from thromboembolism arising intra-cranially or extra-cranially or due to emboli arising from the heart<sup>6,7,8</sup>. Primary intracerebral bleed is due to sudden rupture of a cerebral artery or its perforators. The nature of the vascular lesion leading to the rupture remains unknown but it is known that hypertension plays a major role. Subarachnoid hemorrhage usually occurs due to rupture of a sacular or a berry aneurysm, usually located around the circle of Willis. Approximately 90 - 95% of berry aneurysm lie in the anterior part of the circle of Willis<sup>3</sup>.

Classifying cerebral vascular disease in to cerebral infarction primary intracerebral bleed and subarachnoid hemorrhage has been extensively investigated. The initial work by Fisher & Adams in 1949 which showed the incidence of cerebral infarction being 82%, primary intracerebral hemorrhage 11% and 7% subarachnoid hemorrhage<sup>9</sup>. More recently and extensive study was carried out in the Oxford Community 1990 which again showed an incidence of the cerebral infarction remaining at 81%, primary intracerebral bleed at 10% and subarachnoid hemorrhage at 5%<sup>10,11</sup>.

In our study of 100 patients at Shaikh Zayed Hospital it was seen that the incidence of cerebral infarction was 66% and primary intracerebral bleed was 28% and 3% was subarachnoid hemorrhage. The alarmingly high incidence of primary intracerebral hemorrhage was significantly higher than the previous studies carried out in the western countries. The most common underlying predisposing factor in our study was hypertension present in 74% of cases.

Interestingly some patients with intracerebral bleed presented with focal neurological deficit with no prior history of headache or loss of consciousness, thus making its difficult to differentiate from cerebral infarction clinically<sup>2</sup>. In such cases without availability of CT brain scanning therapeutic options with anti-coagulation and anti-platelet therapy would be hazardous and detrimental to the patient.

As hypertension was a major predisposing factor, specially so in primary intracerebral bleed 89.2% preventive measures in controlling hypertension will go a long way in decreasing the incidence of cerebral vascular disease. The mortality following intracerebral bleed in our study remains high and is commoner in males.

## CONCLUSION

This preliminary report has demonstrated an alarmingly high incidence of intracerebral hemorrhage in our population. Preventive measures in controlling hypertension are essential and before prescribing anti-platelet therapy it would be advisable to obtain a CT brain scan. This is a on going study and a total of 500 patients are to be included. Further analysis of risk factors such as diabetes mellitus, ischemic heart disease will be analyzed.

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### The Authors:

Nadir Zafar Khan  
Assistant Professor of Neurology  
Shaikh Zayed Hospital,  
Lahore.

Zafar Iqbal  
Professor of Medicine  
Shaikh Zayed Hospital,  
Lahore.

### Address for Correspondence:

Dr. Nadir Zafar Khan  
Assistant Professor of Neurology  
Shaikh Zayed Hospital,  
Lahore.