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# ETIOLOGY AND DISTURBANCE OF CONSCIOUSNESS IN STROKE: A HOSPITAL-BASED STUDY

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## ABSTRACT

**Objective:** To determine the prevalence of stroke risk factors and decreased consciousness level in patients with stroke. **Location:** Medical wards of Khyber Teaching Hospital, Peshawar, from June 2005 through August 2006. **Methods:** Patients with stroke (cerebral infarction or hemorrhage) admitted to our facility were evaluated for clinical stroke characteristics and the presence of stroke risk factors through a structured questionnaire. Results: One hundred and eighty-three patients were included. Forty-seven (25.68%) had more than one risk factor. Age range was 31-92 years (mean 57 years). There were 111 (60.65%) males and 72 (39.34%) females. The distribution of risk factors was: hypertension 95 (51.91%), diabetes mellitus 56 (30.60%), hyperlipidemia 21 (11.47%), smoking 23 (12.56%), ischemic heart disease 21 (11.47%), atrial fibrillation 5 (2.73%), obesity 5 (2.73%), physical inactivity 2 (1.09%), history of heparin or warfarin use 2 (1.09%) and history of oral contraceptives 1 (0.54%). Severity of unconsciousness was assessed by the Glasgow coma scale in 122 (66.67%) patients; 42.62% had a score >10, 35.24% scored between 6-10, and 22.13% had a score <6. **Conclusion:** Hypertension, diabetes, hyperlipidemia and smoking are the major modifiable risk factors for stroke in our patient population. Over half of our patients had an unsatisfactory Glasgow coma scale score, indicating a worse prognosis.

Stroke is a clinical syndrome characterized by rapidly developing symptoms and signs of focal, and at times global, loss of cerebral functions, with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin.<sup>1</sup> According to a World Health Organization report from 2002, total mortality due to stroke in Pakistan was 78,512.<sup>2</sup>

In India, China, the Philippines, Thailand, Sri Lanka, Iran, Pakistan, and Nepal there has been a rapid increase in stroke mortality concurrent with prevalence of hypertension. The prevalence of hypertension varies between 15-35% in urban adult populations of Asia. In rural populations, the prevalence is 2-3 times lower than in urban subjects.<sup>3</sup> In a study from Abbotabad, Pakistan, hypertension was found to be the most common risk factor for stroke, with peak stroke prevalence seen during the seventh decade of life in males and the sixth decade in females.<sup>4</sup>

The National Action Plan for Non-Communicable Disease Prevention, Control and Health Promotion in Pakistan

(NAP-NCD) incorporates prevention and control of cardiovascular diseases as part of a comprehensive and integrated non-communicable diseases prevention effort. It promotes population-based blood pressure screening, along with screening for dyslipidemia and diabetes mellitus in high-risk groups. This program underscores the need to conduct clinical end-point trials in the native Pakistani setting to define cost-effective therapeutic strategies for primary and secondary prevention of vascular diseases and their complications, including stroke.<sup>5</sup> The present study was therefore designed in order to further these aims.

## METHODS

This was a prospective observational study conducted at Khyber Teaching Hospital (Peshawar) from June 2005 through August 2006.

Stroke was defined as a focal neurological deficit due to vascular lesions (either cerebral infarction or hemorrhage),

confirmed on CT scanning.<sup>3</sup> Patients with focal deficits from causes other than stroke (such as trauma or intracranial mass lesions) were excluded from this study.

Hypertension was defined as a history of systolic blood pressure > 140 mmHg and/or diastolic BP > 90 mmHg on more than one occasion. Diabetes was diagnosed as fasting blood glucose > 126 mg/dl on more than one occasion and random blood glucose > 200 mg/dl on more than one occasion. Patients were labeled as hyperlipidemic if total serum cholesterol was > 240 mg/dl, and/or serum triglyceride level was > 200 IU/dl. Patients with a history of coronary artery disease, diagnosed and confirmed by a cardiologist, were also recorded.<sup>6</sup>

Prevalence of risk factors was recorded on a structured questionnaire. Level of consciousness was assessed with the help of the Glasgow coma scale system. We divided our patients into three groups: Group A with score > 10, Group B with score between 6-10, and Group C with score < 6.<sup>7</sup>

## RESULTS

A total of 183 patients met the inclusion criteria and were selected for the study. Age range was from 31-92 years (mean age 57 years). There were 111 (60.65%) males and 72 (39.34%) females.

The distribution of risk factors was as follows: hypertension 95 (51.91%), diabetes mellitus 56 (30.60%), hyperlipidemia 21 (11.47%), smoking 23 (12.56%), ischemic heart disease 21 (11.47%), atrial fibrillation 5 (2.73%), obesity 5 (2.73%), physical inactivity 2 (1.09%), history of heparin or warfarin use 2 (1.09%), and history of using oral contraceptives 1 (0.54%). These data are summarized in Table 1.

In 122 (66.67%) patients, we were able to assess the level of consciousness using the Glasgow coma scale. Of these, 42.62% had a score > 10, 35.24% scored between 6-10, and 22.13% had a score < 6.

## DISCUSSION

Stroke is a major cause of mortality and morbidity, associated with disability and social dependence. In the Western world, stroke is the third commonest cause of death after heart disease and all cancers.<sup>8</sup> According to a WHO report from 2003, disability-adjusted life years (DALYs) lost due to stroke per 1000 population is 5-9 years in Pakistan, 10-14 in India, 15-19 in Russia, and 20 or greater in Mongolia.

TABLE 1  
Risk factors for stroke (n=183)

Risk factors	Number of patients (%)
Hypertension	60 (32.78)
Diabetes	20 (10.92)
Hyperlipidemia	9 (4.91)
Smoking	11 (6.01)
Ischemic heart disease	21 (11.47)
Hypertension and diabetes	23 (12.56)
Hypertension and hyperlipidemia	3 (1.63)
Hypertension and smoking	8 (4.37)
Diabetes and hyperlipidemia	8 (4.37)
Diabetes and smoking	4 (2.18)
Diabetes, hyperlipidemia and hypertension	1 (0.54)
Atrial fibrillation	5 (2.73)
Use of heparin or warfarin	2 (1.09)
Obesity	5 (2.73)
Physical inactivity	2 (1.09)
Use of oral contraceptives	1 (0.54)

Hypertension was identified as the major modifiable risk factor for stroke in our study, noted in 51.91% of patients. Our findings correlate with findings from elsewhere in Pakistan, including Karachi (50%)<sup>9,10</sup> and Abbotabad (52%).<sup>6</sup> Diabetes mellitus was the second major modifiable risk factor for stroke in our patients, with a prevalence of 30.60%. Our findings correlate with other studies, including reports by Basharat (21%)<sup>10</sup> and Liaqat (27%).<sup>11</sup> Hyperlipidemia was recorded in 11.47% patients presenting with stroke, which matches with published data (16%).<sup>12</sup>

Smoking was recorded as a modifiable risk factor in 12.56% cases. The respective population-attributable fraction for current smoking has been reported to be 22.0% for lacunar and 11.4% for non-lacunar stroke. The PAF for elevated von Willebrand factor was greater than that for current smoking for cardioembolic stroke.<sup>13</sup>

In 122 patients, we also assessed level of consciousness using the Glasgow coma scale. Our findings correlate with the findings of a study conducted in Dublin, in which a reduced Glasgow coma scale and larger strokes were associated with shorter delays to presentation. Longer delays occurred in patients living alone. There were significant delays in referral to, and assessment by, certain rehabilitation disciplines. Delayed presentation in stroke is a barrier to thrombolysis. Increasing public awareness may reduce this delay.<sup>14</sup>

According to a study from the United States, intracerebral hemorrhage has a wide range of severity at presentation.

Hydrocephalus is a potentially reversible cause of a lower GCS score. Since early withdrawal-of-care decisions are often based on the initial GCS score, recognition of the important influence of hydrocephalus on GCS is warranted before such decisions are made.<sup>15</sup>

## CONCLUSION

Hypertension, diabetes mellitus, hyperlipidemia and smoking are major modifiable risk factors for stroke in our population. A reduced Glasgow coma scale and larger strokes were associated with high morbidity. Our findings underscore the needs for awareness, education, elevation of poverty, proper use of medication, and adoption of healthy life style, for stroke prevention.

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