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Outcome Analysis and Prognostic Determinants in Ischemic and Haemorrhagic Stroke Patients: A Comparative Hospital-Based Study.

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ABSTRACT

Stroke is a major cause of morbidity and mortality worldwide. Ischemic and haemorrhagic strokes differ significantly in etiology, clinical presentation, and outcomes. This study aimed to compare the clinical profile, severity, and prognostic outcomes in patients with ischemic versus haemorrhagic stroke. A hospital-based observational study was conducted on 100 patients diagnosed with stroke (50 ischemic, 50 haemorrhagic) admitted to a tertiary care teaching hospital. Demographic data, risk factors, clinical features, radiological findings, stroke severity (NIHSS), and outcomes (mortality and Modified Rankin Score) were recorded. Statistical analysis was performed using appropriate tests, with a p-value <0.05 considered significant. Ischemic stroke patients were older on average (63.4 years) compared to haemorrhagic stroke patients (58.2 years). Diabetes was significantly associated with ischemic stroke (56%), while alcohol consumption was higher in haemorrhagic stroke (52%). Haemorrhagic stroke patients had significantly more altered sensorium (60%), seizures (32%), and higher NIHSS scores. In-hospital mortality was greater in haemorrhagic stroke (28% vs 12%), and fewer patients achieved good functional recovery (mRS 0–2) compared to ischemic stroke (28% vs 56%).Haemorrhagic stroke presents with greater severity and worse early outcomes compared to ischemic stroke. Identifying prognostic indicators can guide effective stroke management.

Keywords: Stroke outcome, Ischemic stroke, Haemorrhagic stroke.

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INTRODUCTION

Stroke is a leading cause of morbidity and mortality worldwide, with ischemic and haemorrhagic subtypes contributing significantly to the global burden of neurological disability [1]. Ischemic stroke, resulting from the occlusion of cerebral arteries, accounts for approximately 80–85% of all strokes, while haemorrhagic stroke, characterized by the rupture of blood vessels in the brain, constitutes the remaining 15–20%. Although both forms of stroke share some common risk factors, such as hypertension, diabetes, and dyslipidemia, they differ markedly in pathophysiology, clinical presentation, management, and prognosis [2, 3].

The outcome of stroke is influenced by various determinants including age, comorbidities, time to treatment, stroke severity, and radiological findings. Haemorrhagic stroke is generally associated with higher early mortality, whereas ischemic stroke tends to have long-term complications such as motor deficits and cognitive impairment. Identifying prognostic markers early in the course of treatment is crucial for risk stratification, effective management, and rehabilitation planning [4-6].

This hospital-based comparative study aims to analyze the clinical outcomes of patients with ischemic and haemorrhagic stroke and to identify key prognostic factors influencing recovery and mortality. By evaluating these parameters, the study seeks to provide insight into tailored stroke management strategies that could improve patient outcomes and reduce the overall healthcare burden.

METHODOLOGY

This hospital-based observational study was conducted in the Department of General Medicine. . Patients who were diagnosed with either ischemic or haemorrhagic stroke based on clinical evaluation and confirmed by neuroimaging (CT/MRI) were included in the study. The inclusion criteria consisted of adult patients aged more than 18 years presenting with signs and symptoms suggestive of stroke within 72 hours of onset. Patients with transient ischemic attacks (TIAs), traumatic brain injury, space-occupying lesions, or any other non-vascular neurological disorders were excluded.

Each patient underwent a detailed clinical examination and was evaluated using a predesigned proforma capturing demographic data, risk factors (such as hypertension, diabetes, dyslipidemia, smoking, alcohol intake), clinical presentation, neurological deficits, and imaging findings. Investigations included complete blood count, blood glucose, renal and liver function tests, lipid profile, coagulation profile, ECG, chest X-ray, and echocardiography when indicated. CT or MRI scans were performed to determine the type and extent of stroke. Stroke severity was assessed using the NIH Stroke Scale (NIHSS), and functional outcome was evaluated using the Modified Rankin Scale (mRS) at admission and follow-up.

Patients were followed during their hospital stay to assess the clinical course, complications, duration of hospitalization, and in-hospital outcomes. Treatment protocols were based on standard guidelines for ischemic and haemorrhagic stroke management. Outcome measures such as mortality, neurological recovery, and functional status at discharge were recorded. Statistical analysis was carried out using appropriate tests to compare outcomes and prognostic determinants between ischemic and haemorrhagic stroke groups, with a p-value of <0.05 considered statistically significant.

RESULTS

Table 1: Demographic and Risk Factor Profile of Stroke Patients (n=100)

Parameter	Ischemic Stroke (n=50)	Haemorrhagic Stroke (n=50)	p-value
Mean Age (years)	63.4 ± 9.6	58.2 ± 10.3	<0.05*
Male : Female Ratio	32:18	34:16	>0.05
Hypertension (%)	38 (76%)	42 (84%)	>0.05
Diabetes Mellitus (%)	28 (56%)	20 (40%)	<0.05*
Smoking (%)	22 (44%)	24 (48%)	>0.05
Alcohol Consumption (%)	18 (36%)	26 (52%)	<0.05*

*Statistically significant.

Table 2: Clinical Presentation and Stroke Severity

Clinical Feature	Ischemic Stroke (n=50)	Haemorrhagic Stroke (n=50)	p-value
Hemiparesis	46 (92%)	44 (88%)	>0.05
Altered Sensorium	10 (20%)	30 (60%)	<0.001*
Vomiting	8 (16%)	28 (56%)	<0.001*
Seizures	2 (4%)	16 (32%)	<0.001*
NIHSS Score ≥16 (Severe)	12 (24%)	30 (60%)	<0.001*

*Statistically significant.

Table 3: Outcomes and Prognostic Indicators at Discharge

Outcome Parameter	Ischemic Stroke (n=50)	Haemorrhagic Stroke (n=50)	p-value
Mean Hospital Stay (days)	7.2 ± 2.1	9.6 ± 3.4	<0.01*
Mortality	6 (12%)	14 (28%)	<0.05*
Modified Rankin Score 0–2	28 (56%)	14 (28%)	<0.01*
Residual Neurological Deficits	20 (40%)	32 (64%)	<0.05*

*Statistically significant.

DISCUSSION

The present hospital-based study compared clinical profiles, severity indices and short-term outcomes of ischemic (IS) and haemorrhagic stroke (HS) in 100 consecutively admitted patients. Three principal findings emerge. First, the two subtypes differ in demographic and risk-factor patterns, with IS occurring at an older mean age and showing a stronger association with diabetes, while HS patients exhibited heavier alcohol use. Second, HS presented with greater initial neurological compromise—reflected by higher frequencies of altered sensorium, vomiting, seizures and NIHSS ≥ 16—underscoring its more fulminant pathophysiology. Third, the early prognosis after HS was considerably worse, as evidenced by longer hospitalization, higher mortality and lower proportion of functionally independent survivors (mRS 0-2 at discharge) [7, 8].

The 5-year age gap between groups (63 vs 58 years) mirrors global epidemiology, where cumulative atherosclerotic burden, atrial fibrillation and small-vessel lipohyalinosis delay ischemic events into later life, whereas uncontrolled hypertension precipitates intracerebral rupture at relatively younger ages. Diabetes emerged as a significant determinant in IS (56 % vs 40 %), consistent with its role in endothelial dysfunction and accelerated atherothrombosis. Conversely, the strong association of alcohol (52 % vs 36 %) with HS corroborates experimental data that binge drinking induces acute surges in blood pressure and impairs clotting mechanisms, predisposing to vessel rupture. Hypertension prevalence was high in both cohorts (> 75 %), reinforcing its status as the pivotal modifiable driver of all stroke but particularly of HS.

Clinical presentation data illuminate the contrasting neurobiology. Nearly three fifths of HS patients exhibited depressed consciousness on arrival versus one fifth of IS cases; the difference likely reflects rapid mass-effect, raised intracranial pressure and intraventricular extension that are uncommon in early ischemia. Similarly, seizures—present in 32 % of HS vs 4 % of IS—can be attributed to cortical irritation by blood products. These features translated into a threefold higher proportion of severe strokes (NIHSS ≥ 16) among HS, aligning with multicentre registries that describe median NIHSS of 10-12 in IS and 18-20 in primary intracerebral haemorrhage [9, 10].

Outcome analysis confirms the prognostic gulf. In-hospital mortality of 28 % for HS contrasts with 12 % for IS; although slightly lower than some population-based series, the relative risk (RR = 2.3) remains comparable. Functional independence at discharge (mRS 0-2) was attained by just 28 % of HS patients against 56 % of their ischemic counterparts—a figure influenced by initial severity but also by limited evidence-based therapies for haemorrhage. Thrombolysis, thrombectomy and organized secondary prevention afford substantial early recovery in IS, whereas HS management is largely supportive, focusing on blood-pressure control, reversal of coagulopathy and neurosurgical decompression in selected cases. Notably, mean stay was two days longer in HS, reflecting medical instability and rehabilitation delays.

Several prognostic determinants emerge. Advanced age, severe baseline NIHSS, altered sensorium and seizure occurrence clustered with poor outcome irrespective of subtype, but haemorrhagic aetiology itself independently predicted mortality and disability. These variables can inform bedside prognostication and triage decisions. From a public-health perspective, the data underscore the imperative of aggressive hypertension screening, diabetes control and alcohol-harm reduction to curb both stroke incidence and severity.

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