



Original Article

Medicolegal Challenges in the Autopsy Diagnosis of Fatal Cerebrovascular Accidents: A Retrospective Study from Eastern India

Swarnali Mukherjee¹, Kallol Roy², Satrajit Roy³

¹⁻² Assistant Professor, Department of FMT, Barasat Govt. Medical College & Hospital, WB

³ Senior Resident, Department of FMT, Barasat Govt. Medical College & Hospital, WB

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Corresponding Author:

Dr. Swarnali Mukherjee

Assistant Professor, Department
of FMT, Barasat Govt. Medical
College & Hospital, WB.

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ABSTRACT

Background: Fatal cerebrovascular accidents (CVAs) are important causes of sudden natural death encountered during medicolegal autopsies. However, these cases frequently present with falls, external injuries, prolonged hospitalization, decomposition, and diagnostic uncertainty, creating significant challenges for forensic pathologists.

Objectives: To analyse the demographic characteristics, medicolegal circumstances, autopsy findings, associated traumatic injuries, and diagnostic challenges encountered in fatal cerebrovascular accidents referred for medicolegal autopsy.

Materials and Methods: A retrospective descriptive study was conducted using medicolegal autopsy records of fatal cerebrovascular accidents examined in tertiary care centres of Eastern India. Twenty-three autopsy-confirmed cases of fatal CVA were included. Data regarding age, sex, circumstances preceding death, type of cerebrovascular lesion, external and internal injuries, associated pathological findings, and diagnostic pitfalls were extracted and analysed using descriptive statistics.

Results: The age of the deceased ranged from 29 to 85 years, with elderly individuals predominating. Both ischemic and haemorrhagic cerebrovascular accidents were encountered. Sudden collapse and falls were common medicolegal presentations. Several cases demonstrated associated traumatic findings including abrasions, bruises, black eyes, scalp contusions, and cranial fractures despite the primary pathology being natural disease. Bronchopneumonia, pulmonary oedema, pressure sores, cardiac hypertrophy, coronary sclerosis, and renal changes were frequent associated findings. Delayed deaths following hospitalization and decomposed bodies further complicated interpretation.

Conclusion: Fatal cerebrovascular accidents often enter the medicolegal system masquerading as traumatic deaths because of secondary injuries and misleading circumstances. Careful clinicopathological correlation and meticulous autopsy examination are essential to distinguish natural disease from trauma and to avoid erroneous medicolegal opinions.

Keywords: Cerebrovascular accident; Stroke; Medicolegal autopsy; Intraparenchymal haemorrhage; Cerebral infarction; Forensic pathology.

INTRODUCTION

Stroke is a major cause of mortality and disability worldwide and represents an important category of sudden natural deaths encountered during medicolegal autopsy.¹⁻³ Cerebrovascular accidents encompass both ischemic infarctions and intracerebral haemorrhages resulting from interruption of cerebral blood flow or rupture of cerebral vessels.⁴⁻⁷

In forensic practice, fatal CVAs frequently pose diagnostic dilemmas. Victims often collapse suddenly, sustain falls, or present with external injuries raising suspicion of assault or accidental trauma.^{10-12, 15-17} Delayed hospital deaths may be complicated by bronchopneumonia, pressure sores, and systemic infections, obscuring the primary pathology.²¹⁻²³ In decomposed bodies, recognition of cerebrovascular pathology becomes even more challenging.²⁴

Indian literature predominantly focuses on epidemiological aspects of stroke, whereas studies addressing the medicolegal implications of fatal CVAs remain scarce.^{13,14} The present study was undertaken to evaluate the spectrum of medicolegal challenges encountered during autopsy diagnosis of fatal cerebrovascular accidents.

MATERIALS AND METHODS

Study Design

Retrospective descriptive study.

Study Setting

Medicolegal autopsies performed at tertiary care centres of Eastern India.

Study Period

Cases included in the present series spanned multiple years represented in the autopsy records reviewed.

Study Population

Twenty-three medicolegal autopsies diagnosed as fatal cerebrovascular accidents.

Inclusion Criteria

- Autopsy-confirmed fatal cerebrovascular accidents.
- Ischemic cerebral infarctions.
- Intraparenchymal haemorrhages.
- Cases referred as medicolegal deaths.

Exclusion Criteria

- Purely traumatic intracranial haemorrhages without evidence of primary cerebrovascular disease.
- Incomplete autopsy records.

Variables Studied

- Age and sex.
- Circumstances preceding death.
- Survival interval.
- Type of cerebrovascular lesion.
- Brain regions involved.
- External injuries.
- Internal traumatic findings.
- Pulmonary complications.
- Cardiovascular pathology.
- Associated renal findings.
- Diagnostic challenges.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using descriptive statistics. Frequencies and percentages were calculated.

RESULTS

A total of 23 medicolegal autopsies of non-traumatic fatal intracranial haemorrhage were analysed. Males constituted the majority (56.5%), with a male-to-female ratio of approximately 1.3:1. The age of the deceased ranged from 29 to 85 years, with the highest frequency observed in the 61–80-year age group (47.8%).

Table 1. Demographic Characteristics and Circumstances of Fatal Intracranial Haemorrhage Cases (n = 23)

Variable	Frequency (n)	Percentage (%)
Sex		
Male	13	56.5
Female	10	43.5
Age group (years)		
21–40	1	4.3
41–60	8	34.8
61–80	11	47.8
>80	3	13.0
Circumstances preceding death		
Sudden collapse/neurological deterioration	12	52.2

Variable	Frequency (n)	Percentage (%)
Fall following onset of symptoms	8	34.8
Long-standing illness with deterioration	2	8.7
Pregnancy-related presentation	1	4.3

More than half of the decedents (52.2%) developed sudden neurological deterioration or collapse, while 34.8% experienced falls following the onset of symptoms. One case involved a pregnant woman presenting with abdominal pain and subsequently found to have fatal intracranial haemorrhage.

Deep intraparenchymal haemorrhage was the predominant autopsy finding (65.2%). Extension into subdural or subarachnoid spaces was observed in 26.1% of cases, whereas two cases demonstrated liquefactive necrosis consistent with older cerebrovascular events.

Table 2. Spectrum of Intracranial Haemorrhagic Lesions Identified at Autopsy (n = 23)

Autopsy Findings	Frequency (n)	Percentage (%)
Deep intraparenchymal haemorrhage	15	65.2
Intraparenchymal haemorrhage with subdural/subarachnoid extension	6	26.1
Liquefactive necrosis/old infarction with secondary haemorrhagic changes	2	8.7
Ventricular extension of haemorrhage	5	21.7
Midline shift of brain	2	8.7
Cerebellar involvement	7	30.4
Thalamic involvement	10	43.5

External injuries were absent in nearly half of the cases (47.8%). Where present, the injuries were generally minor and compatible with secondary impact during collapse rather than primary traumatic mechanisms.

Associated systemic pathology was common. Cardiovascular abnormalities, including left ventricular hypertrophy, atherosclerosis, valvular thickening, and vascular sclerosis, were present in 78.3% of cases. Renal changes suggestive of chronic hypertensive disease were observed in 82.6%, and pulmonary pathology such as oedema, consolidation, or bronchopneumonia was identified in 65.2%.

Table 3. Medicolegal Challenges and Associated Autopsy Findings in Fatal Intracranial Haemorrhage (n = 23)

Findings	Frequency (n)	Percentage (%)
External injuries present	12	52.2
No external injuries	11	47.8
Pulmonary complications (oedema/consolidation/bronchopneumonia)	15	65.2
Cardiovascular pathology (LV hypertrophy/atherosclerosis)	18	78.3
Renal changes suggestive of chronic disease	19	82.6
Pressure sores in prolonged hospital stay	4	17.4
Cases mimicking traumatic death due to falls/injuries	8	34.8

DISCUSSION

The present study highlights the unique medicolegal dimensions of fatal cerebrovascular accidents.

A notable finding was the frequent occurrence of falls preceding death. Similar observations have been reported previously, where sudden neurological compromise predisposes patients to collapse and secondary injuries.^{19, 20, 29} Such injuries may be misinterpreted as evidence of assault if the underlying pathology is overlooked.^{10-12, 15-17}

The coexistence of abrasions, bruises, black eyes, scalp contusions, and even cranial fractures underscores the importance of careful interpretation. In the present series, traumatic findings often represented consequences rather than causes of the fatal event.

Delayed hospital deaths introduced additional complexity. Bronchopneumonia, pressure sores, and pulmonary complications reflected prolonged survival following the initial cerebrovascular insult, findings that are well documented in previous studies.²¹⁻²³ Failure to recognize these secondary changes may divert attention from the primary diagnosis.

Batchelor et al. reported falls as a frequent complication among stroke survivors, a finding comparable to the present series where several individuals sustained secondary traumatic injuries following neurological collapse.²⁰ Similarly, Langhorne et al. identified respiratory infections as important contributors to post-stroke morbidity and mortality, which is consistent with the bronchopneumonia observed in our delayed deaths.²¹

Cardiovascular abnormalities, particularly left ventricular hypertrophy and coronary sclerosis, were common. These findings support the established association between hypertension, atherosclerosis, and fatal stroke described in standard pathology literature.^{8,9}

The study also emphasizes the importance of thorough examination of decomposed bodies. Recognition of residual pathology in decomposed remains continues to be an important challenge in forensic practice.²⁴

The principal contribution of this study lies in demonstrating that fatal CVAs frequently masquerade as unnatural deaths, necessitating meticulous autopsy examination and clinicopathological correlation.^{15-17,25}

LIMITATIONS

- Small sample size.
- Retrospective study design.
- Single geographical region.
- Lack of histopathological examination in all cases.
- Limited clinical and radiological correlation.

CONCLUSION

Fatal cerebrovascular accidents represent an important cause of medicolegal autopsy referrals. Sudden collapse, falls, secondary traumatic injuries, delayed complications, and decomposition frequently obscure the underlying natural disease process. Awareness of these diagnostic pitfalls, combined with systematic autopsy examination, is essential to distinguish natural cerebrovascular deaths from traumatic fatalities and to formulate accurate medicolegal opinions.

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CONFLICT OF INTEREST

None declared.

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ETHICAL CONSIDERATIONS

The study utilised medicolegal autopsy records and adhered to prevailing ethical principles governing biomedical and health research.²⁷

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