

A Study to Assess the Spectrum of Risk Factors and Clinical Features of Lacunar Strokes

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Abstract

Introduction: Lacunar strokes have a varied clinical presentation and etiological spectrum. Computed tomography and magnetic resonance imaging have greatly increased our ability of precise diagnosis. As the functional outcome of lacunar stroke is generally better than other types of strokes; therefore, this study was conducted to assess the risk factors and clinical presentation of lacunar strokes.

Materials and Methods: This cross-sectional, observational study was conducted on 40 patients aged above 45 years and having lacunar stroke patients. Relevant history and investigations were recorded.

Results: Mean age is 62.48 ± 8.76 years with male to female ratio of 2.63:1. Hypertension was present in 50% cases. HDL was deranged in 95% cases. Pure motor hemiparesis was present in 75% cases. Gangliocapsular area was involved in 29% cases.

Conclusion: Elderly males are most commonly affected. Hypertension and dyslipidemia are common risk factors. Pure motor hemiparesis is the most common presentation and gangliocapsular region is the most common site of lesion.

Key words: Gangliocapsular, Hemiparesis, Lacunar infarct, Lacunar stroke

INTRODUCTION

Historically, the term “lacune” has been used in medical field since long. It was first used to describe the small cavity that remains after a small stroke has healed.^[1] Lacunar infarctions are small subcortical lesions with a size of less than 15 mm in diameter caused by occlusion of a penetrating artery from a large cerebral artery, most commonly from the Circle of Willis. These penetrating arteries arise at sharp angles from major vessels and are, thus, anatomically prone to constriction and occlusion.^[2] Lacunar ischemic strokes comprise approximately 20% of all ischemic strokes. Many different types of lacunar stroke syndromes have been categorized.^[3]

Historically, Dechambre, a French physician, first used the term “lacune” to describe a small cavity formed in

the core of cerebral infarcts in the course of liquefaction and resorption of the infarct. Later, Max Durand-Fardel provided a more detailed description, identifying lacunae as healed, small infarcts.^[4] He also coined the term “état criblé” which can be translated as “tissue riddled with holes” and “sieve-like state” and indicated “dilatations of perivascular space.”^[5]

Hypertension and diabetes mellitus are the major risk factors associated with lipohyalinosis and subsequent lacunar infarction. These risk factors are not present in all the cases and pathologically, the presence of small-vessel disease cannot be confirmed. Other postulated etiologies include atherosclerosis, embolism and stenosis, neurocysticercosis, infectious arteritis, and others.^[6]

Historically, lacunar infarcts have been associated with a favorable short-term prognosis. However, over the years, it has been realized that lacunar infarcts are perhaps a more complex and less benign phenomenon than generally presumed. However, despite the availability of newer imaging modalities, particularly computed tomography (CT) scanning and magnetic resonance imaging, which have enabled the detection of most lacunae *in vivo*,^[7] the research about lacunar strokes is still lacking.

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Since the functional outcome of lacunar stroke is generally better than other types of strokes, therefore, this study was conducted to assess the spectrum of risk factors and clinical presentation of lacunar strokes.

MATERIALS AND METHODS

This cross-sectional, observational, and analytical study was conducted after obtaining approval from the Institutional Ethics Committee. Patients aged more than 45 years and diagnosed with lacunar stroke in the medicine out-patient department (OPD) or admitted in the ward and who consented to participate were included in the study. Any patient having hemorrhagic stroke or acute stroke which appeared to be major cerebral infarct or strokes proven to be a space-occupying lesion or patients not consenting to participate in the study were excluded from the study. A total of 40 patients were included in the study.

Written informed consent was obtained from all the patients. Demographics, detailed medical history, including additional comorbidities and personal history, were recorded. The findings of laboratory and radiological investigations were recorded. Data were analyzed using appropriate software.

Statistical Analysis

All the data were analyzed using SPSS. Descriptive statistics were done. Results were expressed as mean \pm standard deviation and proportions.

RESULTS

The mean age of the study population was 62.48 ± 8.76 years (range: 50–82 years). Males were more affected (72.5%) than females (27.5%). The distribution of risk factors in the study population is shown in Table 1.

Based on clinical diagnosis, pure motor hemiparesis was present in 75% of the cases, dysarthria and clumsy hand in 12.5% cases, transient ischemic attack (TIA) in 7.5% cases, and pure sensory hemiparesis and ataxic hemiparesis in 2.5% cases each.

The laboratory findings in the study population are described in Tables 2 and 3. 2D ECHO showed that 70% of the patients had normal findings, 25% had diastolic dysfunction, and 2.5% had lateral wall ischemia and MS each. About 92.5% of the patients had normal carotid Doppler, 5% had fibro-fatty plaque at RCCA, and 2.5% had fibro-calcific plaque and decreased intima-media thickness of bilateral CCA. CT showed that 30% of the cases had a single lesion while 70% of the cases had multiple lesions.

According to the site of lesion, gangliocapsular area was involved in 29.0% cases, followed by corona radiata in 24.2% cases, thalamus in 22.5% cases, lentiform nucleus in 11.3% cases, and pons and internal capsule in 6.5% cases each.

DISCUSSION

In the present study, it was observed that most of the patients belong to the older age group with a mean age of study subjects was 62.48 ± 8.76 years. Similar were the findings in the study by Kaul *et al.*,^[5] where the majority of the patients having lacunar infarct were between 55 and 75 years. Advancing age is an important risk factor for lacunar infarction as evident by previous studies by Kaul *et al.*^[5] and Arboix.^[8]

Furthermore, in the present study, a male preponderance was noted with male to female ratio of 2.63:1. This was similar to the study by Kaul *et al.*^[5] where the ratio was 3.5:1.

Risk Factors

In the present study, it was found that smoking was the most common risk factor, present in 55% of the cases. Among the comorbidities, hypertension was the most common (50%), followed by diabetes (30%) and IHD (7.5%). Similarly, in the study by Horowitz *et al.*,^[6] they found that hypertension was present in 68% of the cases followed by diabetes in 28% of the cases. Boiten and Ladder^[9] also had noted similar findings.

In another study by Kaul *et al.*,^[5] hypertension was more common (62%) than diabetes (38%). Smoking was also a

Table 1: Distribution of risk factors in the study population

Parameter	Number	Percentage
Smoking	22	55
Alcoholism	4	10
Diabetes mellitus	12	30
Hypertension	20	50
Ischemic heart disease	3	7.5
Others	5	12.5

Table 2: Distribution of laboratory findings in the study population

Parameter	Mean	SD	Range
Fasting blood sugar (in mg/dL)	134.43	49.22	66–295
Post prandial blood sugar (in mg/dL)	183.07	75.92	80–354
HBA1C (in %)	5.91	0.97	5–10.6
Total cholesterol (in mg/dL)	203.32	51.45	105–300
Triglycerides (in mg/dL)	158.53	67.04	66–413
LDL cholesterol (in mg/dL)	99.76	32.82	30–212
HDL cholesterol (in mg/dL)	32.65	11.09	20–94

Table 3: Distribution of laboratory findings according to the normal ranges in the study population

Parameter (cut off)	Normal		Abnormal	
	Number	Percentage	Number	Percentage
Fasting blood sugar (126 mg/dL)	25	62.50	15	37.50
Post-prandial blood sugar (200 mg/dL)	29	72.50	11	27.50
HBA1C (6.5%)	33	82.50	7	17.50
Total cholesterol (240 mg/dL)	33	82.50	7	17.50
Triglycerides (150 mg/dL)	21	52.50	19	47.50
LDL cholesterol (100 mg/dL)	27	67.50	13	32.50
HDL cholesterol (40–60 mg/dL)	2	5.00	38	95.00

significant risk factor in 28% of the cases. Similarly, Bejot *et al.*^[10] observed that hypertension was the most common (69%), followed by diabetes (12.3%).

Clinical Features

In the present study, pure motor hemiparesis was the most common, followed by dysarthria and clumsy hand, TIA, pure sensory hemiparesis, and ataxic hemiparesis.

Kaul *et al.*^[5] found that pure motor hemiparesis was the most common presenting syndrome in 45% patients. Ataxic hemiparesis and sensorimotor stroke accounted for 18% each and dysarthria-clumsy hand syndrome for 14%.

In another study, Arboix^[8] found that pure motor hemiparesis was the most common syndrome (55%) followed by pure hemisensory stroke (18%).

Laboratory Findings

In the present study, dyslipidemia (especially HDL) was more common than hyperglycemia.

A study also observed that cholesterol levels were raised in 17% of the cases, triglycerides in 15.7% cases, LDL in 28.57% cases, and HDL was deranged in 61.4% of the cases. They also observed that HbA1c was deranged in 51.4% of the cases and FBS in 52.9% of the cases, similar to the present study.

Studies by Bots *et al.*^[11] and Basharat *et al.*^[12] noted that dyslipidemia, particularly with respect to HDL, was associated with an increased risk of all types of ischemic strokes.

Carotid Doppler

In the present study, most of the cases were normal (92.5%) with plaques present in only 7.5% of the cases.

Similarly, in the study by Horowitz *et al.*,^[6] they identified atherosclerotic plaque as a possible embolic source in 23% of patients.

Site of Lesion

In the present study, gangliocapsular area was the most commonly involved area, followed by corona radiata, thalamus, lentiform nucleus, pons, and internal capsule.

Limitations

The study was limited by the OPD attendance of the patients having lacunar stroke. Therefore, the results may not be generalized.

CONCLUSION

It can be effectively concluded from the present study that lacunar stroke affects the elderly age group with male preponderance. Hypertension and dyslipidemia (particularly, HDL) are the commonest risk factors. Pure motor hemiparesis is the most common presentation and pure sensory and ataxic hemiparesis are the least common. Gangliocapsular region is the most common site of the lesion, while pons and internal capsule are the least commonly affected areas. Carotid Doppler is normal in the majority of the cases.

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