A Study of Lacunar Stroke with Special Refrence to Elderly Patients

Dr. Sucheeth Avanti[1],Dr Purwa Doke[2],Dr. T.K.Biswas[3]

ResidentDeptOf Geriatrics, LecturerDept of General Medicine, Professor & HODDept of Geriatrics.
MGM Medical College MGM Institute Of Health Sciences Deemed University Navi Mumbai

Abstract: *Stroke is the leading cause of death and the most common cause of severe disability. World Health Organization defines clinical diagnosis of stroke as.*"*Rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting for 24hours or longer or leading to death, with no apparent cause other than of vascular origin". This definition includes subarachnoid and intra cerebral haemorrhage but excluding syndromes mimicking stroke resulting from trauma, CNS infections, tumours etc.Much of our current knowledge of lacunar stroke is due to Fisher's prior cadaveric dissection of post-mortem stroke patients. Most of the studies pertaining to lacunar stroke are old. Then precise diagnosis of pathology and site was clinical and based on x rays. Present advancement in CT scan and MRI have many folded increased accuracy in diagnosis.*
Aims*: To study the clinical features, risk factors of lacunar stroke, outcomes of lacunar strokes in adults.*
Objectives:*To find out incidence of lacunar stroke amongst stroke in adults specially in elderly.To asses risk factors so as to adopt suitable preventive measures.*
Method:*All the cases newly diagnosed as lacunar stroke was in the study population. Already diagnosed and coming for follow up were also included in the study.*
Results: *The cases coming with the history of infract is examined and looked for the incidence age sex and risk factors comparing with the patients of age below 60yrs to 60yrs and above.*
Discussion: *By the results obtained it is compared with the other similar studies.*
Conclusion:*To know the incidence of lacunar infract, the mean age group effected, To know the risk factors leading to the infarct for possible preventive measure and clinical feature for quick diagnosis for appropriate treatment.*
Keywords:*Clinical features, Lacunar infract, Risk factors, stroke, tumours.*

I.   Introduction

Stroke is the leading cause of death and the most common cause of severe disability. World Health Organization defines clinical diagnosis of stroke as:

" Rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting for 24hours or longer or leading to death, with no apparent cause other than of vascular origin". This definition includes subarachnoid and intra cerebral haemorrhage but excluding syndromes mimicking stroke resulting from trauma, CNS infections, tumours etc.

Stroke is classified into two main types:

1). Ischaemic stroke

2). Haemorrhagic stroke

The Trial of ORG 10172 in Acute Stroke Treatment (TOAST) developed a different system for categorization of stroke subtypes based on etiology. It included the following 5 subtypes of ischemic stroke[2]:

- Large artery atherosclerosis
- Cardioembolism
- Small vessel occlusion (lacunar stroke)
- Stroke of other determined etiology
- Stroke undetermined etiology

Much of our current knowledge of lacunar stroke is due to Fisher's prior cadaveric dissection of post-mortem stroke patients. Most of the studiespertaining to lacunar stroke are old. Then precise diagnosis of pathology and site was clinical and based on x rays. Present advancement in CT scan and MRI have many folded increased accuracy in diagnosis. Even then there not many studies on clinical presentation and association of risk factors and particularly in elderly population. Whatever studies are available, have been carried outside India. Only few Indian studies are available. There is no literature on this subject from the Indian subcontinent.

II. Material & Method

Study was conducted from 01st May 2014 to 31st August 2016 in MGM Hospital, Kamothe. Navi Mumbai, a tertiary referral university hospital receiving patients from surrounding urban and suburban areas.

The study was prospective one.

All the cases newly diagnosed as lacunar stroke was in the study population. Already diagnosed and coming for follow up were also included in the study.

III. Aims & objectives

Aims
1. To study the clinical features of lacunar stroke.
2. To study the risk factors of lacunar stroke.
3. To study the outcomes of lacunar strokes in adults aged above 60years.
   Objectives
1. To find out incidence of lacunar stroke amongst stroke in adults specially in elderly.
2. To asses risk factors so as to adopt suitable preventive measures.

Inclusion criteria
1. History of stroke(large and/or small vessels affected)
2. Adults
3. Patients either sex presenting with stroke.

Exclusion criteria

Patients presenting with
1. Transient ischemic attacks.
2. Intra cranial space occupying lesions

Lacunar stroke or lacunar infract(LACI) is defined as a type of stroke that results from occlusion of one of the penetrating arteries that provides blood to brain's deep structures.

The diagnosis was based on Computed Tomography scan or MRI of the brain.

The study was carried out in adults.

A details history from the patients was taken & the relevant systemic examination apart from the detailed neurological examination was carried out. All routine investigation like CBC, LFT, RFT, FBS, PPBS, Lipid profile & urine analysis was carried out. In all patients ECG, chest x ray, 2D ECHO & carotid Doppler was done.

The following seven traditional risk factors were studied in details in all cases of lacunar stroke.
1. Hypertension
2. Diabetes Mellitus
3. Obesity
4. Hyperlipidemia
5. Tobacco smoking
6. Alcohol
7. Family history or previous stroke

IV. Results

Table no-1 Age and sex wise distribution

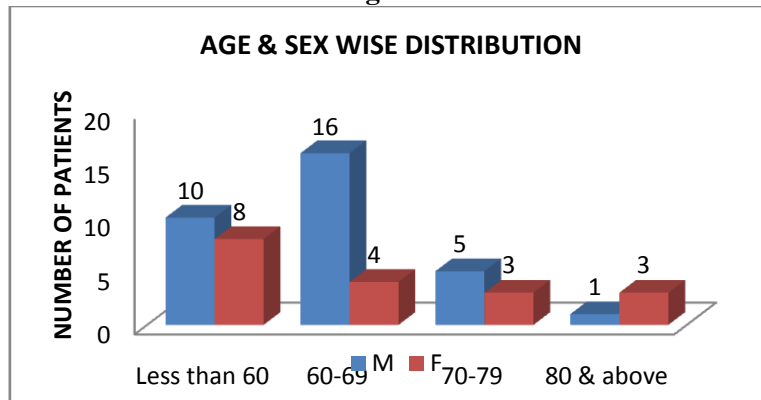|	M	F	Total
Less than 60	10	8	18
60-69	16	4	20
70-79	5	3	8
80 & above	1	3	4
Total	32(64%)	18(36%)	50(100%)

Figure 1

Table no-1 shows the distribution of 50(100%) patients based on the sex in which 32(64%) were males and 18(36%) were females. Among these 18(36%) patients below 60years and 32(64%) were 60years or above.

Table No-2 Distribution according to risk factors

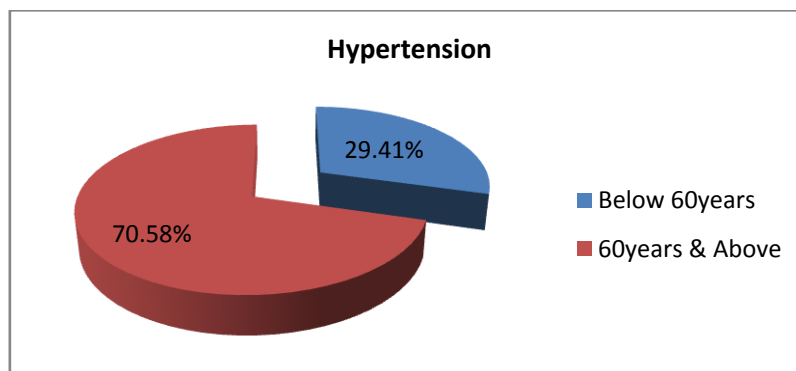|	Below 60	60 & above	
Hypertension	5	12	17(34%)
DM	14	20	34(68%)
Obesity	12	23	35(70%)
Hyperlipidemia	14	25	39(78%)
Smoking	10	20	30(60%)
Alcohol	8	12	20(40%)
Family History	2	1	3(6%)

Figure 2
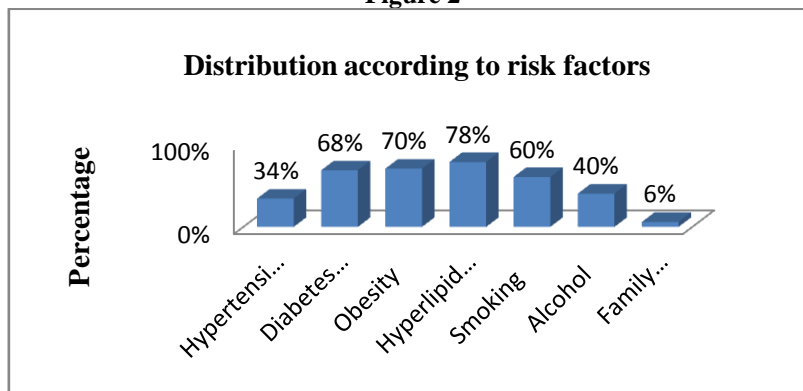
Figure 2.1 Distribution of Hypertension

Hypertension was found to be in 17 patients from 50 i.e. 34%. 5(29.41%) patients were of age group below 60years and 12(70.58%) were in the age group of 60years and above in these 17 hypertensive patients.

Figure 2.2 Distribution of Diabetes mellitus

Diabetes mellitus was present in 68% of patients. In 34 patients out of 50 a fasting blood sugar >126mg/dl & post prandial sugar >200mg/dl was found. Further these 34 patients in which 14(41.17%) were younger than 60years of age and 20(58.82%) were 60years and older.
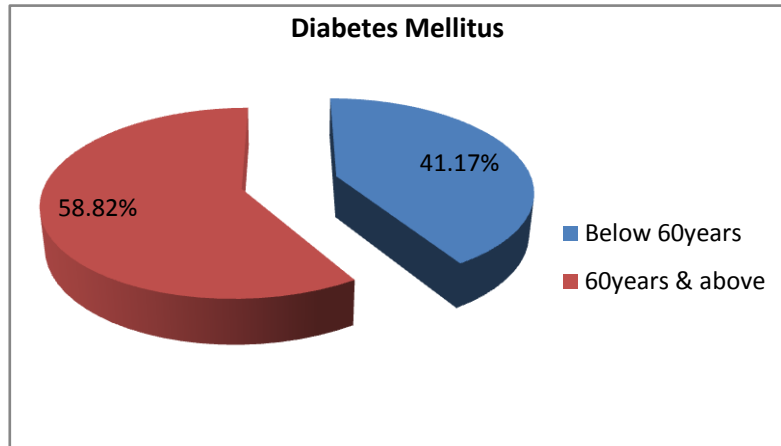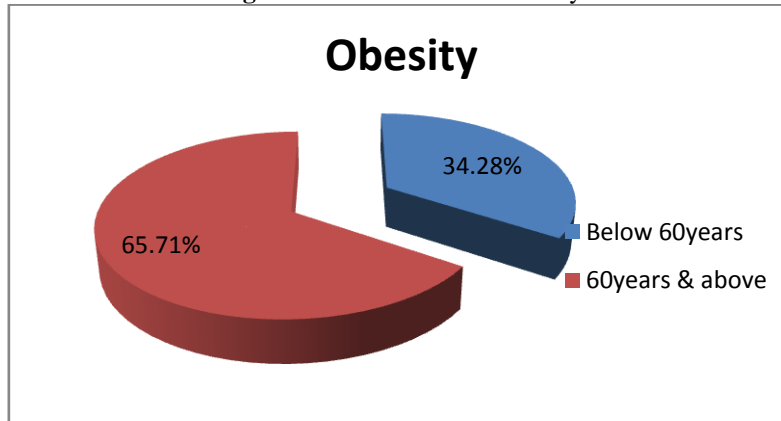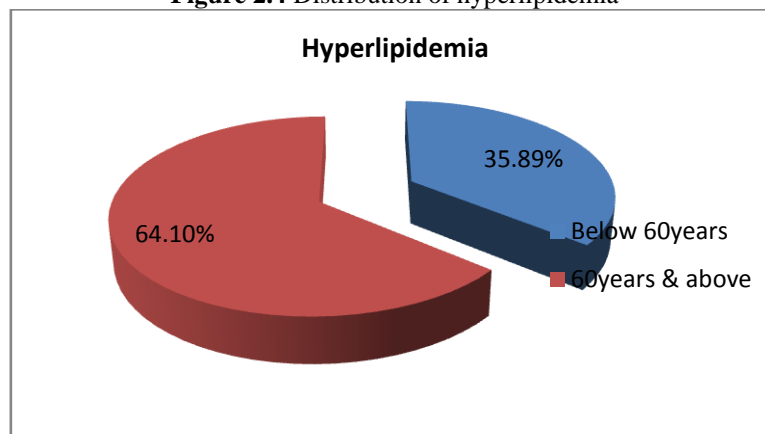

**Figure 2.3** Distribution of obesity

Obesity was found in 70% individuals. Total 35 patients from 50 had a BMI >30kg/msq. In these 35 patients 12(34.28%) were younger than 60years of age and 23(65.71%) were 60years and older.

**Figure 2.4** Distribution of hyperlipidemia

Hyperlipidemia was present in 78% individuals. Total 39 patients out of 50 had triglycerides on a higher level. In these 39 patients 14(35.89%) were younger than 60years of age and 25(64.10%) were 60years and older.

Figure 2.5 Distribution of smoking
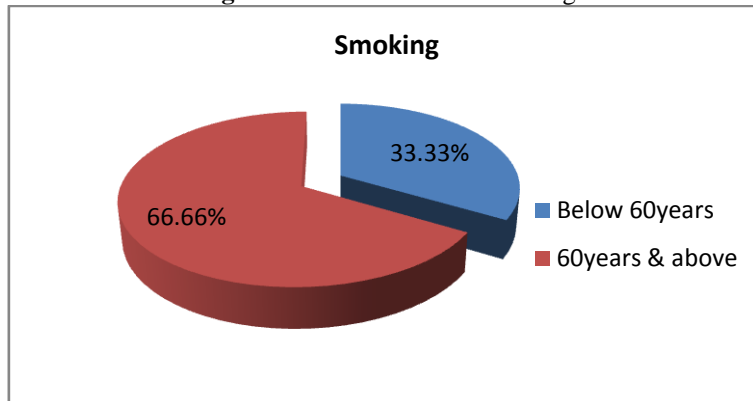
Smokers were 60% persons. Total 30 out of 50 persons gave history of tobacco smoking. In these 30 persons 10(33.33%) were younger than 60years of age and 20(66.66%) were 60years and older.

Figure 2.6 Distribution of alcohol
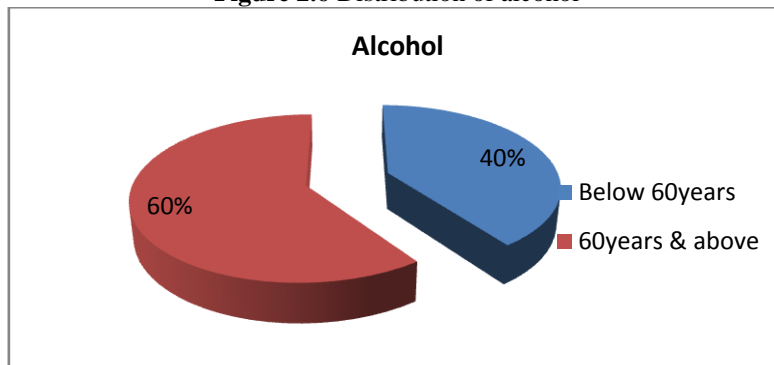
Total 40% individuals consumed alcohol. Overall 20 people from 50 gave history of alcohol consumption. In these 20 people 8(40%) were younger than 60years of age and 12(60%) were 60years and older.

Figure 2.7 Distribution of family history
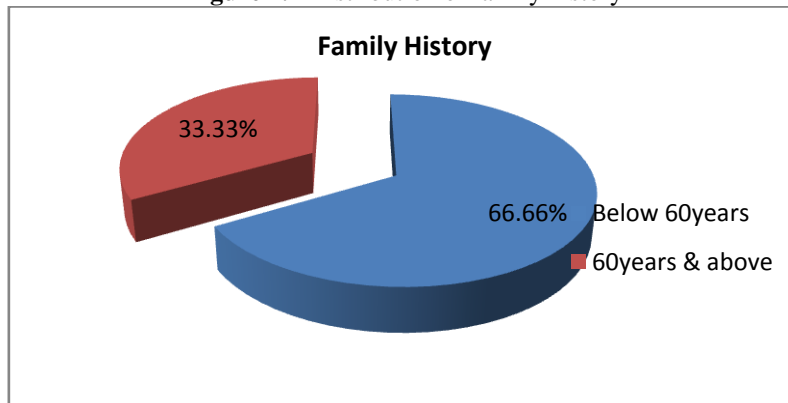
Only 3 patients gave a positive history of ischemic CVA in their first degree relatives. Out of which 2(66.66%) were younger than 60years of age and only 1(33.33%) was older than 60years of age.

Table No-3 Distribution of clinical features

Clinical features	Frequency	Percentage
Pure motor stroke	34	68%
Pure sensory stroke	1	2%
Dysarthria/CHS	11	22%
Ataxic Hemiparesis	4	8%

Figure 3: Distribution of clinical features
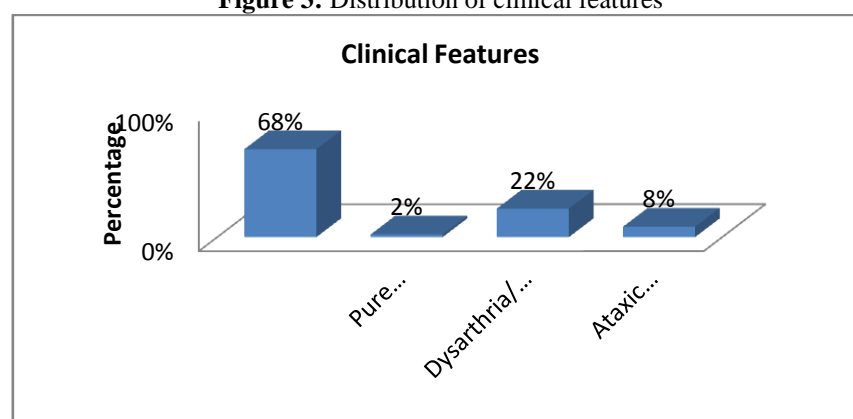
N=50

Pure motor stroke was present in 68% persons and was most commonly seen. This was followed by Dysarthria or clumsy hand present in 22%. Pure sensory stroke and ataxic hemiparesis was seen in less number of individuals.

V.   Discussion
1.   Age & sex distribution
The mean age in this study was found to be 62.52 years with a range from 35-85years.
In the Jordhan University Study, the mean age was 61.2 years with a range from 29-95 years which is similar to this study.
Thus the maximum of the cases were in the range of 60-69years of age. There were 32 males & 18 females in our study. The males were more affected than the females. Similar findings were also seen in the study conducted in Nizam's Institute.

2.   Risk factors
Among the risk factors in this study, hyperlipidemia, obesity & smoking were the commonest risk factor followed by DM & HTN.

Table No-4 Comparison between risk factors from MGM &Nizam's Institute study

Study	Sample size	HTN(%)	DM(%)	Hyperlipidemia(%)	Smoking(%)	Sig carotid stenosis
Our study	50	34	68	80	74	10
Nizam's Institute	141	62	38	--	28	None

In the study from the Nizam's Institute, HTN followed by DM were the commonest risk factors. In North American symptomatic carotid endarterectomy trial group, history of diabetes and hyperlipidemia were more important than arterial hypertension as risk factors for patients with lacunar stroke.
In the Nizam's Institute study, none of the patients of lacunar stroke had significant carotid artery stenosis while in this study, 10% cases had documented significant stenosis.

3.   **Clinical** features

Table No-5 Comparison between clinical features from MGM &Nizam's Institute study.

Clinical Features	PMS (%)	PSS(%)	AH(%)	D/CHS(%)
Our study	68	2	4	22
Nizam's Institute	43	4	18	14

PMS:- Pure Motor Stroke
PSS:-Pure Sensory Stroke
AH:-Ataxic Hemiparesis
D/CHS:-Dysarthria/Clumsy Hand

In this study the most commonest presentation was of pure motor stroke which was also the case seen in the Nizam's Institute study & the Jordhan University study. In medical literature, this type of stroke has been the most common presentation.

This was followed by the dysarthria or clumsy hand syndrome.

In the Nizam's Institute study, ataxia hemiparesis & sensorimotor stroke were the second commonest.

4.   Site of infract for pure motor stroke
In pure motor stroke, maximum number of infracts were present in the internal capsule & corona radiate.
Similar finding were present in the Nizam's Institute study & Jordan University study.

5.   Site of infract for sensorimotor stroke
In sensorimotor stroke, most infracts were in the posterior limb of internal capsule.
Likewise maximum infracts for this type of stroke in Nizam's Institute study were found in the posterior limb of internal capsule more than the anterior limb.

6.   Site of infract for pure sensory type of stroke
In the pure sensory type of stroke, maximum infracts were found in the thalamus followed by the anterior limb of internal capsule.
Similar findings were present in the Nizam's Institute study.

7.   Site of infract for dysarthria or CHS
Corona radiata followed by the thalamus were the most common site for infracts in the dysarthria or clumsy hand syndrome.
In Nizam's Institute study, corona radiata& the anterior limb of the internal capsule were involved the most in CHS.

8.   68% patients were found to have multiple lacunar infracts while 32% patients had single lacunar infracts on neuroimaging.

VI. Conclusion

1.   The maximum patients who had lacunar stroke were in the age group of 60-69years.
2.   The mean age was 62.52years.
3.   Males were more affected than females.
4.   Diabetes mellitus was more common than Hypertension among the subjects.
5.   Hyperlipidemia was also found to be a risk factor for lacunar stroke.
6.   The most common type of lacunar stroke seen was pure motor type followed by dysarthria.
7.   In pure motor type, the maximum number of infracts was found to be in the internal capsule & corona radiata.
8.   In dysarthria type , the commonest site of infracts were also in the corona radiata& internal capsule.
9.   In pure sensory stroke, the infracts were seen in the thalamus & internal capsule.
10.   Patients having pure lacunar stroke had less morbidity than those having lacunar infracts along with a major stroke.
11.   Patients having pure motor stroke had more morbidity than those having dysarthria.
12.   Total 68% patients were found to have multiple lacunar infracts, while 32% had single lacunar infracts on neuroimaging.
13.   The incidence rate of lacunar stroke was found to be 28.4 per 100 strokes per year.

References
[1].   sethi P K. Incidence in India and management of ischemic stroke Neuroscience today 2002; 6:139-143.
[2].   Stroke Vol 24, No 1 January 1993.
[3].   Sacco S, Marini C, Totaro R, et al. A population-based study of the incidence and prognosis of lacunar stroke. Neurology May 9,2006;66(9): 1335-8.
[4].   Poiner J. Derouesre C. Le concept de lacunecerebrale de 1838 a nosjourns. Rev Neurol (Paris)1985;141:3-17.
[5].   Donnan GA Lacunes& Lacunar syndromes In: Ginsberg MD, Bogousslavsky J. (eds) cerebrovascular Disease Pathophysiology, Diagnosis & Treatment. Malden, MA Blackwell science, 1998, 1090-102.
[6].   Millikan C.Futrell N. The fallacy of the lacune hypothesis, stroke 1990; 21: 1251-7
[7].   Bamford JM, Warlow CP, Evolution & testing of the lacunar hypothesis stroke 1988; 19: 1074-82.
[8].   Grau-Olivares M, et al. Neuropsychological abnormalities associated with lacunar infraction, J NeurolSci, 2007 Jun 15;25.