Original Research Paper

Neurology

STUDY ON CLINICAL PROFILE AND OUTCOME OF RECURRENT ISCHEMIC STROKE

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KEYWORDS :

Introduction

Stroke is defined according to the World Health Organization criteria[1] as "rapidly developing symptoms and/or signs of focal, and at times global, loss of cerebral function, with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin."

Recurrent stroke[2] is defined as a stroke, in which there was clinical evidence of the sudden onset of a new focal neurological deficit with no apparent cause other than that of vascular origin (ie, the deficit could not be ascribed to an intercurrent acute illness, epileptic seizure, or toxic effect) occurring at any time after the index stroke; or there was clinical evidence of the sudden onset of an exacerbation of a previous focal neurological deficit with no apparent cause other than that of vascular origin occurring 21 days after the index stroke.Each recurrent stroke[3] was classified as ischemic, hemorrhagic, or of undetermined nature on the basis of a CT or MRI scan performed within 28 days of recurrence or autopsy examination of the brain. Etiologic subtypes of ischemic stroke were defined according to Standardized criteria.

Conceptually the following definition is applicable in a community based study .Recurrence represents the proportion of patients with stroke who had a second stroke during a specified period of time. If a stroke occurred during time interval 3-21 days, it often had to be in a different vascular territory or anatomical site from the first event, of a different stroke subtype, or result in a different neurological deficit, in order to be considered a recurrence. A neurological worsening occurring at any time after the index event[4], following a period of stability of 24 h should be considered a potential recurrent stroke. This will not allow the very early recurrence risk to be underestimated. Stroke-in-progression has been defined by the European Stroke Database collaboration[5] as 'neurological progression occurring within the first 3 days'.

Based on WHO task force[6] report on stroke prevention diagnosis and therapy-1989, it appeared that for large artery hypertension & smoking elevated blood lipid levels, obesity & diabetes are more important modifiable risk factors. Cardio embolic stroke, RHD&IHD[7] seem to be the dominant risk factors among Indians. In this study the incidence of recurrent stroke, various subtypes of presentation, etiologies and risk factors are analyzed. The precise arterial pathology underlying lacunar infarcts[8], which are presumed to result from the occlusion of single, small perforating arteries, remains undetermined. It is often assumed to differ from the

atherothromboembolic processes that occlude large intracranial and extracranial arteries and cause most other types of ischaemic stroke. However, evidencefrom direct pathological studies is limited because lacunar infarction has a low case fatality, autopsy rates are declining, and informative pathological studies are expensive, technicallydemanding and time consuming.

Aims of the study

To study

1. The clinical profile,
2. Patterns of vascular involvement.
3. Analysing the associated risk factors,
4. Combination of more than one risk factor which contribute to recurrence.
5. Analysing the stroke free interval after the index stroke.

Materials and methods

This study was conducted during January 2016 to December 2017 at Tirunelveli Medical College Hospital ,Tirunelveli.

Patients with clinical features suggestive of second or subsequent strokes were taken up for study. All were subjected to CT/MRI scan of brain.

Inclusion criteria

1. All the patients with clinical features suggestive of second or subsequent stroke.
2. Imaging showing ischemic infarcts in the brain

Exclusion criteria

1. First ever episode of stroke
2. Evolving stroke.
3. Imaging showing evidence of hemorrhage.
4. Imaging showing evidence of venous infarct.

Patients' details regarding age, sex, and family history, risk factors like hypertension, diabetes mellitus, hypercholesterolemia, valvular heart disease, atrial fibrillation, trauma, smoking, and substance abuse were recorded. The onset and details of the symptoms and clinical signs were noted during each stroke episode from the patient or close relative and the old records. All patients had detailed neurological examination.

All patients underwent a basic investigation protocol that included complete blood counts , erythrocyte sedimentation rate, blood

glucose, urea ,creatinine, electrolytes, lipid profile (triglycerides, total cholesterol, and fractions) CT brain, chest x-ray, electrocardiogram.

MRI brain with MRA and DWI, carotid and vertebral Doppler study had been done wherever indicated. Investigations done during previous stoke episodes were also recorded.

Observations

A total of 50 patients admitted in Tirunelveli Medical College Hospital between January 2016 and December 2017 with clinical features and neuroimaging suggestive of second or subsequent stroke were included in the study.

Sex Distribution
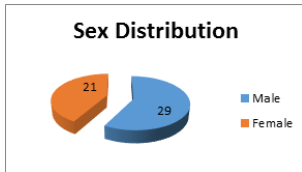
(n=50)

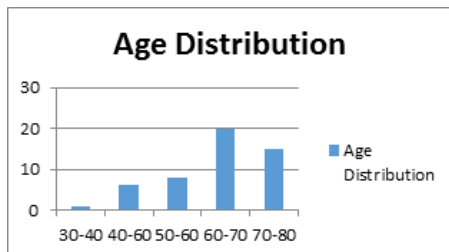(Males: 58%, Females: 42%)

Age Distribution

Table-1
(n:50)

Age group	Number of patients	Percentage
30-40	1	2
40-50	6	12
50-60	8	16
60-70	20	40
70-80	15	30

Incidence of stroke recurrence
Table-3

Period of occurrence	Patients. (n=50)	Percentage
First month	2	4
Within 1 One year	13	26
1- 2 years	20	40
3rd or subsequent	15	30

Vascular territory involved in Ischemic strokes
Table-4.1

Vascular territory involved	Recurrent stroke Number of Patients
Middle cerebralArtery	32
Posterior cerebral artery	7
Anterior cerebral artery	3
Verebrobasilar artery	8

Table-4.2

Recurrent Stroke Territory		Vascular Territory of the first episode in the recurrent stroke patients			
		MCA	PCA	ACA	VBI
MCA	32	24	4	2	2

PCA	7	2	5	0	0
ACA	3	3	0	0	0
VBI	8	1	2	0	5

Table-5
Risk factors identified during first & subsequent strokes

Risk factors	First stroke	
Atherosclerotic	Number percentage Of	patients
Hypertention	32	64
Diabetes mellitus	18	36
Dyslipidemia	10	20
Smoking	28	56
Alcoholism	19	38

Table 5.2 – Combination of Risk factors

Hypertension + Diabetes	15
Hypertension + Dyslipidemia	8
Diabetes + Dyslipidemia	10
Hypertension + Smoking	25
Diabetes + Smoking	14
Diabetes + Alcohol	19
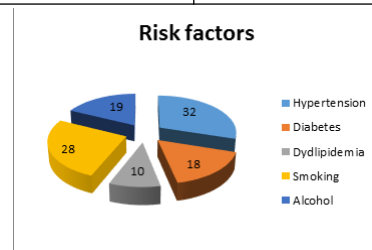
Table-5.3

Risk factors	Number patients of	Percentage
Valvular heart disease	4	8
Ischemic heart disease	10	20
Carotid Artery disease	8	1

Among the valvular heart disease all the four cases were rheumatic heart disease- mitral stenosis with atrial fibrillation, All the 10 ischemic heart disease patients had an episode of myocardial infarction in the past.

In view of the aims and objectives of this study, we were focusing on the risk factors, combination of risk factors and the commonest time period for stroke recurrence. We also focused on the change in vascular territory in the subsequent strokes.

In the present study, 50 patients were enrolled. Similar to previous studies, the majority of cases were male (58%). Regarding the age distribution, the peak was seen at the age group of 60-70years. The recurrence was most common within the period of 1-2 years (40%). Considering the vascular territory involved, Middle Cerebral Artery appeared to be the most common (32/50). In these 32 cases the first episode also involved MCA in 24 cases. The others were distributer in the PCA, ACA and VBA territories. In PCA strokes, 5 of the 7 cases had also suffered the first stroke in the same territory. The other two were in the MCA territory. This was also the case in vertebrobasilar strokes. In ACA strokes, all the three had previous stroke in the MCA territory. Among the risk factors, Hypertension(64%) was the predominant one. In the hypertensive cases, the commonest additional risk factor was smoking, followed by diabetes. The median stroke free interval is between 1 to 2 years among enrolled patients. 16 out of the 24 patints who had the firstt stroke in the MCA territory, developed recurrence in the same side and in the MCA distibution. So, 66% of cases with MCA stroke developed recurrence in the same site. So, intracranial arterial imaging with doppler sstudies/High Resolution MRI/CT Angiography has to be done in patients rather than routine MRI cerebral angiography.

Discussion

Secondary prevention of stroke by treating the modifiable risk factors have been studied in many landmark trials. Prevention of stroke is the goal of all physicans, and there is good evidence that modification of risk factors would reduce the risk. Let us look at the evidence for the interventions that modify the most common risk factors.

Hypertension is a major risk factor for stroke and treating hypertension is a very effective way for primary prevention of stroke.

After searching the medical literature, 7 placebo controllled trials were found. They assessed the effect of lowering B.P in patients with a prior history of stroke or TIA. Meta Analysis was done to combine these results and conclusions were made. The results were expressed as odds ratios. Overall, Antihypertensive medications decreased the risk of recurrent stroke. ACE-I reduced the risk of MI and the combination of drugs reduced both. Four of the seven trials used fixed drug combinations. There were debates whether the effects were because of B.P lowering or because of the direct effect of the drugs.

Smoking increases the risk of Stroke. Level 1 evidence is not available as Randomised controlled trials have never been done on this topic. It is ethically impossible to do so. The next possibility is a prospectiuve cohort trial. The Framingham Study, which started after the Second World War, is still going on. 1n 1988, it reported that cigarette smoking is a risk factor for stroke. It followed 4.225 men and women, 36 to 68 years old. During a 26 year followup, 459 strokes occurred. Multivariate analyis showed that smoking is an independent risk factor for all strokes, especially thrombotic strokes. The risk of stroke increased in proportion to the number of cigarettes smoked. People who stopped smoking still had the same risk for the first 2 years. By 5 years, the risk dropped down to the level of non-smokers. In 1989 a case controlled study looked at 621 patients with stroke and 573 controls without stroke. The authors estimated an increased relative risk of 1.5 for every 10 cigarettes consumed daily, both in men and women.

Intra cranial carotid artery stenosis causes about 5–10% of strokes in white people, 15–29% of transient ischaemic attacks or strokes in black people, and up to 30–50% of strokes in Asian people. The frequency of ICAS as a cause of stroke also seems to be higher in India than in white populations. This may be because of the genetic susceptibility of some racial and ethnic groups, and differences in lifestyle and risk factors between races. Traditional risk factors associated with ICAS include hypertension, smoking, diabetes mellitus, and hyperlipidaemia. In the Warfarin Aspirin Symptomatic Intracranial Disease (WASID) trial, the most important modifiable risk factors for an increased risk of recurrent stroke and vascular events associated with ICAS were raised blood pressure and cholesterol concentrations. In the WASID trial, patients with at least 70% stenosis of a major intracranial artery had an increased risk of recurrent stroke in the territory of the stenosis compared with patients with 50–69% stenosis. Howeve, the presence of collaterals in patients with greater than or equal to 70% stenosis reduced the risk of recurrent stroke. In anotherr study of 69 patients with symptomatic ICAS, Lau and colleagues showed that adequate antegrade flow and good collaterals were protective against stroke. So evaluation of intracranial and extracranial carotid artery patency is important in managing the prevention of recurrence in stroke patients.

Conclusion

From interpreting the results above, recurrence is most common within 1-2 years. So, more vigilance is needed during this period. The predominant risk factor in these cases remains to be hypertension. So hypertension management is still the cornerstone in preventing stroke recurrence. In hypertensives, smoking is found to be the commonest additional risk factor. So counselling is needed to address this. MCA is the commonest vessel involved. In cases where the first stroke occurred in PCA, VBA and ACA, MCA territory is still the site of recurrent strokes in a significant proportion of people. So it seems like screening for MCA atherosclerosis is needed even in cases of non MCA infarcts. Similarly, screening for posterior circulation atherosclerosis may also be helpful in anterior circulation strokes.

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