Original Research Paper

General Medicine

EVALUATION OF MODIFIABLE RISK FACTORS OF ISCHEMIC STROKE

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ABSTRACT Stroke is the third most common cause of death in industrialized countries and leading cause of morbidity and longterm disability. Prevalence rate was higher among men compared with women 3.44 and 2.41 per 1000 respectively. On average, about every three minutes someone dies of a stroke. The modifiable risks factors are discussed[1,2].

KEYWORDS : Stroke; modifiable; risk factors; ischemic

INTRODUCTION:

Ischemic Cerebrovascular disease (ischaemic stroke) is a leading public health problem. Every 53 seconds, someone in the United States has a stroke. Annually, approximately 7,60,000 Americans have an initial or recurrent ischaemic stroke. Rates are particularly high in Asia and Eastern Europe. Although definitive data from many third-world countries are not available, stroke likely is a major health care problem in these nations.

RISK FACTORS FOR ISCHAEMIC STROKE

Non-modifiable risk factors
Advancing age
Gender (men>women)
Ethnicity(AfricanAmerican>AsianAmericans,>HispanicAmericans or whites)
Social and economic status
Family history of vascular disease
Environmental factors

Leading modifiable risk factors
Arterial hypertension
Diabetes mellitus
Hyperlipidemia
Obesity
Physical inactivity
Hyperhomocystinemia
Tobacco use

Other modifiable, less common risk factors
Alcohol abuse
Drug abuse
Post-menopausal use of estrogens
Oral contraceptive use
Pregnancy and peripartum state
Migraine
Infections
Sleep apnea

Symptomatic disease in other arterial circulations
Heart disease
Coronary artery disease
Sources of embolism

AIMS & OBJECTIVES:
1. To evaluate the modifiable risk factors in patients with ischemic stroke.
2. To find out the prognosis of ischemic stroke with reference to modifiable risk factors.

MATERIALS & METHODS:
Source of data : present study included patients with ischaemic stroke who were admitted in Government general hospital kurnool, Department of general medicine during the period (january 2015 – October 2016).

Informed consent was taken before enrolment.
Sixty five patients were enrolled for the study.

Inclusion criteria
Patients with the evidence of ischaemic stroke.
Ischaemic stroke is diagnosed if the following criteria are present :

1. Symptoms and signs suggestive of acute loss of focal or global cerebral function.
2. Evidence of ischemia on CT scan of brain.

Exclusion criteria
1. Patients with focal epilepsy, migraine, and structural brain lesions (such as tumours).
2. Patients with evidence of haemorrhage on CT scan of head.
3. Stroke secondary to infection and connective tissue disorders.

Investigations like CUE; CBP; FBS;PPBS, RFT;LFT; lipid profile , ECG; 2D ECHO ; Carotid Doppler, CT Brain plain were carried out as part of the study.

The prognosis /outcome was classified as follows:
• Complete recovery
• Partial recovery
• No recovery (No improvement)
• Death

RESULTS & ANALYSIS
In the present study 65 cases of acute ischemic stroke who met inclusion and exclusion criteria were analyzed with regards to the risk factors, individually and in combination and they were correlated with the outcome.

Fig. 1 : Sex Distribution
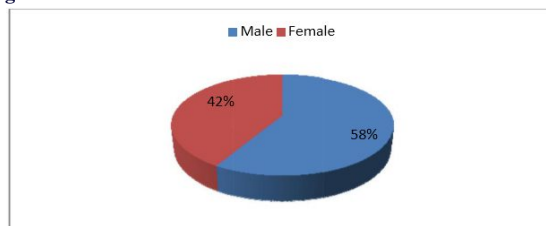
Among 65 patients, 38 were males and 27 were females.

Table – 1 : Sex Distribution & outcome

	Total	Expired	Complete Recovery	Partial Recover	No Recovery
Male	38 (58.46%)	4 (10 .52%)	6(15.78%)	16 (42.12%)	12 (31.57%)
Female	27 (41.54%)	4 (14 .81%)	3 (11.11%)	8 (29.62%)	12 (44.44%)

In the 38 male patients, 4 patients (10.52%) expired, 6 patients (16.78%) had complete recovery, 16 patients (42.12 %) had partial recovery and 12 patients (31. 57%) had n o recovery.

In the 27 female patients, 4 patients (14.81 %) expired, 3 patients (11.11%) had complete recovery, 8 patients (29.62%) h ad partial recovery and patients (44.44%) had no recovery.

Fig. 2 : Age Distribution
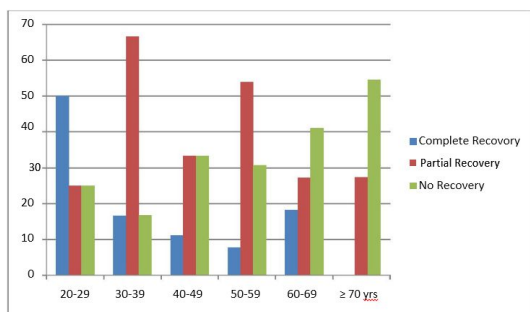
Age distribution ranged widely from with youngest patient being 23yrs and oldest being 80yrs.

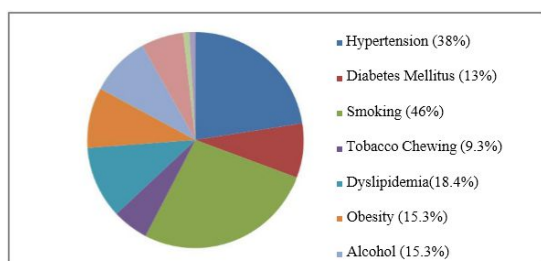### Fig: 3 : Risk factors observed in ischaemic stroke patients

- Hypertension (38%)
- Diabetes Mellitus (13%)
- Smoking (46%)
- Tobacco Chewing (9.3%)
- Dyslipidemia(18.4%)
- Obesity (15.3%)
- Alcohol (15.3%)

Table – 2: Hypertension

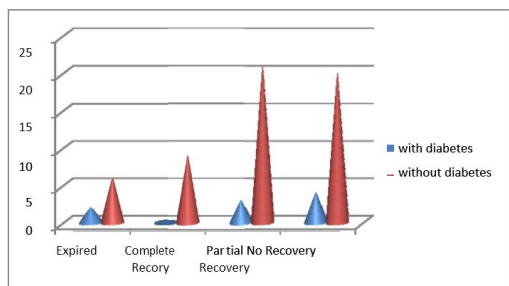|	Total		Expired		Complete Recovery		Partial Recovery		No Recovery	
	No.	%	No.	%	No.	%	No	%	No	%
No. of cases with history of hypertension	25	38.46	3	12	3	1 2	11	44	8	32
No. of cases without history of hypertension	40	61.5	5	12.5	6	1 5	13	32.5	16	40

Out of 65 patients, 25 patients (38.4 6%) had hi story of hypertension. Among 25 patients who presented with hypertension 3 patients (12 %) expired, 11 patients (4 4%) had partial recovery, 3 patients (12%) had complete recovery and 8 patient s (32%) had no recovery.

40 patients who did not gave history of hypertension, 5 patients (12.5 %) expired, 6 patients (15%) had recovery, 13 patient (32.5%) partial and 16 patients (40%) had no recovery

Table-3: Diabete s mellitus

	Total No.	Expired		Complete Recovery		Partial Recovery		No Recovery	
		No.	%	No.	%	No	%	No.	%
No.of cases with diabetes	9	2	22.22	0	0	3	33.33	4	44.44
No .of cases with out diabetes	56	6	7.71		9	16.7	21	37.5	20	35.71

Fig 4: Diabetes mellitus

Out of 65 patients 9 (13.84%) had diabetes mellitus.

Among 9 patients 2 (22.22%) expired, complete recovery w as not not ed in this cate gory of pa ients. 3 (3 3.33%) patients had partial recovery and 4 (44.44%) ha d no recovery.

Among 56 patients who were non-diabetes, 6 (7.07%) patients expired, 9(18.7%) had comple te recovery, 21 pati ents (37.5 %) had partial recovery and 20 patie nts (35.7) had no recovery.

Table :4 : Dyslipidemia

	Total		Expired		Complete Recovery		Partial Recovery		No Recovery	
	No.	%	No.	%	No.	%	No	%	N	%
No. of cases with Dyslipidemia	12	18.46	3	25	0	0	5	41.66	4	33.33
No. of cases without Dyslipidemia	53	81.54	5	9.43	9	16.98	19	3 .84	20	37.33

Fig :5: Dyslipidemia
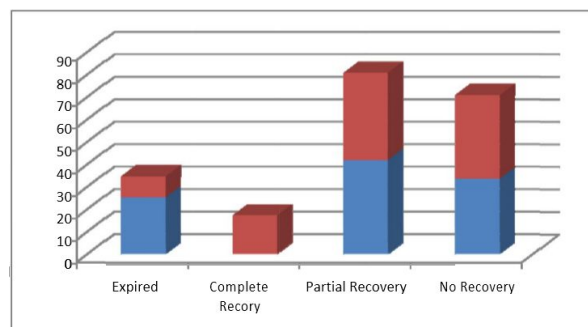
Among 65 patients, 12 patients (18.46%) had dyslipidemia. Among these patients 3 patients (25%) expired, 5 patients (41.66%) had partial recovery and 4 patient s (33.33%) had no rec overy. Complete recovery was not noted in any of them.

Out of 65 patients, 53 patients did not show dyslipidemia. Among these patients, 9 patients (16.9%) had complete recovery, 19 patients (38.84%) had partial recovery and 20 patients (37.53%) had no recovery. 5 patients (9.43 %) expired in this group.

Table 5 : Obesity

	Total		Expired		Complete Recovery		Partial Recovery		No Recovery	
	No.	%	No.	%	No.	%	No	%	N	%
No. of patients who were obese	10	100	1	10	1	1 0	6	60	2	20
No. of patients who were not obese	55	100	7	12.72	8	14.55	18	3 .73	22	40

Among 65 patients, 10 patients were obese. Among these patients 1 (10%) patient expired, 1 (10%) patient had complete recovery,6 (60 %) patients had partial recovery and 2 (20%) patients had no recovery.

Table-6 : Alcohol consumption

	Total No.	Expired		Complete Recovery		Partial Recovery		No Recovery	
		No.	%	No.	%	No.	%	No.	%
No .of cases with Alcohol con stumption	10	1	10	2	20	5	50	2	20
No .of cases without Alcohol	55	7	12. 72	7	12.72	9	34.5 4	22	40

10 pa tients gave history of alcohol co nsumption
Among 10 patients (15.38 %), 1 patie nt (10%) ex pired, 2 pa tients (20 %) had complete recover y, 5 patient s (50%) h ad partial recovery an d 2 patients (20%) had n o recovery.

SMOKING :
Out of 65 patients, 30 patients (46 .2%) were smokers.
Among these 30 patients, 2 patients (6.66%) expired, 5 patients (9.25%) had complete recovery, 13 patients (43.33%) had partial

recovery and 10 patients (33.33%) had no recovery. In 35 patients who were non-smoker s, 6 patients (17.14%) expired, 4 patients (11.42%) had complete recovery, 11 patients (31.42%) had partial recovery and 14 patients (40%) had no recovery.

Table-7 : Tobacco chewing

	Total No.	Expired		Complete Recovery		Partial Recovery		No Recover y	
		No.	%	No.	%	No.	%	No	%
Tobacco Chewers	6	0	0	0	0	4	6.66	2	33 33
Non chewer s	59	8	13.56	9	15.25	20	33.90	20	37.29

Fig 6 : Tobacco chewing
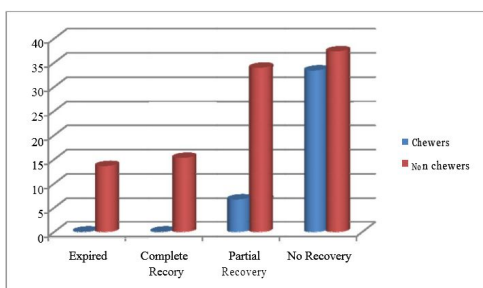
Among 65 patients (9.23%) gave a history of tobacco chewing chewing. Among them 4 patients (6.66%) had partial recovery and 2 patients (53.33%) ha d no recovery.

Among 59 non-tobacco chewers, 9 (15.25%) had complete recovery, 20 (33.9%) had partial recovery, 22 (37.29%) had no recovery and 8 patients (13.56%|) expired

Table-8 : Heart Diseases

	Total No.	Expired		Com plete Recovery		Partial Recovery		No Recovery	
		No.	%	No.	%	No.	%	No.	%
No.of cases with heart diseases	7	2	28.5 7	1	14.28	4	57.14	0	0
No.of cases with out Heart diseases	58	6	10. 34	8	13.86	20	34.4 8	24	4 1.39

Among 65 patients, 7 patients had heart diseases (10.76%) which consisted of AF valvular heart disease (R HD), IHD, LVH. Among them 2 patients (28.57%) expired, 1 patient (14.28 %) had complete recovery and 4 patients (57.14%) had partial recovery. 58 patients were without any heart disease, in this group, 8 patients (13.86%) had complete recovery, 20 patients (34.48 %) had partial recovery and 24 patients (41.37%) had no recovery. 6 patients (10.34%) expired in t he group.

Table-9 : Multiple risk factors and its outcome

	Total No.	Expired		Complete Recovery		Partial Recovery		No Recovery	
		No.	%	No.	%	No.	%	No.	%
No .of cases with risk factors > 1	47	6	12.7 6	5	7	20	30.76	16	34.04
No.of cases ≤ 1 risk factors	18	2	11. 11	4	22.22	4	22.2 2	8	4 4.44

Fig 7: Multiple risk factor s and its outcome
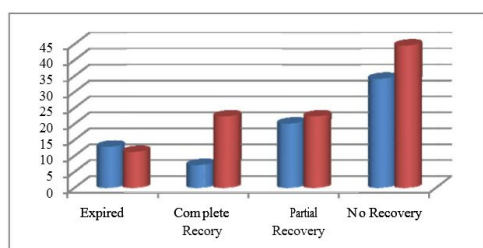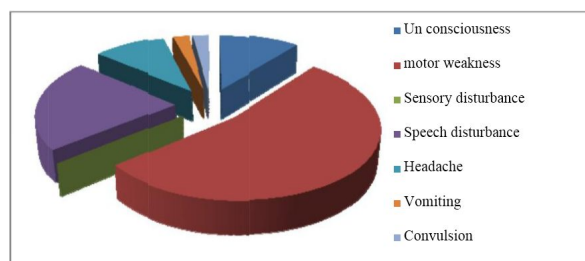

Fig 8: Clinical presentation of ischaemic stroke

When the all 65 patients were analysed with respect to clinical presentation, motor weakness wa s most common manifestation being present in 49 pati ents (i.e.,75.39%).

Speech disturbance was next frequent presentation found in 20 patients (20.7%).

Unconscio usness an d headac he f ollowed being in 10 and 9 pati ents respectively.

Vomiting and convulsions present in 2 patients each. None of the patients in this series presented with sensory disturbances

DISCUSSION
Stroke especially ischaemic is a common clinical problem, Approximately 50% of patients are left with permanent disability. Effective risk factor intervention offers a real hope of reducing stroke morbidity and mortality. Certain risk factors have been consistently identified as significant predictor of stroke outcome, while some are less consistent.

Hypetension:
Arterial hypertension increases the stroke risk. Both elevated diastolic and systolic blood pressures are associated with increased risk.[5] Chronic hypertension promotes the development of both large and medium caliber artery atherosclerosis and the lipohyalinosis of small penetrating arteries of the brain. Present study is consistent with Sridharan study[18], Naik et al[7] study and low when compared with Devkota et al[8] study, Bansal study[9], Indraprastha Apollo hospital study[10], Pathak et al[11] study, Khan et al[12] study, Tariq mohammad study[14], Taj e et al[13] study and Feigin study[17].

Diabetes mellitus
Persons with either type I or type II diabetes mellitus have an increased susceptibility for large artery atherosclerosis and small artery occlusive disease. Present study is higher when compared to Feigin[17], Devakota et al[8] and lower when compared to Bansal[9], Shridhran[18], Indraprasthan Apollo hospital[10], Khan et al[12], Taj e et al[13] and Tariq mohammad[14] studies.

Dyslipidemia
Dyslipidemia is an elevation of plasma cholesterol, triglycerides (Tgs), or both, or a low high-density lipoprotein level that contributes to the development of atherosclerosis[15]. In Present study 12 patients (18.46%) were suffering from dyslipidemia. This was higher when compared to Bansal[9] and Tarik mohammad[14] studies and lower when compared to Taj et al[13], Khan et al[12] and Indraprastha Apollo hospital[10] studies.

Obesity
Overweight men have approximately twice the risk of stroke than thin 16 men.. 10 patients (15.38%) in present study were obese this was low when compared to Khan et al[12], Tariq mohammad[14], Feigin[17] study.

Alcohol consumption
Mild-to-moderate alcohol consumption reduces the risk of ischaemic heart disease and stroke, possibly by increasing the concentration of HDL cholesterol. 10 patients (15.39%) were alcoholics, this was consistent with Bansal[9] and Shridharan[18] studies higher when compared with Pathak et al[11], Khan et al[12] studies and lower when compared with Devakota et al[8] studies.

Smoking :
Smoking increases risk of intracranial and extracranial atherosclosis. Present study 30 patients (46.2%) were smokers. This was higher when

compared to Feigin[17], Bansal[9], Sridharan[18], Tariq ahammad[14], Naik et al[7], Khan et al[12], indraprastha Apollo hospital[10] and lower when compared to Devakota[8] and Pathak et al[11] studies.

Tobacco Use

Cigarette smoking is a potent risk factor for advanced atherosclerosis,16 myocardial infarction and ischaemic stroke. It appears to be the primary life-style factor associated with a high risk of ischaemic stroke. Within 2-5 years of halting tobacco consumption , a smoker's risk declines to that of a non smoker [3,4] 6 patients (9.23%) chewed tobacco in present study. this was consistant with Bansal study.

Heart disease

Heart diseases are the second cause of acute cerebrovascular events and are diagnosed in one third of patients with stroke[1,2].. 7 patients (10.76%) suffered from heart ailments in the present study. This was lower when compared to Bansal study[9], Indraprastha Appolo hospital study[10], shridharan study[18] and Feigin stud[17].

Family history of vascular disease

Ischemic stroke results from a number of inherited disorders of coagulation or of genetic disorders that predispose to arterial disease 1 patient (1.6%) had a family history of stroke in present study, this was much lower when compared to Bansal[9] and Feigin[17] study.

SUMMARY AND CONCLUSION

1. Study was conducted on 65 patients of ischaemic stroke proven by CT scan who were admitted in Government General Hospital, Kurnool from January 2015 to October 2016.
2. In this study 72.31% of patients were associated with multiple risk factors.
3. Concluding modifiable risk factors smoking, hypertension, dyslipidemia, diabetes, alcohol consumption and obesity were common and associated with poor outcome.
4. The patients continuing smoking and alcoholic consumption were associated with poor prognosis than those who stopped smoking and alcohol consumption.
5. Proper diabetic control and hypertension control will help in decreasing the risk of ischemic strokes.

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