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STUDY OF COMPLICATIONS AND OUTCOME OF ACUTE ISCHEMIC STROKE

Neurology

Dr Chennappan Chinnathambi	Consultant Neurologist Dhanalakshmi Srinivasan medical college & hospitals Perambalur, Tamilnadu, India.
Dr Shankar Ganesh. N*	Asst professor, Dept of Neurology kanyakumari medical college, Tamilnadu ,India. *Corresponding Author

ABSTRACT

BACKGROUND Stroke is an important cause of disability and second most common cause of death, worldwide. Prognosis and final outcome in patients with stroke are significantly affected by complications occurring during acute phase of stroke.

METHODS This prospective study was conducted in Institute of Neurology & RGGGH, Chennai, for a period of one year in 100 patients with first ever ischemic stroke. Their detailed history, examination , hematological , biochemical parameters , complications were documented. Outcome at 30days post stroke was assessed using MRS score.

RESULTS 49% patients developed atleast one complications like constipation(41%), shoulder pain(31%), dysphagia(28%), UTI(24%), bed sore(23%), depression(22%), RTI(20%), haemorrhagic transformation with brain oedema(10%).

CONCLUSION Patients with complications were more likely to have poor outcome(87.8%) compared to patients without complications(54.9%).Hence early diagnosis and prompt treatment of these complications is needed, in order to improve the outcome and thereby the quality of life of patients after stroke.

KEYWORDS

stroke complications,outcome,early diagnosis

INTRODUCTION

Stroke is an important cause of disability and second most common cause of death, worldwide. Developing countries account for two thirds of death due to stroke [1,2]. The final outcome of stroke patients has been improved with various strategies like early diagnosis, early prophylactic treatment, early recognition of complications and mobilization [3].

Although the direct effect of brain damage is the main cause for immediate mortality after stroke, the early mortality that occur within the first month after an acute stroke is commonly due to preventable medical complications, that occur either early or late during the course of recovery from stroke. [4] High incidence of complications, ranging from 40% to 95%, following stroke have been found in previous studies. [5,6,7,8]

AIM

To study the frequency of complications after an acute ischemic stroke and their impact on the outcome of patients.

INCLUSION CRITERIA

*   First ever stroke
*   Ischemic stroke

EXCLUSION CRITERIA

*   Patients who have hemorrhagic stroke
*   Previous history of stroke.
*   Patients with traumatic brain injury.

MATERIALS & METHODS

100 Patients with first ever stroke who were admitted in Rajiv Gandhi Government General Hospital were recruited in the study. Detailed history including age, sex, symptoms at the time of stroke and risk factors was collected. All patients were clinically examined and subjected to investigation like complete blood count, renal function test, serum electrolytes, lipid profile, serum protein ,ECG,ECHO,CT brain, carotid and vertebral Doppler and MRI brain in selected patients.

Stroke was classified into anterior circulation stroke and posterior circulation stroke. Severity was classified using the National Institutes for Health Stroke Scale (NIHSS) as mild to moderate (score ≤10) and moderately severe to severe (score ≥11).

Occurrence of complication was observed in all patients during their hospital stay. Complications included infections (UTI,RTI),shoulder pain, thromboembolism (DVT and Pulmonary embolism), complications of immobility (pressure / bed sores),psychological(depression) ,gastrointestinal (constipation, UGI bleed) and neurological (seizure,haemorrhagic transformation, brain edema).

Complications were treated accordingly. Patients were observed during their hospital stay, at the time of discharge and after one month. Assessment of functional outcome was done using the modified Rankin Scale (mRS). Outcome was grouped as good (mRS score 0-2) or poor (mRS score 3-6).

RESULTS AND ANALYSIS

Descriptive statistics were utilized and all results are presented in terms of percentages. Categorical data were compared using chi square test or fischer's exact test, if appropriate. Statistical significance was $p<0.05$.

Among the 100 cases, 49 of them had at least one complication, out of which 32 were male and 17 were female. The rest had no complications (36 male and 15 female).

AGE DISTRIBUTION

The patients were divided into two age groups, less than 50 years and more than 50 years, with 44 and 56 patients in each group respectively. However there was no statistically significant association with regard to the age group and complications.

The age distribution ranges from 20 to 85 years. The mean age of the patients was 51.84±14 years. Distribution of the patients in the age group of 51-60 years was relatively higher than the other groups.
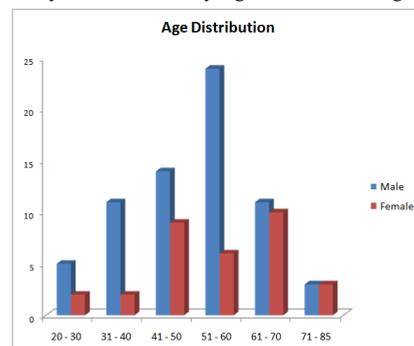

Figure 1

STROKE SYMPTOMS ASSOCIATED WITH COMPLICATIONS
Statistically significant symptoms associated with complications were, dysphagia (p-0.001), dysphasia (p-0.042), dysarthria (p-0.045), analyzed by chi square test.
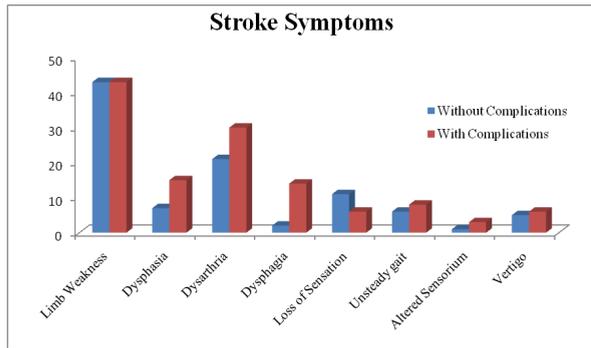

Figure 2

RISK FACTORS
Among the various risk factors ,carotid artery atherosclerosis was statistically significant with complications after stroke (p- 0.025).
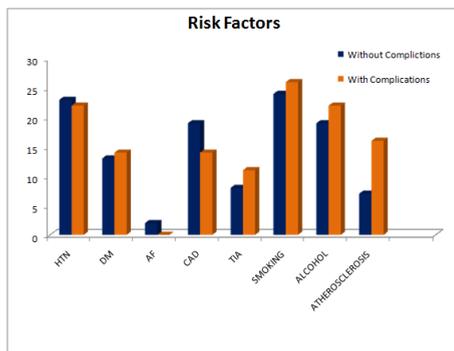

Figure 3

LAB PARAMETERS
Various lab parameters were assessed in both the groups, with and without complications. Among them random blood sugar on admission was statistically significant in patients who had complications (p- 0.052).
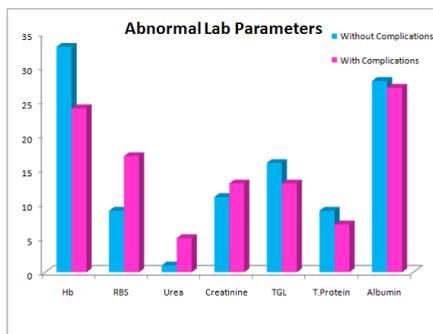

Figure 4

STROKE CHARACTERISTICS
The average length of hospital stay was 11.7 ± 5.08 days for patients who had no complications and 19.88 ± 6.6 days for those who developed complications. 47 out of 49 (95.9%) patients who had complications were in the hospital for more than ten days, which is statistically significant (p- 0.000).

All the patients were grouped using NIHSS score into mild to moderate (0-10) and moderately severe to severe (>11). Among the patients who had complications, 33 were in the moderately severe to severe group which is statistically significant (p- 0.000).

Functional outcome of these patients were assessed at the end of one month after stroke and grouped as good ($\leq$2) and poor (>2) outcome

according to mRS score. Out of 49 patients who had complications 43 (87.8%) had poor outcome which is statistically significant (p- 0.000) when compared to those who had no complications (54.9%).
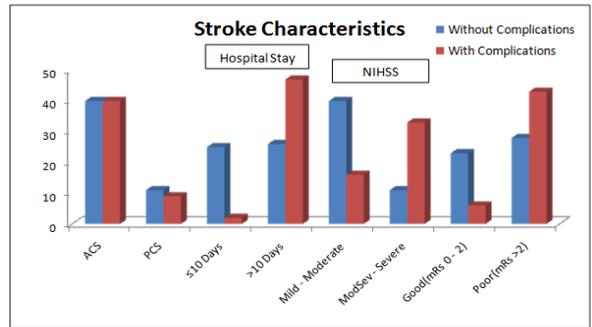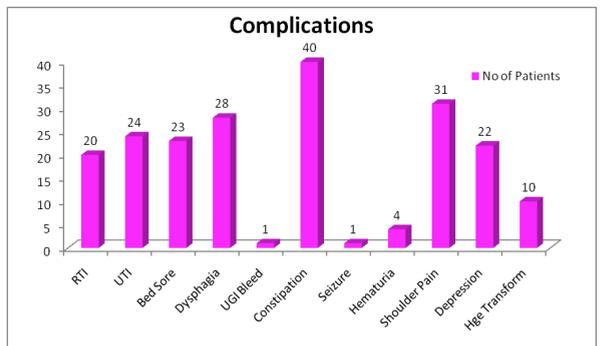

Figure 5

COMPLICATIONS IN ACUTE ISCHEMIC STROKE
Out of the 100 patients, 49 had at least one complication. The most commonly found complications are listed below. Neurological complications in the form of haemorrhagic transformation with brain oedema were found in 10 patients and seizure in one patient.

DISCUSSION
In our study 49% of the patients developed at least one complication during their hospital stay; however the frequency of complications reported in previous studies varies from 40% to 95%.[5,6,7,8]

In our study the occurrence of complications in their order of frequency was constipation (41%), shoulder pain (31%), dysphagia (28%), UTI (24%), bed sore (23%), depression (22%), RTI (20%), haemorrhagic transformation with brain oedema (10%), hematuria (4%), UGI bleed (1%), seizure (1%) and hyponatremia (1%), with no incidence of thromboembolic complications. Only one patient was deceased at the end of one month follow-up.

Constipation
41% of the patients had constipation following an ischemic stroke which is unlike the study of Jose C Navarro et al who reported constipation in only 7.9% of his patients.[9]

Shoulder pain
31% of the patients had shoulder pain which is similar to the study by Braus DF et al [10] who found shoulder pain in 27% of his patients. Lindgren I et al [11] and Jeyaraj D Pandian et al[12] showed the occurrence of shoulder pain to be around 22% and 7.8% respectively in their study.

Dysphagia
Mann G et al [13] and Ramsey DJ et al[14] had dysphagia in 51% and 50% of patients respectively whereas it was only 28% in our study. The incidence was increased to 64% in the study by Mann G et al when video fluoroscopy was used for the diagnosis of dysphagia.

Infection
Commonly found infections were that of the urinary tract (24%) and respiratory tract (20%) which is similar to Katarzyna Grabska et al [15] with 19.5% of RTI and 23.3% of UTI and Jeyaraj D Pandian et al with 21.2% of RTI. But the incidence of UTI was only 8.7% in their study. In contrast to our study, Jose C Navarro et al had a lesser incidence with 9.4% of RTI and 4.9% of UTI.

Bed sore

23% of patients developed bed sores which are comparatively more to that of Jeyaraj D pandian et al and Jose C Navarro et al with only 7.8% and 2.6% respectively.

UGI bleed

Frequency of UGI bleed was 1% which is comparable to that of Jose C Navarro with 1.6%. Study of Jeyaraj D Pandian showed 2.23% and that of Davenport RJ [16] showed 3% of UGI bleed.

Seizure

1% of patients reported to have seizures after stroke which is similar to that of Bogousslavsky J et al[17] with less than 1% and Jose C Navarro et al with 1.3%. However Jeyaraj D Pandian et al found a higher incidence about 3.8% in their study.

Hematuria

Frequency of hematuria was found to be higher (4%) when compared to 1.1% in the study of Jose C Navarro.

Depression

Studies with similar incidence (22%) were Astrom M et al [18] (25%) and Jeyaraj D Pandian et al (18.1%). A lesser frequency (4%) was found in the study of Jose C Navarro et al.

Haemorrhagic transformation with brain edema

Incidence of hemorrhagic transformation was 10% which is similar to that found in Krieger DW et al[19] (10%-20%) but it was much higher (30%- 40%) in Lyden PD et al.[20]

Hyponatremia

Study of Luisa Fofi et al[21] showed an incidence of hyponatremia in 6.3% of survivors and 20.7% of the deceased following an acute ischemic stroke. Similar findings of about 4% were found in our study. Study of Sreeraj K et al showed hyponatremia in 31.1% of their patients[22]. Sajadieh A et al demonstrated that a poor outcome was three times more likely in patients with hyponatremia.[23]

Lab parameters

Though the prevalence of anaemia (57%) was more in the study group, it did not influence the complications. Abnormal sugar values (more than 140 mg/dl) was found to influence the complication with a frequency of 26%. This is similar to the study of Wong AA et al where the frequency of abnormal blood sugar (more than 126 mg/dl) was up to 50%.[24]

Other parameters like serum creatinine, triglycerides, total proteins and albumin did not have any influence over the complications.

Strength of our present study is that it is a prospective study design which can provide more accurate information than a retrospective study. This is one among the few studies with data on majority of complications confined to ischemic stroke from a particular group of population. However there are few limitations in our study like non assessment of severity of complications, time of occurrence of stroke.

SUMMARY

The results of the present study showed that the incidence of complications in patients after an acute ischemic stroke to be 49%.

The length of hospital stay, blood sugar, carotid artery atherosclerosis, severity of stroke (NIHSS score), dysphagia and dysarthria were the factors with significant association with complications.

Patients with complications were more likely to have poor outcome (87.8%) compared to patients without complications (54.9%).

CONCLUSION

In our study, the rate of medical complications was high in patients with acute ischemic stroke and those patients were found to have a poor outcome. Hence early diagnosis and prompt treatment of these complications is needed in order to improve the outcome and thereby the quality of life of patients after stroke.

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