Outcomes in Patients with Ischemic Cerebrovascular Disease

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Summary: An analysis was conducted to determine at discharge the outcomes associated with risk factors in 246 patients with ischemic cerebrovascular disease who were admitted within 48 hours after the onset of the disease. Statistical analysis in this study disclosed that atrial fibrillation was a significant risk factor contributing to the worse outcomes among the subtypes of the ischemic cerebrovascular disease.

Key words outcome, cerebral ischemia, atrial fibrillation

INTRODUCTION

To prevent ischemic cerebrovascular disease, a variety of researches on risk factors associated with ischemic cerebrovascular disease have been done and documented that hypertension (HT), hyperlipidemia (HLP), diabetes mellitus (DM) and atrial fibrillation (AF) are the major risk factors regarding to the occurrence of ischemic cerebrovascular disease [1-5]. The purpose of the present study was to determine at discharge the outcomes in patients with ischemic cerebrovascular disease in association with risk factors, such as HT, HLP, DM, AF, and the subtypes of the disease. Age and gender were also analyzed in the study.

PATIENTS AND METHODS

Between January 1998 and June 2000, consecutive 246 patients with ischemic cerebrovascular disease were admitted to our institution within 48 hours after the onset. On admission, their neurological status and neuroradiology were assessed and as being defined by the World Health Organization [6], the patients were classified in the following subtypes: lacunar infarction (LI), atherothrombotic infarction (ATI), cardioembolic infarction (CEI), and transient ischemic attack (TIA). In regard to the risk factors associated with the outcomes in each subtype of the disease, HT, HLP, AF, and DM, as well as age and

gender were studied using the multiple logistic regression analysis and the analysis adjusted for age and gender. The Glasgow Outcome Scores at discharge were noted [7]. Excellent outcomes describe no symptoms; good outcomes indicate no disability despite some symptoms, or have slight disability in previous activity; moderate disability needs some help walking; severe disability requires nursing care; worse outcomes are vegetative and death.

RESULTS

This study included 117 males and 129 females and the mean age for the patients upon diagnosis was 74.8 years (range 64.2 to 85.5 years). The number of patients in each subtype of the disease was the following: LI (n=92) (37%), ATI (n=49) (19.9%), CEI (n=54) (21.6%), TIA (n=48) (19.5%), and unclassified (n= 3) (0.01%) (Fig. 1).

One hundred and five (44%) of 239 patients had HT; and 40 (17.8%) of 225 patients showed DM; 35 (15%) of 233 patients had HLP. HT, followed by HLP, and DM, was found to be a higher risk factor among the subtypes (Fig. 2). AF was shown in 71 (29.7%) of 239 patients. The highest AF rate of 91% was seen in the patients with CEI (Fig. 3). Fifty-nine (83%) of 71 patients had nonvalvular AF. AF was the highest risk factor in patients with CEI.

The outcomes in each subtype of the disease were the following: excellent/good in LI (74.4%),

ATI (60.4%), CEI (37.2%). The fatal rates were 0% in the patients with TIA and LI, 6% in ATI, and 35.1% in CEI. CEI, followed by ATI and LI showed the worst outcome among the subtypes of the disease (Fig. 4). The better outcomes at discharge, including the patients with excellent, good outcomes, and slight and moderate disability were noted in 84

(93%) of 91 patients with LI, 38 (83%) of 48 patients with ATI and 26 (49%) of 53 patients with CEI (Fig. 5). The worse outcomes, including the patients with severe disability, vegetative state and death were seen in 7 (7%) of 91 patients with LI, 10 (20.1%) of 48 patients with ATI, and 27 (50.9%) of 53 patients with CEI (Fig. 5).

Co-relations were analyzed between the worse outcomes at discharge and the risk factors in each subtype of the disease. The statistical analysis indicated that age, gender, and AF were the determinants of the worst outcomes of the disease (Table 1). Furthermore, AF was determined to be a significant risk factor contributing to the worse outcomes among the subtypes of the disease (Table 2).

Fig. 1. The number of the patients in each subtype of the disease.

Fig. 2. Frequency of risk factors in regard to the ischemic cerebrovascular disease.

Fig. 3. Distribution of AF in regard to subtypes of the disease.

Fig. 4. Outcomes and subtypes of the disease.

Fig. 5. The better and the worse outcomes in regard to the subtypes of the disease.

TABLE 1.
Determinants of the worse outcome
(Multiple logistic regression analysis)

Variables	β	SE	Probability
Age	0.096	0.021	$p < 0.001$
Gender	-1.331	0.374	$p < 0.001$
Hypertension	-0.016	0.337	NS
DM	-0.130	0.456	NS
Hyperlipidemia	-2.153	1.029	$p < 0.05$
AF	2.367	0.383	$p < 0.0001$
NVAF or Others	-0.591	0.666	NS

DM: diabetes mellitus; AF: atrial fibrillation; NVAF: non-valvular atrial fibrillation; β : coefficient; SE: standard error
NS: not significant

TABLE 2.
Determinants of the worse outcome
(Multiple logistic regression analysis adjusted for age and gender)

Variables	β	SE	Probability
AF	2.325	0.423	0.00001
HLP	-1.868	1.055	NS

AF: atrial fibrillation; HLP: hyperlipidemia; β : coefficient; SE: standard error; NS: not significant

DISCUSSION

Increasing population in the geriatric with female dominancy has been indicated in Japan, and the increased rate of AF is reported to be in parallel with the age [8,9]. But, in the present study, it is clearly identified that AF is an independent risk factor associated with the worse outcomes of the subtypes of the disease. Our study suggested that AF might play a significant role in association with the causal mechanism of LI and ATCI. In their study, Moulin documented that embolic heart disease and large-artery disease were the main cause of small deep infarct of their patients and that LI may be caused not only by intracranial hypertensive arteriolopathy, but also by cardiac embolism [10]. In the present study, CEI presented the worst outcome among the subtypes of the disease and furthermore, statistical analysis indicated that AF was the most significant risk factor associated with the outcomes of the ischemic cerebrovascular disease. High recurrence rate in the early stage of the onset and multiple, and the presence of large cerebral infarction in the patients with CEI are reported and this may be related to the worse outcomes [1,11-13].

Further study is needed to elucidate the causal mechanism between cerebral infarction and AF to provide an appropriate treatment options for the patients with ischemic cerebrovascular disease and to achieve much better outcomes.

CONCLUSION

Present study showed that AF was a significant risk factor contributing to the worse outcomes in patients with ischemic cerebrovascular disease.

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