



Importance of the initial grade of subarachnoid hemorrhage in the patients with the age of 80 years and older from a single center analysis

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Abstract

In the developed countries, especially Japan, elderly population is rapidly increasing, but outcomes of elderly patients with the age of 80 years and older suffering from subarachnoid hemorrhage (SAH) remain still unclear. We retrospectively reviewed the medical records of non-traumatic SAH patients aged 80 years and older, who were hospitalized in a single center between 1998 and 2009.

There were 28 patients (80-90 years old and 75% female), representing 5.9% of all non-traumatic SAHs ($n = 474$). Of those, 16 patients received an intervention (ten clipping and six endovascular coiling) and the remaining 12 patients were managed conservatively. The median survival time of intervention group was 110 days and that of conservative group 49 days ($p = 0.12$, log rank analysis). Cox's proportional hazards model yielded two variables, the Japan Coma Scale (JCS) grade on admission (hazard ratio: 2.93 [$p = 0.009$]) and conservative treatment (hazard ratio: 2.14 [$p = 0.054$]). In the outcome of the modified Rankin Scale between these two groups, logistic regression analysis had significant variable; the JCS grade on admission (odds ratio: 280, [$p = 0.020$]).

In the elderly patients with good initial clinical condition, an acute intervention may have good outcome.

Key words: Elderly patients; prognosis; subarachnoid hemorrhage; 80 years of age and older; outcome; Japan Coma Scale.

Introduction

In present days, Japan has one of the highest life expectancy rates in the world (1). Female life expectancy was 86.4 years and male 79.6 on 2009 in our country (1). On October 1, 2009, 6.2% of Japanese has reached 80 years of age and older (male to female ratio was approximately 1 to 2) (2). Despite the rapid increase of these elderly people, the standard treatment of subarachnoid hemorrhage (SAH)

for these patients is still unclear. For example, the International Subarachnoid Aneurysm Trial (ISAT) reported with the elderly people of SAH, but only four persons (1.4% of the total) entered in their study (3).

Our first author previously reported that we may expect the good outcome with the intervention of surgical or endovascular treatment if the SAH patients of the people aged 80 years and older have good clinical condition at presentation, based on a single center's data (4). Because the outcomes of SAH patients with 80 years and older are still limited, we represent some new data as below.

Patients and methods

The medical records of all patients at our department in the Teikyo University Hospital on Tokyo from January 1998 to June 2009 were screened SAH patients in their ninth and tenth decade of life. All medical records, including imaging studies, of the patients thus identified were retrospectively reviewed to determine the pre- and post-treatment clinical courses, neurological status, and daily activities. Patients with traumatic SAH was excluded from the clinical course and imaging data. For the evaluation of consciousness, the Japan Coma Scale (4-7) is widely used in Japan and utilized in the present study. Until June 2010, we surveyed the outcome of SAH by telephone interviews with family members, staff at hospitals to which the patients were transferred, and staff at outpatient clinics that the patients attended. Outcome measures included mortality and independence defined as modified Rankin Scale (mRS) of 0 to 6 (8). Prognostic factors for elderly patients with SAH were derived using JMP (version 5.1; SAS Institute, Cary, NC, USA) for statistical analyses.

Table 1
Clinical features our 28 patients

No.	Sex	Age [years]	On admission status JCS ^b WFNS ^c scale		Site of aneurysm	mRS ^a at last	Survival time [days]	Cause of death
(A-1) Group of the patients with surgical clipping								
1	F ^d	87	2	2	Lt ^e MCA ^f bifurcation	6	43	Pneumonia
2	M ^g	87	1	1	Lt IC ^h top	6	65	Pneumonia
3	M	90	3	3	Acom ⁱ	3	2979	Alive case
4	F	84	3	4	Acom	5	112	Censored case
5	F	81	200	5	Lt IC-PC ^j	4	135	Censored case
6	F	82	1	1	Lt MCA bifurcation	1	84	Censored case
7	F	80	1	1	Lt ICAnchor ^k	5	119	Censored case
8	F	82	1	1	Lt IC-PC	3	1490	Censored case
9	M	84	1	1	Acom	5	2907	Censored case
10	F	83	30	4	Rt ^l IC-PC	4	63	Censored case
(A-2) Group of the patients with endovascular coiling								
11	M	86	10	2	Lt IC-PC	6	151	Pneumonia
12	F	85	200	5	Lt IC-PC	5	108	Censored case
13	F	81	1	1	BA ^m -SCA ⁿ	5	94	Censored case
14	F	82	1	1	Acom	3	487	Censored case
15	F	82	3	2	Rt IC-PC	S	61	Censored case
16	F	83	200	5	BA top	5	77	Censored case
(B) Group of the patients with conservative treatment								
17	F	81	200	5	Rt MCA bifurcation	6	5	SAH
18	F	83	300	5	Acom	6	2	SAH
19	F	86	300	5	ACA ^o distal	6	22	SAH
20	F	85	10	2	Lt IC-PC	6	59	SAH
21	M	86	10	2	not tested	6	12	Pneumonia
22	F	88	2	1	Rt MCA bifurcation	5	1420	Alive case
23	M	85	3	1	Lt ACA distal	3	39	Censored case
24	F	88	1	1	Acom	4	1608	Censored case
25	F	87	1	1	ACA distal	3	22	Censored case
26	F	80	1	1	Rt VA ^p dissecting	4	172	Censored case
27	M	88	3	4	Lt VA-PICA ^q	5	1257	Censored case
28	F	83	2	1	Rt IC-PC	5	356	Censored case

^a Modified Rankin Scale

^b Japan Coma Scale

^c World Federation of Neurological Societies

^d Female

^e Left

^f Middle cerebral artery

^g Male

^h Internal cerebral artery

ⁱ Anterior communicating artery

^j Posterior communicating artery

^k Anterior choroidal artery

^l Right

^m Basilar artery

ⁿ Superior cerebellar artery

^o Anterior cerebral artery

^p Vertebral artery

^q Posterior inferior cerebellar artery

Results

A total of 474 patients with SAH were treated during the study period. There were no patients greater

than 90 years of age during this period, but there were 28 patients in their 80s and 90. These 28 patients (5.9% of the total), 21 females and 7 males were studied in detail (Table 1). Their mean age was

84 \pm 2.7 years (range, 80-90 years). The median length of stay at our hospital was 55 days (25th-75th percentile: 18.5-80 days; range: 2-134 days). The median observation period was 101 days (25th-75th percentile: 47-454 days; range: 2-2979 days). Ten patients underwent craniotomy and aneurysmal neck clipping, while six patients had endovascular coiling of the aneurysm. We designated these 16 patients as comprising intervention group. The remaining 12 patients did not undergo clipping surgery or endovascular coiling because of their clinical status and/or a lack of permission from their family members (conservative group).

In the intervention group, no patients died secondary to the SAH, but three patients died of pneumonia within six months (two: clipping, one: coiling). Two patients survived more than five years including one censored case (these cases were clipping only). One censored case with clipping operation survived more than four years. One censored case with endovascular treatment survived more than one year. Remaining nine censored cases survived within six months. Median survival time of the intervention group was 110 days (25th-75th percentile: 68-403 days; range: 43-2979 days).

In the conservative group, four patients died secondary to the SAH within two months, and one patient died of pneumonia within two weeks. Three patients survived more than three years including two censored cases. One censored case survived about one year. Remaining three censored cases survived within six months. Median survival time of the conservative group was 49 days (25th-75th percentile: 14.5-1032 days; range: 2-1608 days). Between the intervention and conservative group, there was no statistical significance in the median survival ($p = 0.12$, log rank analysis).

Cox's proportional hazards model with the stepwise method yielded two variables, the Japan Coma Scale grade on admission (after logarithmic transformation, hazard ratio: 2.93 and 95% confidence interval: 1.32 to 7.13 [$p = 0.009$]) and conservative treatment (hazard ratio: 2.14 and 95% confidence interval: 0.988 to 5.20 [$p = 0.054$]). In the modified Rankin Scale, we defined less than four as good outcome, and more than three as poor outcome. In the outcome of the modified Rankin Scale between these two groups, logistic regression analysis with univariate had two statistical significant variables, the Japan Coma Scale grade on admission (after logarithmic transformation, odds ratio: 280 and 95% confidence interval: 1.81 to 1.09×10^7 [$p = 0.020$]) and the World Federation of Neurological Societies Scale grade on admission (odds ratio: 29.4 and 95% confidence interval: 1.18 to 2.13×10^4 [$p = 0.037$]).

We had no additional variables by the logistic regression analysis with stepwise method in the modified Rankin Scale.

Discussion

Our data showed that the SAH patients with the age of 80 years and older may have good outcome with the good consciousness and intervention in the acute stage (surgical or endovascular treatment). We also suggested that the most important thing to become the good outcome of the SAH of these elderly people was the good consciousness on admission.

In France, the reported data indicated exceeding 75 years, poor initial grade of SAH, and occurrence of ischemia were the poor prognostic factors on the SAH patients with the age of 70 years and older (9). Even in the SAH patients with 80 years and older, initial grade of SAH was the most crucial factor of the outcome of the SAH based on this article and former one (4). On the contrary, multidisciplinary treatment may be the most crucial factor if initial grade was poor (10). In our country, on the people with the age of 75 years and older, the mortality rate due to pneumonia and cardiac disease was higher than that due to cerebrovascular disease (1). If the elderly SAH patients with initial poor grade survive, their complications may, therefore, be very important in order to have good outcomes.

In our former study (4), the number of endovascular treatment was only one. Now in this article, it was six, but the number of total entry cases was almost the same (the former 24 versus the latter 28). In spite of the increase of the number of endovascular treatment, we have had almost the same results. This means that the most important factors of the good outcome of SAH patients with the age of 80 years and older may be the good initial grade of SAH and clipping surgery or endovascular treatment in the acute stage. Therefore, the elderly patients with the good grade of SAH should take a certain intervention (clipping or coiling).

So far, we can recommend that the SAH patients with the age of 80 years and older in the good initial grade of SAH should take endovascular treatment expect for the middle cerebral artery (MCA) aneurysms (3). In case of MCA ruptured aneurysms, they should take clipping operation (3). Because these elderly people may have arteriosclerosis, we should pay attention to move catheters in the endovascular treatment and to use temporary clips in clipping surgery. On the contrary, the SAH patients with the age of 80 years and older in the poor initial grade of SAH should take multidisciplinary treatment (especially pneumonia) in order to survive (1, 10).

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