

Vascular

The key to improving prognosis for aneurysmal subarachnoid hemorrhage remains in the pre-hospitalization period

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Abstract

Background: Despite advances in neurosurgical management, aneurysmal subarachnoid hemorrhage (aSAH) still has high mortality and morbidity. This study aimed to clarify how delaying hospital admission after aSAH contributes to worse prognosis even today and to find the possibility for an improvement of its prognosis by early admission.

Methods: Four hundred twenty-one consecutive patients are the basis for this study. Cause of delay was classified into 5 categories: patient delay (PD), doctor delay (DD), transportation delay (TD), no delay (ND) (within 2 hours of onset), and others. Condition of each patient was assessed at time of onset and admission using H&K. The relationships between cause of delay and worsening of Hunt and Kosnik grading (H&K) were examined.

Results: The median delay time was 1.7 days. Only 41% of patients visited our institution without delay. Admission delay, especially PD and DD, exhibited a significant correlation to worsening of H&K. In addition to nondirect admission, misdiagnosis or delayed diagnosis contributed significantly to worsening of H&K. Incidence of DD has declined in recent years, whereas that of PD has increased. Consequently, no change in total number of delays was found.

Conclusions: There remains much room for an improvement of prognosis for aSAH by early admission. We need to fully realize this reality and to directly face this problem.

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Keywords: Aneurysmal subarachnoid hemorrhage; Admission; Delay; Prognosis

1. Introduction

Although aSAH is a common condition encountered in daily clinical practice, it still has high mortality and high morbidity. Because the most important predictor of prognosis for aSAH remains the clinical state at admission [3,4,10,11,29], the worsening of the neurologic condition,

especially that caused by rebleeding, must be avoided. Therefore, there have been many warning reports that an admission delay will result in rebleeding or a worsening of prognosis [1,5,6,13,18–20,23,25,26]. However, we still encounter patients with aSAH who have worsened as a result of delayed admission. The present study shows a 17-year situation with regard to the hospitalization of patients with aSAH in a rural area of western Japan, and it revives this problem in comparison with previous reports worldwide.

2. Materials and methods

Our hospital is located in Masuda city, which is a clearly defined closed-boundary rural area in western Japan with a population of about 91 000 with low emigration, and is the

Abbreviations: aSAH, Aneurysmal subarachnoid hemorrhage; DD, Doctor delay; H&K, Hunt and Kosnik grading; ND, No delay; PD, Patient delay; TD, Transportation delay.

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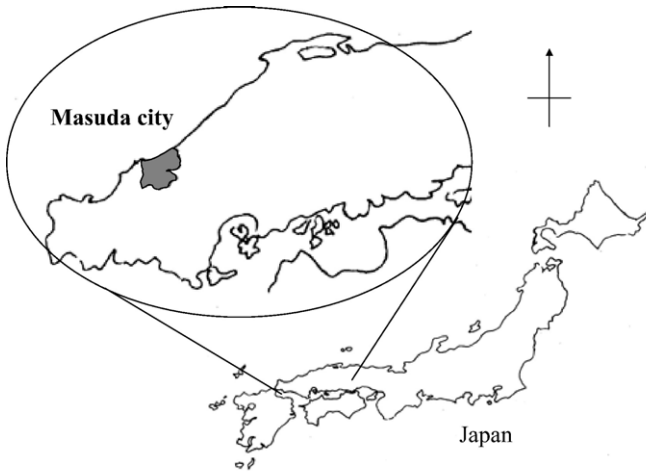


Fig. 1. Geographic location of Masuda city.

sole hospital in the area responding to stroke requiring emergency operation (Fig. 1). Therefore, most cases of subarachnoid hemorrhage, including those in which the patient is dead on arrival, are dealt with at our hospital. This study was performed based on a total of 421 consecutive patients with proven subarachnoid hemorrhage who were admitted to our hospital, Masuda Red Cross Hospital, between July 1985 and December 2001. In each case, subarachnoid hemorrhage was confirmed by computed tomography, including 5 cases that required lumbar puncture additionally. Five cases of arteriovenous malformation and one of dural arteriovenous fistulae were excluded from the analysis because it was shown that they were not aSAH. Eleven patients with missing data for symptom onset time or condition were also excluded. Consequently, the study population was composed of

404 patients who were diagnosed with or strongly suspected of having cerebral aneurysm.

Patients arriving at our hospital later than 2 hours after the first attack of severe headache or consciousness disturbance were regarded as delayed admissions. The condition of each patient was assessed at the time of onset and admission using H&K [11] based on the patient's history or related to the referring physician's examination.

Patients were divided into 2 groups, that is, those who visited our institution within 24 hours from onset and those who visited our hospital more than 24 hours from onset. The relationships between admission delay and worsening of H&K were examined. Patients were also divided into 2 groups, that is, those who visited our hospital directly (direct admission) and those who first visited a primary physician or hospitals without neurosurgical unit (nondirect admission). The relationships between admission style and worsening of H&K were also examined.

Causes of delay in hospitalization were divided into 5 categories: PD caused by a lack of patient awareness; DD caused by misdiagnosis or delayed diagnosis; TD caused by transportation of patients to another institution first or extra time in transportation; ND, where patients were admitted to our hospital within 2 hours from onset; and others, where patients were diagnosed with aSAH, but were retained at another hospital because of the severity of their condition. The correlations between cause of delay and worsening of H&K were examined.

Subsequently, the subjects in the present study were classified into 3 groups according to era in which they were affected by aSAH, that is, from 1986 to 1990 (A), from 1991 to 1995 (B), and from 1996 to 2000 (C). The correlations between admission delay and era were investigated.

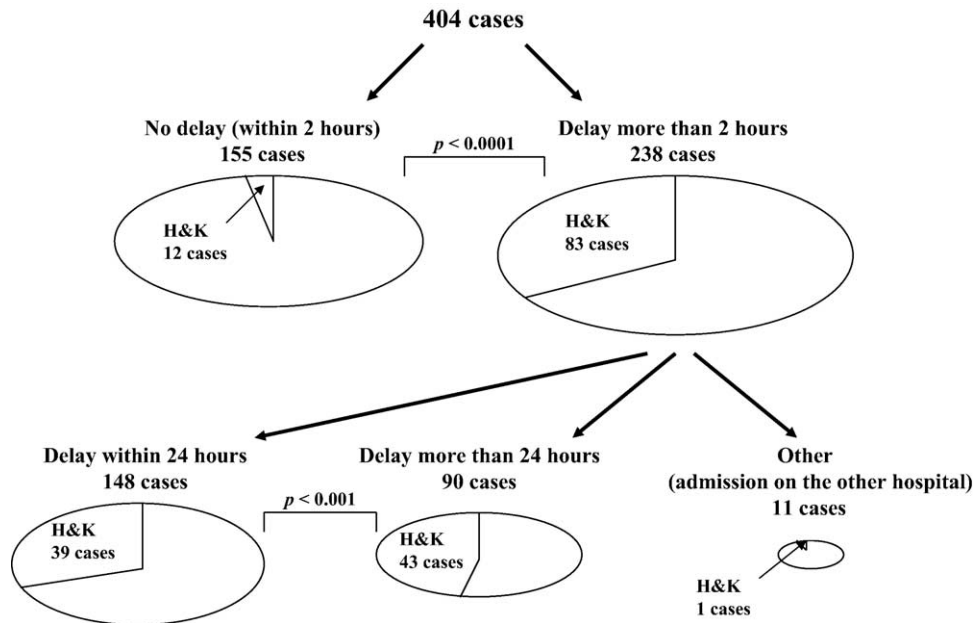


Fig. 2. Flow chart of 404 consecutive patients showing the rate of worsening of H&K corresponding to the degree of admission delay in our hospital. χ^2 test was used for comparisons. Down arrow indicates worsening.

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