Management of Non-traumatic Subarachnoid Hemorrhage in Filipinos

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Abstract

A retrospective study of a consecutive series of 110 Filipino patients with non-traumatic subarachnoid hemorrhage (SAH) treated by the author in an urban setting is presented as to etiology, sex and age, diagnostic procedures employed, and short- and long-term results of non-surgical and surgical management. Aneurysms were the source of hemorrhage in 48%, arteriovenous malformation in 9%, and “other SAH” (hypertension/undetermined causes) in 43%. Fifty-seven (52%) patients were initially seen by a general practitioner, 44 (40%) by a neurologist, and only nine (8%) were seen directly by the neurosurgeon. A male sex preponderance for aneurysm was seen below the age of 50 years and a female preponderance for other SAH and aneurysm above age 50 years. The great majority of patients were admitted on the same day they had SAH — usually within 8 hours of onset. Delay in hospitalization did not adversely affect the clinical grade. SAH was demonstrated by lumbar puncture (71%) and computed tomography (29%). Of 74 patients who underwent angiography, vasospasm was associated mainly with aneurysms and present in 50% of these cases. Medications most commonly utilized were for control of edema, sedation, and anti-vasospasm. Forty-three of 53 patients with aneurysms underwent surgical procedures of various types. In general, patients admitted with good clinical grade had good outcomes of treatment. For high grade patients the attitude was to wait for an improvement in clinical grade before performing surgery.

Key words: non-traumatic subarachnoid hemorrhage, management, Filipinos

Introduction

This study attempts to characterize Filipino patients with non-traumatic subarachnoid hemorrhage (SAH) as to etiology, sex, age, clinical grade, diagnostic procedures and treatment, and short- and long-term results of management. Patients were managed in an urban setting and attitudes involving treatment resulted from the availability of diagnostic and therapeutic equipment and medications present in the most ideal setting available in the Philippines at the time they were treated.

Materials and Methods

A consecutive series of 110 Filipino patients with non-traumatic SAH treated by the author before 1992 in a university hospital and several private hospitals in Metro Manila are included in the study. “Filipino” meant an “oriental” born in the Philippines. Patients’ ages ranged from 11 to 83 years, with a mean of 47 years and a median of 49 years. These patients were seen initially by either a general practitioner, neurologist, or directly by the neurosurgeon. SAH was documented either by cerebrospinal fluid (CSF) examination obtained by lumbar puncture and/or by computed tomography (CT). Angiography was utilized to demonstrate the lesion(s) causing the SAH.

Data analyzed included: age and sex incidences, birthplace and current address of each patient at the time of SAH, symptomatology and clinical grading (Hunt and Hess), and CT and angiographic findings. Patients were treated either by medical/non-surgical means or by surgery. The condition on discharge from hospital of 56 patients treated non-surgically and 54 patients who underwent surgery, and a 10-year follow-up on 16 patients treated surgically were analyzed utilizing a grading system which considered neurological status, capacity for self care, and ability to work. A recent survey of the experiences of 10 neurosurgeons also practicing in an urban area in treating SAH is also presented in regard time and grade at which patients were seen, timing of an-
Results

The youngest patient was 11 years (an arteriovenous malformation [AVM]) and the oldest was 83 years (SAH etiology undetermined). Of the 110 patients, 57 (52%) were initially seen by a general practitioner, 44 (40%) by a neurologist, and nine (8%) directly by the neurosurgeon. The Philippine archipelago has 7,200 islands with a longitudinal distance of 1,500–500 km north and 1,000 km south of Manila. Although patients were born in various islands distant from Manila, the majority of patients at the time SAH occurred were residents of Metro Manila and bordering provinces within a radius of 100 km.

The causes of SAH were intracranial aneurysm in 53 patients (48%), AVM in 10 (9%), and “other SAH” (hypertension/undetermined etiology) in 47 (43%). There was a male sex preponderance for aneurysms below the age of 50 years and a female preponderance for “other SAH” and aneurysm in patients over 50 years old.

The initial symptoms of SAH are listed in Table 1. The clinical presentation of aneurysms and “other SAH” group closely paralleled that of the general patient population. A focal motor neurological deficit was prominent in the AVM group.

Patient clinical grade assessment was done according to the Hunt and Hess method. A correlation between the onset of SAH and time of admission to hospital and the clinical grade on admission showed that the great majority of patients were admitted on the same day of the SAH and usually within 8 hours after onset (Fig. 1).

SAH was documented by CSF examination (71% of all patients), CT (29%), or both (10%). CT scan of

32 patients demonstrated the presence of SAH in 84.3% and the etiology was either suggested or documented by CT in 16 cases (50%), 14 of which subsequently underwent angiography which confirmed the diagnosis in all cases. In 11 patients with CT and CSF examination done within 24 hours of each other, eight had bloody CSF showing SAH on CT and three had bloody CSF but did not show on CT. The CSF red blood cell count (RBC) in patients with SAH seen on CT was 2,150 to 345,000/ml and RBC not showing in CT was 3,120 and 340,200/ml.

Seventy-four of the 110 patients underwent angiography (Table 2). Demonstration of both the supratentorial and infratentorial vessels was done in 74% of patients either through cannulation of three or four vessels by the transfemoral (Seldinger) technique or by direct carotid puncture and retrograde brachial artery injection. Forty-six percent had visualization only of the supratentorial vessels and 84% of all procedures were direct carotid punctures. In patients with SAH without localizing signs, a combination of left carotid and right retrograde brachial injection was frequently employed.

Fifty-five aneurysms were demonstrated: 26 (47.3%) in the anterior cerebral/anterior communicating artery complex (ACA), 20 (36.40%) in the internal carotid artery (ICA), nine (16.3%) in the middle cerebral artery (MCA), and none were seen in the

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<th>Table 1 Initial symptoms of subarachnoid hemorrhage (SAH), 110 patients</th>
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AVM: arteriovenous malformation.
vertebral/basilar artery complex. Three patients had multiple aneurysms; one patient had a MCA aneurysm and an AVM. In terms of size, 49 (89%) were small (S) (up to 9 mm), four (7%) globular (GL) (10–25 mm), and two (4%) giant (G) (larger than 25 mm). There were 10 AVMs: one small (<1 cm), three medium (<5 cm), and six large (>5 cm); six were cerebral and four cerebellar.

In this study, vasospasm was graded minimal or localized (extent not exceeding 2 cm in one major vessel, usually the artery with the lesion); moderate or regional (more than 2 cm or involving several branches of one major vessel group, e.g., MCA); and severe if generalized. Vasospasm was associated mainly with aneurysms and present (53%) about the same rate as it was absent (47%). No vasospasm was seen in 10 patients with AVMs. Only two out of 12 (17%) patients with other SAH had vasospasm of a moderate degree.

In 86 angiographic procedures done on 74 patients, 62 of which had one study and 12 with two studies, there was one mortality in a patient who underwent bilateral direct carotid artery puncture which resulted in necrotizing arteritis of the major intracranial arteries. There was one major morbidity of basilar artery thrombosis following transfemoral vertebral artery cannulation. Minor morbidities consisting of headache and restlessness were noted in two patients.

Medications given were primarily for control of edema (steroids and diuretics), sedation (barbiturates and diazepam), antivasospasm agents (kanamycin, dipyridamole, reserpine), antithrombolitics (tranexamic acid), and antacids. Dipyridamole/acetylsalicylic acid have been used as antiplatelet aggregate.

Of 55 aneurysms found in 53 patients, 37 aneurysms (67%) were clipped (18 ACA, 4 MCA, 15 ICA; 35 S, 2 GL). One of which ruptured intraopera-

tive necessitating ICA ligation (ICA; S). Three were wrapped solely (1 ACA, 2 MCA; 3 S); one was treated by proximal/cervical carotid artery ligation and wrapping (MCA; S); nine patients (17%) had a CSF shunting procedure for hydrocephalus, four as the sole procedure and five as an additional procedure. Ten patients were treated non-surgically (5 ACA, 2 MCA, 3 ICA; 6 S, 2 GL, 2 G).

Outcome of management was assessed at the time of discharge from hospital and on long-term follow-up. Outcome on discharge was graded levels 1–5 (1: normal; 2: minimal neurological deficit, capable of self care; 3: major neurological deficit, not capable of self-care; 4: vegetative; 5: dead). Outcome on long-term follow-up was graded levels 1–5 (1: no neurological deficit, back to former work; 2: minimal neurological deficit, work with restrictions; 3: minimal/major neurological deficit, self care, no work; 4: vegetative, maximal care; 5: dead).

For those who were treated non-surgically, in general those admitted with good clinical grade had good outcomes (levels 1 and 2). Conversely, patients in grades 4 and 5 had poor outcomes and high mortality. Of grade 3 patients, there was almost an equal number of good and poor outcomes.

For patients surgically managed, the general attitude was to await improvement in clinical grade before performing surgery. As in the non-surgically treated group, outcomes were generally dependent on clinical grade on admission.

Two surgically treated patients died: one with intraoperative aneurysm rupture necessitating ICA ligation and resulting in massive infarction, the base of the aneurysm located in the ICA had a hard arteriosclerotic plaque; one was due to severe vasospasm and severe cerebral edema postoperative. Three non-surgically treated patients died: two following herniation after lumbar puncture; one with intracerebral hematoma, etiology undetermined.

An analysis of 16 patients with aneurysms followed up to 10 years showed the following: 75% were admitted in grades 1 and 2 and all underwent aneurysm clipping. On discharge, the majority had minimal neurological deficit but capable of self care (level 2). Long-term outcomes ranged from return to normal or work with restrictions (levels 1 and 2) for 75% of the patients and no work but capable of self-care (level 3) for the remainder. In the meantime two died of unrelated causes.

A survey of 10 neurosurgeons in private practice in the Philippines was recently conducted regarding their data on aneurysm surgery for 1995–1996. Eight neurosurgeons performed less than 10 cases per year and two did more than 10 cases/year. Patients...
were referred to them 1–3 days after onset of SAH in 60% and more than 10 days in 40%. Patients were grades 1–2 at the time of referral in 60% and grade 3 or 4 in 40%. Angiographic diagnosis was made in SAH days 1–3 in 10% and SAH days 4–14 in 90%. Usual time of surgery for grade 1–2 patients was within 3 days of SAH onset in 10%, 4–14 days in 80%, and more than 15 days in 10%. Surgery on grade 3 patients was done on SAH days 4–14 in 60% and after more than 15 days in 40%. All patients with grades 4–5 were operated on after 15 days of SAH onset. Vasospasm resulted in temporary disability in 60%, permanent disability 40%, and did not result in any mortality. Favorable factors that affect outcome in SAH grades 1–2 were ranked in order of importance as follows: early referral, early angiographic confirmation, and early surgery. Unfavorable factors for SAH grades 3–4 were delayed referral, delayed angiographic confirmation, and delayed surgery, in that order.

Discussion

The etiology of SAH among Filipinos shown in this study parallels the incidences in the United States. Aneurysms were primarily located in the ACA in contrast to incidences in Singapore (personal communication with Tham CF in 1982) and also the United States where the ICA was the predominant location. The sizes of the aneurysms found among Filipinos were similar in incidence as those found in the United States.

The majority of patients with SAH were initially seen by a general practitioner and only a minority were seen first by the neurosurgeon. Because of difficulties of access to hospitalization for definitive management in a significant segment of our population, an attempt was made to answer the question of whether delay in hospitalization affects the clinical picture of the SAH patient and therefore the eventual outcome of management. Analysis of the time interval between onset of SAH and admission to hospital and the clinical grade on admission showed that a delay in hospitalization did not adversely affect the clinical grade (Fig. 1). It is possible that patients in poor grade did not reach hospital and instead died at home.

Examination of CSF has remained the primary method of documenting SAH. Of the patients who both had CSF and CT examinations there was no significant correlation between the amount of blood in the CSF and its demonstration by CT, although the number of these patients was too small for analysis.

Angiography has been the primary diagnostic procedure in demonstrating the etiology of SAH. The majority of the procedures were performed by the author, were done in different hospitals, and the techniques employed and the extent of the procedures were dictated primarily by the type of angiographic equipment available in the hospital where the patient was confined. After 1990 when the services of invasive neuroradiologists became more available, practically all angiographic procedures have been performed by these specialists and four-vessel angiography has become the standard procedure.

Vasospasm as an aggravating factor in morbidity particularly in patients with SAH from aneurysms has been a primary concern in the management of the present series and of the other Filipino neurosurgeons surveyed. A significant part of the medical management has consisted of medications to either treat or prophylactically prevent this condition. Since calcium channel blockers (particularly nimodipine) became available in the early 1990s, these have become the pharmacological mainstays for antivasospasm.

Obliteration of the aneurysm by clipping in a patient with good clinical grade has yielded the best short- and long-term outcomes. Protection of the ruptured aneurysm by proximal vessel occlusion has been sparingly practiced by the author and the capability of coiling is as yet not available in the Philippines.

In summary, this paper has presented the management of SAH by one neurosurgeon in various hospitals in urban Metro Manila and presents the results of a small survey of the experiences of other neurosurgeons practicing in the same area.

Reference


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