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CEREBRAL ANEURYSMS

ASSESSMENT OF 50 CASES OPERATED ON AND COMPARISON WITH PREVIOUS SERIES

GUILHERME BORGES*, NEVAIR ROBERTI GALLANI**

ABSTRACT - A retrospective analysis of 50 patients who suffered subarachnoid hemorrhage (SAH) treated at UNICAMP between April 1988 and March 1992 is made, distributed as 34% in Hunt & Hess grade I, 38% in grade II, 16% in grade III, and 12% in grade IV. Males were predominant (66.6%), and patients age varied around 47±12.13 years old. Only 13 patients (26%) were admitted within the first 24 hours after bleeding, with an overall average of 20.45 days of delay. From all cases only one had a rebleeding, survived and was submitted to surgery. Four patients died after surgery (8%). Timing of operation and prognostic chances were available, being 27.30 days after SAH for Hunt & Hess group I. It is analyzed also the timing for diagnosis - which responded for the most delay, and treatment for the other groups, and a historical comparison with previous series since year 1956 of the same Hospital were documented. Good results were observed in 38 cases (76%). The overall results in terms of mortality and morbidity is, in comparison, in accordance with the literature, and is ameliorated from the past series due to technical improvement, despite worsen difficulties in managing admittance, diagnosis and treatment faster, which is required to deal with the disease.

KEY WORDS: subarachnoid hemorrhage, cerebral aneurysm, cerebral vasospasm.

Aneurismas cerebrais: análise de 50 casos operados e comparação com séries anteriores

RESUMO - Revisão cirúrgica de 50 pacientes portadores de aneurisma cerebral é realizada. O "timing "cirúrgico e prognóstico é bem documentado e comparado com séries anteriormente publicadas . A demora em se operar os pacientes foi devida à dificuldade de se realizar o diagnóstico (CT e angiografia). Observamos bons resultados em 38 casos (76%) e a taxa de mortalidade foi de 8% (4 casos). Os resultados finais estão, em comparação com a literatura, dentro do aceitável.

PALAVRAS-CHAVE: hemorragia meníngea, aneurisma cerebral, vasoespasmo.

The brain is unique among the organs of the body since it has no regenerative power and the highest metabolic needs. A ruptured cerebral aneurysm has the nefast property of causing subtle catastrophyc hemorrhages in the working brain, though bringing high morbidity and mortality to previously healthy individuals. This frequent course of subarachnoid hemorrhage (SAH) due to cerebral aneurysm has led to many attempts to ameliorate diagnosis and treatment, and several improvements were achieved analyzing the timing of onset of symptoms and clinical or surgical characteristics of series of patients who suffered from SAH, since the prevention of rupture of an intact and asymptomatic aneurysm still remains a dilemma [14,15,18]. Delayed ischemic deficits due to cerebral vasospasm are well known. Several drugs have been evaluated in order to plead in favor of a better patient outcome[1-6,12-14]

Disciplina de Neurocirurgia da Faculdade de Ciências Médicas da Universidade Estadual de Campinas (UNICAMP) *Professor Doutor; ** Pós-graduando. Serviço de Neurocirurgia da Casa de Saúde Campinas: *Chefe do Serviço; **Neurocirurgião. Aceite: 14-janeiro-1997.

Dr. Guilherme Borges - Rua Barão Geraldo de Rezende 282 - 13020-440 Campinas SP - Brasil.

The surgical treatment of a ruptured aneurysm and their surgical modalities still remains controversial [3,7-9,11,14-18]

A retrospective analysis of 50 operated patients who suffered SAH due to aneurysm rupture is reported and compared to previous series of the same hospital.

MATERIAL AND METHODS

Between April 2nd 1988 and March 9th 1992, 50 patients who suffered from SAH due to an aneurysm rupture treated at UNICAMP Medical School were retrospectively analyzed, in order to point out some particular procedures. Routinely the patients were admitted at the emergency ward after being transported from other smaller cities in the region of Campinas, SP, Brazil. On admission our patients were graded according to Hunt & Hess[10] scale, and the diagnosis of cerebral aneurysm was based on computer tomography (CT) and four vessel angiography. Nimodipine (90-360 mg/day orally or 2 mg/hour intravenously) or nifedipine were administered in the cases admitted within the first 24 hours after SAH (26%) orally or intravenously, according to the patient condition, and in all postoperatively. All the patients were submitted to a fronto-temporo-sphenoidal craniotomy - with a total of 51 craniotomies (one case bilateral), and a neurological examination follow up was done after 18 months.

RESULTS

Only 13 patients (26%) were admitted within the first 24 hours after bleeding. Most of them (60%) were admitted after the 3rd day after SAH (with an overall average of 20.45 days). Males were predominant (66.6%), and patients ranged from 23 to 68 years old (average of 47±12.13).

On admission 17 of our patients were classified in Hunt & Hess grade I (34%), 19 in grade II (38%), 8 in grade III (16%), 6 in grade IV (12%), and none in grade V. Cranial nerve palsy was observed in 13 cases (26%), 11 of them had a 3rd nerve deficit, and 2 of the 6th. Among the cases with 3rd nerve palsy, 8 were in grade II. The earliest diagnosis (including CT and Angiography) was carried out in the first 24 hours after bleeding in only two cases (4%). The other patients underwent diagnosis later due to a bureaucratic health insurance management (average of 23.54 days after SAH), which provided dangerous delay in surgery as well, particularly for patients in grades I and II as discussed below. CT showed cisternal hemorrhage in 20 patients (40%), and the exam was found to be normal in 18 cases (36%); also there were 5 cases with hydrocephalus, one with intracerebral hematoma, and 6 cases with no information or with CT made in the referring hospital. Two patients had to be submitted to shunt operation before aneurysm clipping, and one had already a valve implanted 7 months before admission, possibly even a consequence of prior bleeding. The localization of aneurysms followed the distribution as shown in Figure 1. The earliest surgery was performed 8 days after hemorrhage and the latest cases were operated on up to 116 days after bleeding (average 38.22 days).

From all cases only one (2%) had a rebleeding, and this patient survived and was submitted to surgery on the 32nd day. Four patients died after surgery (8%): three had aneurysm of ICA and one of ACoA. Hypertension was observed in 12 cases (24%). CSF fistula occurred in two cases post-operatively. Our patients were discharged the earliest on the 5th day after operation, with an average of 24.28 days. By this time the evolution was considered to be good in 38 cases (76%), with 4 (8%) in better conditions than that at admission, and other 4 (8%) worse. This distribution according to Hunt & Hess scale at admission is shown in Figure 2. A total neurological deficit recovery (hemiparesis) was observed in all cases at the neurological follow up examination. A partial recovery of the 3rd cranial nerve function was observed.

The time of operation was analyzed in relation to the number of days since the ictus, the admission, and the complete diagnosis. Excluding those cases of giant and of multiple aneurysms, of diagnosis made elsewhere outside before admission, and of severe clinical impairment, the mean delay for surgery was: (i) for Hunt & Hess I group - of 27.30 days after SAH, 21.76 days after admission, or 8.92 days after diagnosis; (ii) for Hunt & Hess II - of 35.26 days after SAH, 24.33 days after admission, or 12.8 days after diagnosis; (iii) for Hunt & Hess III - of 39.75 days after SAH, 32.62 days

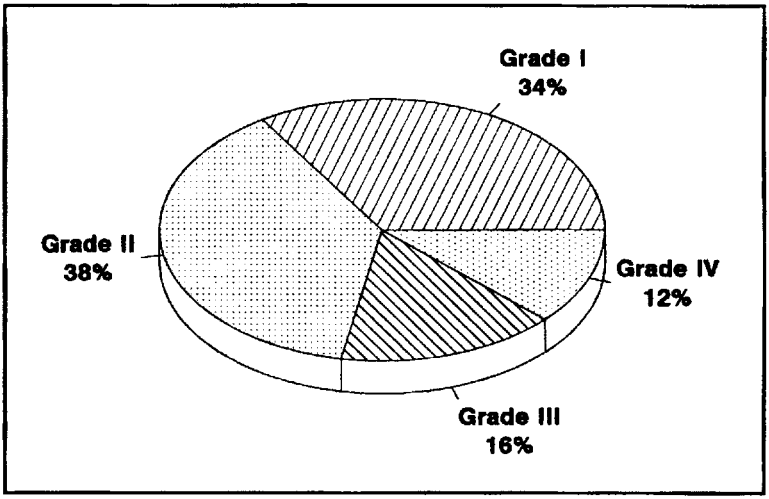

Fig 1. Distribution of patients on admission according to Hunt & Hess[10] clinical grades.

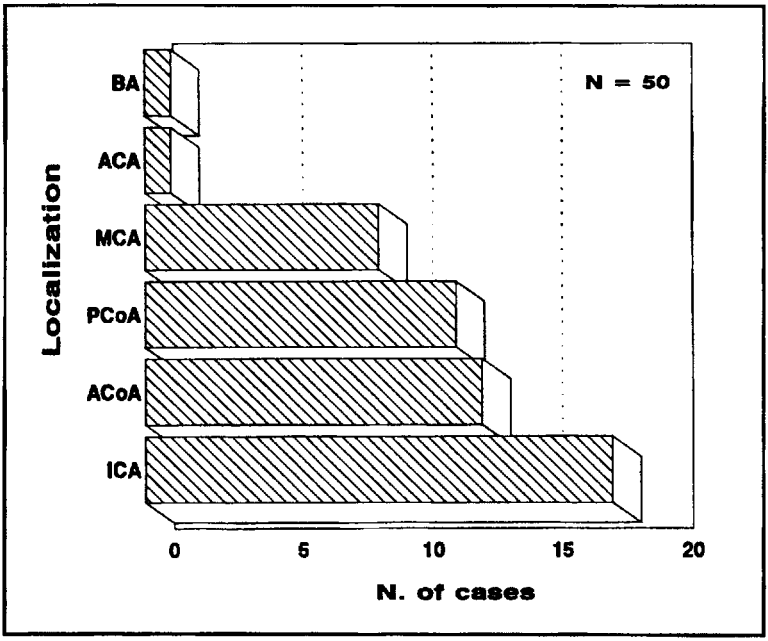

Fig 2. Aneurysms locations (BA, basilar artery; ACA, anterior cerebral artery; MCA, middle cerebral artery; PCoA, posterior communicating artery; ACoa, anterior communicating artery; ICA, internal carotid artery).

after admission, or 20.5 days after diagnosis; (iv) for Hunt & Hess IV - of 34.4 days after SAH, 31.4 days after admission, or 16 days after diagnosis (Figs 3 and 4).

DISCUSSION

In a previous paper[7], we analyzed two series: one with 200 patients between 1956/78, and the other with 177 patients in the years 1979/82. The former series of patients were classified as

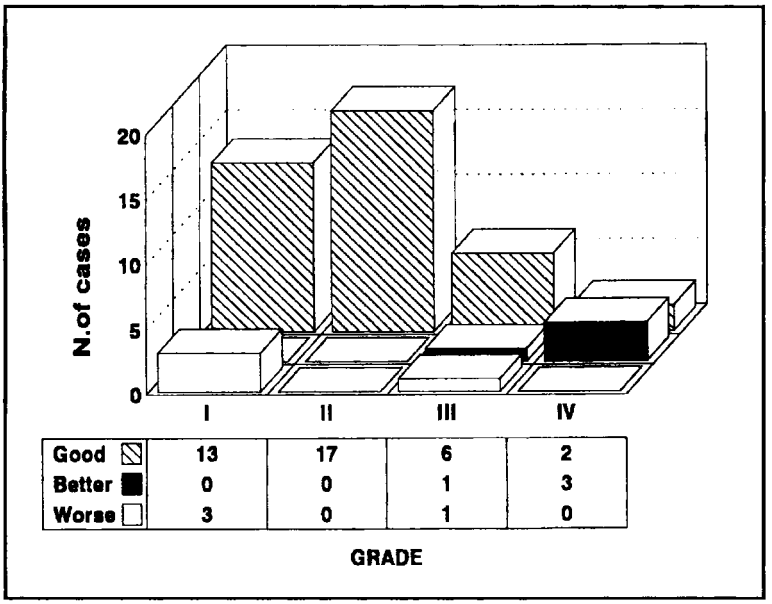

Fig 3. Overall outcome of patients at discharge according to Hunt & Hess[10] clinical grades.

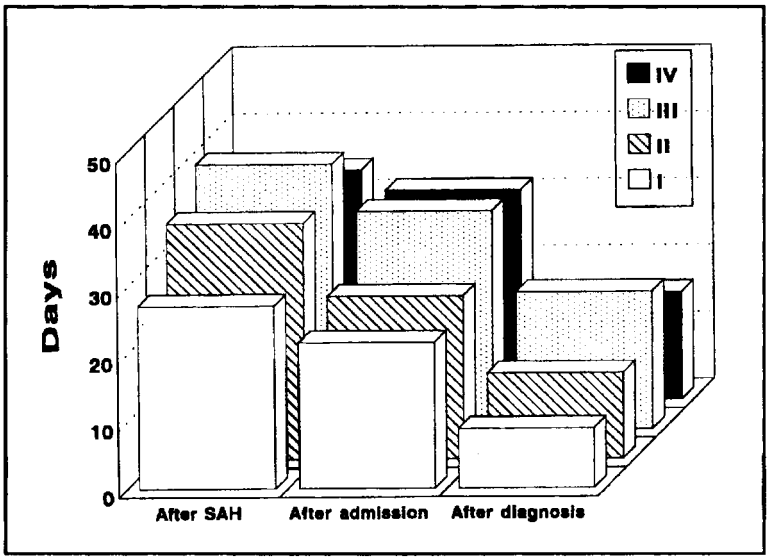

Fig 4. Delay for surgery and patients clinical conditions according to Hunt & Hess[10] scale.

88% in grades I and II, 7% in grade III, and 5% in grades IV and V. The later group were 79% in grades I and II, 14.7% in grade III, and 6.2% in grades IV and V, with an overall mortality rate of 22.5% and 11.7%, respectively. The second group of patients (1979/82) had the mortality analyzed according to their neurological status at admission, resulting in 6,4% in grades I and II, 23.0% in grade III, and 27.0% in grades IV and V. Also, the interval between SAH and operation was analyzed, with higher mortality (8.3%) for those cases in grades I and II who were operated on from 15 days or more after SAH, but lower for cases classified in grades III, IV or V treated with the same delay.

In another study[4,5], we analyzed 52 patients operated on at UNICAMP, out of 62 patients who suffered SAH, between 1984/85. At this time, 34 patients were operated until the 6th day after SAH, with 20% of these presenting clinical deterioration. The overall mortality rate lied in 23%. There were 10 patients who were not operated, and 3 of them died. The localization of aneurysms was predominantly of ACoA (13), followed by MCA (12), multiple (11), ICA (8), PCoA (6), VA (1) and ACA (1). The Hunt & Hess evaluation on admission showed 75% of cases in grades I and II, and 35% in grade III - similar to the present series. Despite differences in localization (noticing the high number of cases with multiple aneurysms), there would be a tendency for the patients to be treated with lower morbidity and mortality rates, in spite of the diagnosis and treatment being carried out even later (due to a worsening in bureaucratic management). This aspect shows the important role of a natural technical improvement in the later series.

In the present study taking in account Figure 3 we verify a majority of patients being discharged in good conditions, a tendency to ameliorate the status of survivors comparing patients from grade I until grade IV, as of course is highly improbable to improve patients that are already admitted in good conditions (grades I and II). On the other hand, what has to be prevented is to worsen patients admitted in better grades, what did not happen with 3 cases in grade I of the present series, possibly related to the elevation of the time delay for surgery that took place also with this group of patients in comparison to the *timing* obtained with the series between 1979/82. Moreover, analyzing what could have influenced the surgical treatment delay of these ruptured aneurysms, Figure 4 shows that although there is still a period between the diagnosis and treatment to improve. The greater delay was due to the time it took for the patients to be admitted at hospital, and to have their diagnostic procedures done (CT scan and angiography). Finally, in spite of this, the overall results in terms of morbidity and mortality of the present study are quite reasonable in comparison with the literature.

REFERENCES

1. Allen GS, Ahn HS, Preziosi TJ, Battye R, Boone SC, Chou SN, Kelly DI, Weir BK, Crabbe RA, Lavik PJ, Rosenbloom SB, Dorsey FC, Ingram CR, Mellits DE, Bertsch LA, Boisvert DPJ, Hundley MB, Johnson RK, Strom JÁ, Transou CR. Cerebral arterial spasm: a controlled trial of nimodipine in patients with subarachnoid hemorrhage. N Engl J Med 1983; 308:619-624.
2. Auer LM. Acute operation and preventive nimodipine improve outcome in patients with ruptured cerebral aneurysms. J Neurosurg 1984;15:57-66.
3. Auer LM. Unfavorable outcome following early surgical repair of ruptured cerebral aneurysms: a critical review of 238 patients. Surg Neurol 1991;35:152-158.
4. Borges G, Facure NO, Facure JJ. Klinische Wechselbeziehung der Gefaespasmen in der Chirurgie der Aneurysmen. Zent Neurochir 1987;48:219-221.
5. Borges G, Facure NO, Facure JJ. Correlação clínica do vasoespasmo na cirurgia de aneurisma. Arq Bras Neurocirurg 1988;7:29-32.
6. Damasceno BP, Borges G. Acidentes vasculares cerebrais. Rev Bras Med 1991;48:72-85.
7. Dei-Anang K, Hey O, Borges G, Schurmann K, Muller W. Management of giant aneurysms. Arq Neuropsiquiatr 1990;48:231-235.
8. Guglielmi G, Vinuela F, Dulkwiler G, Dion J, Lylyk P, Berenstein A, Strother C, Graves V, Halbach V, Nichols D, Hopkins N, Ferguson R, Septka I. Endovascular treatment of posterior circulation aneurysms by electrothrombosis using electrically detachable coils. J Neurosurg 1992;77:515-524.
9. Hey O, Dei-Anang K, Borges G, Schurmann K, Muller W. Cerebral aneurysms: assessment of 377 cases (1956-1982). Arq Neuropsiquiatr 1990;48:225-230.
10. Hunt WE, Hess RM. Surgical risk as related to time of intervention in the repair of intracranial aneurysms. J Neurosurg 1968;28:14-20.
11. Mandai S, Kinugasa K, Ohmoto T. Direct thrombosis of aneurysms with cellulose acetate polymer. J Neurosurg 1992;77:497-500.
12. Meyer FB, Muzzi DA. Cerebral protection during aneurysm surgery with isoflurane anesthesia. J Neurosurg 1992;76:541-543.
13. Ohman J, Heiskanen O. Effect of nimodipine on the outcome of patients after aneurysmal subarachnoid hemorrhage and surgery. J Neurosurg 1988;69:683-686.
14. Saveland H, Hillman J, Brandt L, Edner G, Jakobsson KE, Algers G. Overall outcome in aneurysmal subarachnoid hemorrhage. J Neurosurg 1992;76:729-734.
15. Scievink WI, Piepgras DG, Wirth FP. Rupture of previously documented small asymptomatic saccular intracranial aneurysms. J Neurosurg 1992;76:1019-1024.
16. Suzuki M, Onuma T, Sakurai Y, Mizoi K, Ogawa A, Yoshimoto T. Aneurysms arising from the proximal (A1) segment of the anterior cerebral artery: a study of 38 cases. J Neurosurg 1992;76:455-458.
17. Vermeulen M, Lindsay KW, Murray GD, Cheah F, Hijdra A, Muizelaar JP, Schannong M, Teasdale GM, van Crevel H, van Gijin J. Antifibrinolytic treatment in subarachnoid hemorrhage. N Engl J Med 1984;311:432-437.
18. Wiebers DO, Whisnant JP, O'Fallon M. The natural history of unruptured intracranial aneurysms. N Engl J Med 1981;304:696-698.