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A Small Asymptomatic Intracranial Aneurysm in an Elderly Woman that Ruptured Soon after Discovery

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ABSTRACT

A 78-year-old woman underwent magnetic resonance (MR) imaging to assess the deterioration of her right hemiparesis initially caused by putaminal hemorrhage that occurred 5 years prior to referral. MR imaging detected an anterior communicating artery aneurysm but no new lesion was seen that might have caused the deterioration was observed. Hemiparesis improved within several days and she was referred for endovascular treatment of the aneurysm. Digital subtraction angiography demonstrated a 4.4 mm long aneurysm at the A1-A2 junction of her left anterior cerebral artery. Information on the risk associated with treatment caused her to hesitate. Three days after discharge and 40 days after the discovery of the aneurysm it ruptured, causing severe subarachnoid hemorrhage. The patient died on the following day.

Key words: *Rupture, Incidental aneurysm, Elderly*

The most commonly used criteria in Japan to determine whether craniotomy is indicated in cases involving an asymptomatic intracranial aneurysm include aneurysm 5 mm or larger[11)] and age of 70 years or younger[13)]. Candidate patients should also be in good overall physical and neurological condition prior to undergoing surgical intervention[22)]. We encountered a patient with an asymptomatic aneurysm whose conditions did not fulfill any of these criteria. The patient ultimately died of rupture of the aneurysm 40 days after its discovery.

CASE REPORT

A 78 year-old woman exhibited right hemiparesis caused by left putaminal hemorrhage which had occurred 5 years prior to referral. The hemiparesis had improved considerably in response to rehabilitation and she was able to walk unaided. She underwent magnetic resonance (MR) imaging to assess a transient deterioration of her right hemiparesis on November 6, 1999, in a nearby hospital. MRI failed to detect any lesion causative of the deterioration. MR angiography revealed a small aneurysm, approximately 4 mm in maximum diameter, on her left anterior cerebral artery (Fig. 1). The right hemiparesis improved again after several days of administration of low molecular dextran. Per-oral ticlopidine 200 mg/day was prescribed in addition to anti-hypertensive drugs, which had been prescribed for 5 years. She was referred and admitted to the Department of Neurosurgery, Hiroshima University School of Medicine on December 6, 1999. Digital subtraction angiography revealed an oval shaped aneurysm,

Fig. 1. Magnetic resonance angiography revealing an oval aneurysm of the anterior communicating artery.

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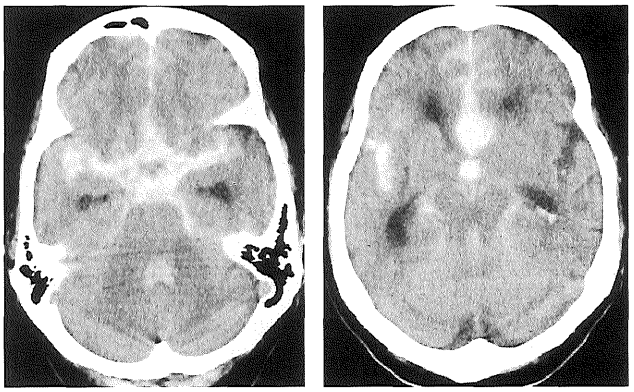
Fig. 2. Digital subtraction angiography revealing aneurysm, 4.4 mm in maximum diameter and projecting upward and to the right from A1-1-A2 junction of the left anterior cerebral artery.



a b

Fig. 3. Computed tomographic scan at a point when the patient became comatose, 40 days after detection of the aneurysm, showing severe subarachnoid hemorrhage, thickest in the interhemispheric fissure, in the basal cisterns.
a: at the level of pons, b: at the level of midbrain

4.4 mm in maximum diameter at the A1-A2 junction of her left anterior cerebral artery (Fig. 2). The aneurysmal dome projected upward and to the right.

The patient was informed that the rupture rate of this type of aneurysm is approximately 1–2 % a year[5–7,20,23] and mortality plus severe morbidity rate of endovascular treatment is approximately 3–5 % based on our own experience. The patient postponed making a decision and was subsequently discharged on December 14, 1999 to discuss this with family members. In the evening, two days after discharge, she lost consciousness and fell. Upon arrival at a nearby hospital, she was deeply comatose, Glasgow coma scale:4. She was apneic and both of her pupils were dilated. Computed tomographic scan showed thick subarachnoid hemorrhage in the basal cisterns, especially in the interhemispheric fissure (Fig. 3). The severity of her condition precluded radical treatment. She died of subarachnoid hemorrhage (SAH) on December 17, 1999.

DISCUSSION

In the present case, the patient was 78 years old, the aneurysm was 4.4 mm in maximum diameter, and a cerebral ischemic attack had occurred just one month prior to referral[9,11,13,18,22]. All these conditions are generally considered to contraindicate craniotomy in the treatment of incidental cerebral aneurysm.

The risk of rupture of an asymptomatic intracranial aneurysm in patients older than 70 years of age appears to be very low compared to the risk in younger patients[3]. Some studies reportedly did not encountered no cases at all involving patients older than 70 years of age in whom an incidentally detected aneurysm had ruptured[1,10]. The risk of rupture of an aneurysm smaller than 5 mm is reportedly also low[24]. In addition, the operative mortality and morbidity associated with an asymptomatic aneurysm is relatively high in cases with a history of cerebral infarction[18,25].

However, there is some disagreement over the exclusion criteria for craniotomy. Ono et al recommended surgical intervention for healthy patients older than 70 years of age because two thirds of the patients they encountered presenting with SAH were within this age range[16]. Yasui et al reported that rupture of an aneurysm occurred in two out of ten patients older than 70 harboring an unruptured aneurysm[21].

The critical size of an aneurysm in terms of risk of rupture has been reported to be 4 or 5 mm. Kassell et al, however, reported that aneurysms smaller than 5 mm accounted for 13% of 1,092 cases presenting with SAH[8]. Schievink et al reported three patients with SAH due to rupture of an incidentally found small aneurysm (< 5 mm) in a 2.5 to 9.5 year follow-up period[19]. Asari et al also reported rupture of incidentally found aneurysms less than 5 mm in diameter[2].

In terms of the site of the aneurysm, the annual rupture rates of the aneurysms located posterior circulation[17] and anterior communicating artery[5,15], as in our case, are relatively high compared to those in other arteries.

In addition, the patient's gender should be considered. Noguchi reported that the death rates caused by SAH for men after the age of 40, 50, 60 and 70 were 16.4, 20.4, 24.1, and 29.2 per 100.000, respectively, whereas the rates were 25.0, 32.8, 44.1 and 62.4 for women[14].

According to the 1988 abridged life tables for Japan, the life expectancy for 78 year-old women is 12 years[4]. Thus, the possibility of rupture can be estimated to be not negligible based on the above described facts.

Recent developments of endovascular techniques using Guglielmi detachable coils (GDCs) have widened the treatment window for patients with poor physical or neurological conditions with incidental aneurysm. Murayama et al reported that all eleven of their patients with poor medical condition, including three cases with cerebral ischemia, underwent GDC aneurysm embolization without clinical complications[12].

A more vigorous encouragement of our patient to undergo endovascular treatment might thus have been justified. However, given the lack of any detailed data on the natural course of elderly patients with incidental cerebral aneurysm based on long term follow-up study of a large cohort, we hesitated to do so at the time.

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REFERENCES

1. **Asari, S.** 1992. Management of unruptured aneurysm based on the long-term outcome. Surgery for Cerebral Stroke **20:** 7–13 (In Japanese).
2. **Asari, S. and Ohmoto, T.** 1993. Natural history and risk factors of unruptured cerebral aneurysms. Clin. Neurol. Neurosurg. **95:** 205–214.
3. **Dell, S.** 1982. Asymptomatic cerebral aneurysms: assessment of its risk of rupture. Neurosurgery **10:** 162–166.
4. **Health and Welfare Ministry.** 1998. Abridged life table for Japan, 1998. Health and Welfare Ministry
5. **Heiskanen, O.** 1999. Risks of surgery for unruptured intracranial aneurysms. J. Neurosurg. **65:** 451–453.
6. **Jane, J.A., Kassell, N.F., Torner, J.C. and Winn, H.R.** 1985. The natural history of aneurysms and arteriovenous malformations. J. Neurosurg. **62:** 321–323.
7. **Juvela, S., Porras, M. and Heiskanen, O.** 1993. Natural history of unruptured intracranial aneurysms: a long-term follow-up study. J. Neurosurg. **79:** 18–36.
8. **Kassell, N.F. and Torner, J.C.** 1983. Size of intracranial aneurysms. Neurosurgery **12:** 291–297.
9. **Khanna, R.K., Malik, G.M. and Qureshi, N.** 1996. Predicting outcome following surgical treatment of unruptured intracranial aneurysms: a proposed grading system. J. Neurosurg. **84:** 49–54.
10. **Mizoi, K., Takahashi, A., Fujiwara, S., Koshu, K., Sugawara, T., Abiko, H. and Yoshimoto, T.** 1992. Management of incidental cerebral aneurysms-Retrospective analysis of 73 patients-. Surgery for Cerebral Stroke **20:** 73–77 (In Japanese).
11. **Mizoi, K., Yoshimoto, T., Nagamine, Y., Kayama, T. and Koshu, K.** 1995. How to treat incidental cerebral aneurysms: a review of 139 consecutive cases. Surg. Neurol. **44:** 114–121.
12. **Murayama, Y., Vinuela, F., Duckwiler, G.R., Gobin, Y.P. and Guglielmi, G.** 1999. Embolization of incidental cerebral aneurysms by using the Guglielmi detachable coil system. J. Neurosurg. **90:** 207–214.
13. **Nakagawa, T. and Hashi, K.** 1994. The incidence and treatment of asymptomatic, unruptured cerebral aneurysms. J. Neurosurg. **80:** 217–223.
14. **Noguchi, M.** 1998. Subarachnoid hemorrhage in "Vital Statistics of Japan", 1993–1995: Variability with age and sex. No Shinkei Geka **26:** 225–232 (In Japanese).
15. **Onda, H., Kagawa, M., Takeshita, M., Sato, K., Ujiie, H., Izawa, M. and Oikawa, A.** 1992. Management of asymptomatic unruptured aneurysms -Management of Multiple Aneurysms-. Surgery for Cerebral Stroke **20:** 196–200.
16. **Ono, J. and Yamaura, A.** 1996. Should unruptured aneurysms be treated? Junkan Kagaku **16:** 1036–1038 (In Japanese).
17. **Rinkel, G.J., Djibuti, M. and van Gijn, J.** 1998. Prevalence and risk of rupture of intracranial aneurysms: a systematic review. Stroke **29:** 251–256.
18. **Saitoh, I.** 1996. Asymptomatic cerebral aneurysms: management and controversies. No Shinkei Geka **24:** 875–884 (In Japanese).
19. **Schievink, W.I., Piepgrass, D.G. and Wirth, F.P.** 1992. Rupture of previously documented small asymptomatic aneurysms. J. Neurosurg. **76:** 1019–1024.
20. **Taylor, C.L., Yuan, Z., Selman, W.R., Ratchenson, R.A. and Rimm, A.A.** 1995. Cerebral arterial aneurysm formation and rupture in 20,767 elderly patients: Hypertention and other risk factors. J. Neurosurg. **83:** 812–819
21. **Yasui, T., Sakamoto, H., Kishi, H., Komiyama, M., Iwai, Y., Yamanaka, K., Nishikawa, M. and Nakajima, H.** 1998. Management of elderly patients with incidentally discovered unruptured aneurysms. No Shinkei Geka **26:** 679–684 (In Japanese).
22. **Yoshimoto, T. and Mizoi, K.** 1997. Importance of management of unrupture cerebral aneurysms. Surg. Neurol. **47:** 522–526.
23. **Wiebers, D.O., Whisnant, J.P., Sundt, T.M., Jr. and O'Fallon, W.M.** 1987. The significance of unruptured intracranial saccular aneurysms. J. Neurosurg. **66:** 23–29.
24. **Winn, H.R., Almaani, W.S., Berga, S.L., Jane, J.A. and Richardson, A.E.** 1983. The long-term outcome in patients with multiple aneurysms. Incidence of late hemorrhage and implications for treatment of incidental aneurysms. J. Neurosurg. **59:** 642–651.
25. **Wirth, F.P., Laws, E.R., Jr., Piepgras, D. and Scott, R.M.** 1983. Surgical treatment of incidental intracranial aneurysms. Neurosurgery **12:** 507–511.