

Neurol Med Chir (Tokyo) 50, 917 ~ 920, 2010

Giant Internal Carotid Artery Aneurysm Manifesting as Difficulty in Swallowing

—Case Report—

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Abstract

A 66-year-old man presented with a rare case of a giant aneurysm of the internal carotid artery manifesting as difficulty in swallowing, resulting in severe malnutrition. Initial examination found a pulsating mass protruding from the posterior wall of the pharynx in the oral cavity. The patient had left hemiplegia caused by cerebral infarction one year previously. The patient underwent surgical therapy consisting of superficial temporal artery-middle cerebral artery bypass and trapping of the internal carotid artery. The pulsation of the oral mass vanished just after surgery and his difficulty in swallowing gradually improved. The patient was discharged with no new neurological deficits. The previous cerebral infarction was probably caused by an embolus from this giant aneurysm.

Key words: giant aneurysm, internal carotid artery aneurysm, difficulty in swallowing, superficial temporal artery-middle cerebral artery bypass, embolus

Introduction

Extracranial internal carotid artery aneurysm is relatively rare, accounting for 0.34% to 3.7% among all extracranial aneurysms.¹⁵⁾ Giant aneurysms of 5-cm diameter or larger are found only occasionally.^{12,15)} The primary causes include syphilis, tuberculosis, and localized infection, and recently arterial dissection and injury.¹⁾ Associations include Marfan syndrome, fibromuscular dysplasia, aortitis syndrome, Behcet's syndrome, and neurofibromatosis.^{5,15,18)} Extracranial internal carotid artery aneurysm is associated with a 30% to 74% incidence of cerebral ischemia caused by embolism.¹⁸⁾ Difficulty in swallowing

is a common neurological deficit but is rarely caused by extracranial internal carotid artery aneurysm.

We describe a rare case of a patient with a giant cerebral aneurysm in the high position of the extracranial internal carotid artery compressing the posterior wall of the pharynx and protruding into the oral cavity, leading to difficulty in swallowing as the major symptom.

Case Report

A 66-year-old man had a history of cerebral infarction in the right middle cerebral artery (MCA) territory causing left hemiparesis of grade 4 on the modified Rankin scale.

Received September 3, 2009; Accepted February 24, 2010

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Fig. 1 Photograph obtained when the patient first visited the otolaryngology department of another hospital showing a pulsating mass in the oral cavity.

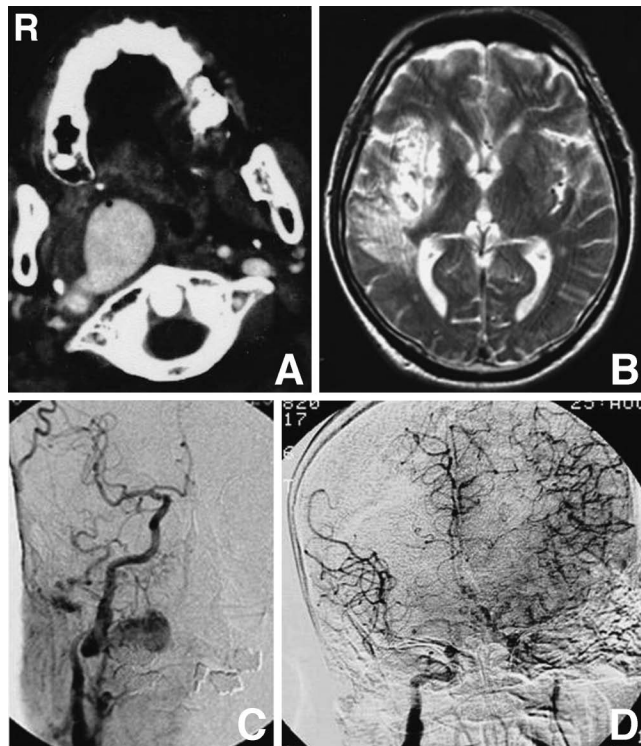


Fig. 2 A: Preoperative computed tomography scan with contrast medium demonstrating a giant carotid aneurysm compressing the pharynx at the atlas level. B: Preoperative T₂-weighted magnetic resonance image showing infarction of the right middle cerebral artery (MCA) territory. C, D: Anteroposterior right carotid angiogram (C) showing a giant aneurysm at the high cervical position of internal carotid artery, and left internal carotid angiogram with simultaneous right carotid artery compression (D) showing cross-flow of the right MCA via the anterior communicating artery.

Head and neck magnetic resonance (MR) angiography showed no stenotic lesions in the major vessels and cardiogenic cerebral embolism was excluded. He suffered stroke after bathing in a public bathhouse for more than 30

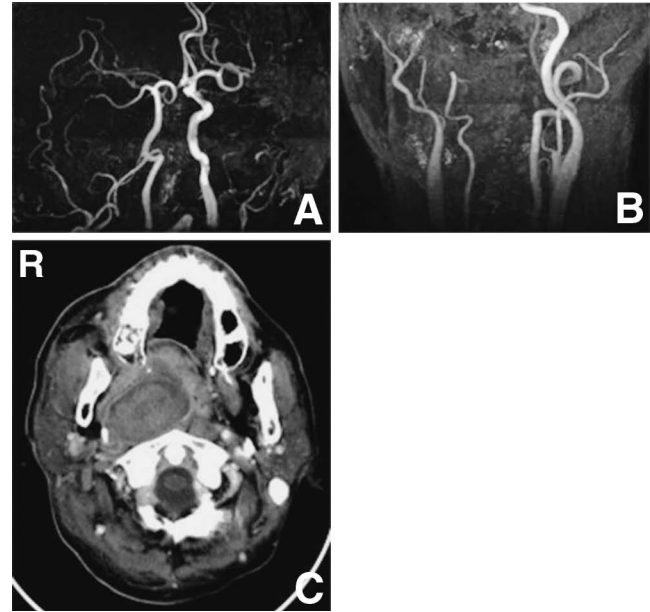


Fig. 3 A, B: Postoperative head (A) and neck (B) magnetic resonance angiograms. C: Postoperative computed tomography scan with contrast medium demonstrating the completely thrombosed tumor mass.

minutes, so severe dehydration seemed to be the cause. Antiplatelet agent was administered to prevent recurrence. Approximately one year later, his family happened to notice a protruding extraneous substance in the patient's oral cavity, and the patient visited the otolaryngology department of another hospital. Abscess was suspected and a puncture needle was inserted into the protrusion. However, arterial hemorrhage was observed and the procedure was stopped immediately. Two weeks later, he became aware of difficulty in swallowing, and visited our emergency department.

The patient was dehydrated and malnourished. A pulsating mass was found protruding from the posterior wall of the pharynx in the oral cavity (Fig. 1). Computed tomography with contrast medium showed a giant cerebral aneurysm of 6-cm diameter at the atlas level of the right extracranial internal carotid artery (Fig. 2A). The difficulty in swallowing was thought to be attributable to the rapidly growing pulsating tumor mass in the oral cavity which compressed the pharyngeal portion. Head MR imaging showed the previous cerebral infarction (Fig. 2B), and preoperative cerebral angiography showed a giant aneurysm at high cervical position and recanalization of the right MCA (Fig. 2C). Left internal carotid angiography with manual compression of the right internal carotid artery indicated good cross-flow to the side of the affected area via the anterior communicating artery (Fig. 2D), and the neurological deficit in the partial territory of the right MCA was present one year previously, so we decided a high-flow bypass was not necessary for the potential ischemia caused by obstruction of the right internal carotid artery. To avoid the risk of rupture of the aneurysm because of the difficulty in inserting an operating tube, a

tracheotomy was conducted before the surgery, and a superficial temporal artery-MCA bypass was performed before trapping of the proximal internal carotid artery and the proximal portion of the posterior communicating artery.

After surgery, the pulsations of the mass in the oral cavity vanished and the degree of compression on the pharyngeal portion improved (Fig. 3). The tumor mass in the oral cavity shrank significantly and the patient became able to take food and liquids orally 2 weeks after the surgery. No new neurological deficits were observed, and the patient was discharged from our hospital and returned home, where he was able to continue his previous daily activities.

Discussion

At the previous presentation with cerebral infarction one year ago, the extracranial internal carotid artery lesion at the higher position was not detected. No obvious major arterial obstructions or stenotic lesions were discovered and possible causes of cardiogenic cerebral embolism such as arterial fibrillation were excluded. Considering the situation at onset, he was diagnosed with thrombosis due to severe dehydration, and antiplatelet agent was given. At this presentation, MR angiography showed the right MCA was recanalized. Therefore, the cerebral infarction of one year previously was very probably caused by an embolus within the giant internal carotid artery aneurysm and naturally recanalized after the cerebral infarction was completed. Cases of cerebral infarction with unknown causes, including such rare cases, require investigation with cerebral angiography.

Only one previous case of a giant internal carotid artery aneurysm has manifested with difficulty in swallowing.⁷⁾ The symptom was discovered when the patient was 82 years old. Occluding the internal carotid artery with a coil or a balloon was considered, but the treatment was not provided because of the large size of the aneurysm and the patient's advanced age. The patient's swallowing difficulties increased gradually over 5 years, and the patient had a reattack on the same side at age 87 years and passed away. The natural history of extracranial internal carotid artery aneurysms indicates the chance of a cerebral ischemic attack caused by an embolism is 30% to 74%.¹⁸⁾ The rate of natural healing is only 5% with long-term follow up. The death rate when untreated is 40%,²⁾ so aggressive medical treatments are recommended. However, surgical treatment of a giant carotid aneurysm poses various problems. An aneurysm in a high cervical position such as the atlas and axis level is difficult to expose with a direct surgical treatment, and chances are high that hypostatic cranial nerve will be damaged.^{11,13)} Direct surgery for a giant carotid aneurysm in a high position which protrudes into the oral cavity is highly invasive and nearly impossible. Coil embolization of the aneurysm also presents difficult problems, such as escape of the coil from the aneurysm, distal embolization, and reopening due to coil compaction.¹⁵⁾ In this case, the difficulty in swallowing progressed rapidly 2 weeks after the mass protruding into the oral cavity was punctured, so the patient was judged to require

urgent treatment.

Therapeutic occlusion of the internal carotid artery is often necessary to exclude aneurysms from the circulation, and can be achieved by either trapping or trapping and bypass. Although there is no consensus regarding the indications for this procedure, balloon test occlusion (BTO), based on evaluation of clinical signs, stump pressure, and measurement of cerebral blood flow, has been used to determine the need for bypass (low flow or high flow) or non-bypass.^{3,6,9,16)} However, the BTO test is not without risk¹⁴⁾ and is also plagued with the possibility of false negative findings.¹⁰⁾ Moreover, use of only a low flow bypass procedure may be inadequate to prevent ischemic events,¹⁷⁾ and in patients younger than 75 years of age without major systemic diseases, high flow bypass should be performed without use of the BOT.⁸⁾ In addition, successful completion of the bypass procedure can be fraught with long-term complications such as de novo aneurysm development due to changes in flow and hemodynamic stresses.⁴⁾ Based on reports of delayed postoperative complications with therapeutic occlusion of the internal carotid artery without bypass,¹⁴⁾ the trend is to use the bypass procedure together with therapeutic occlusion of the internal carotid artery.³⁾ If no neurological after-effect has occurred on the same side, evaluation of the cerebral perfusion reserve should be conducted before considering other therapeutic approaches. Fortunately, no new neurological complications occurred, the pulsations from the tumor mass disappeared, and the tumor mass gradually shrank in size in our patient. The difficulty in swallowing improved progressively over 2 weeks.

This rare case of giant internal carotid artery aneurysm manifested as difficulty in swallowing due to a pulsating mass that protruded into the oral cavity. The patient had suffered cerebral infarction one year previously and the embolus in the tumor was assumed to be the cause. Although extracranial internal carotid artery aneurysms carry a high risk of embolic complications, with little risk of bleeding due to rupture, aggressive medical treatments are desirable, but surgical treatments should be carefully considered.

Acknowledgments

This work was supported in part by the Yao Municipal Hospital Department of Otolaryngology. Appreciation is expressed to Dr. Tsuruta and other doctors in the Yao Municipal Hospital.

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