Pterion keyhole approach for anterior circulation aneurysms
Hiroshi Tokimura

Department of Neurosurgery, Graduate School of Medical and Dental Sciences, Kagoshima University, Kagoshima City - Japan

Introduction: Recent advancement of intravascular technique has minimized the operative invasiveness. In rivalry with this technique, aneurysmal clipping has become less and less invasive. Hitherto, three less invasive surgical approaches as supraorbital keyhole approach, lateral supraorbital keyhole approach, and pterion keyhole approach, have been proposed for the clipping of the anterior circulation aneurysms.

Objectives: We report our experience with keyhole pterional approach as favorable treatment for anterior circulation aneurysms during the last decade, and also discuss the importance of the preoperative mapping of the facial nerve for keyhole craniotomy.

Methods: A series of 220 consecutive patients with 244 anterior circulation aneurysms, 168 females and 52 males, treated through keyhole pterional craniotomy from 2001 to 2011 were reviewed. Surgical indication was confined to the patients with small aneurysms less than 1.5cm in diameter, and without intracerebral hematoma. Locations of the aneurysms were; aneurysms at anterior communicating artery 66 cases, at internal carotid artery 71, and at middle cerebral artery 107. Ruptured and unruptured aneurysms were 157 and 87 respectively. Preoperative grading of the patients with subarachnoid hemorrhage (SAH) by Hunt & Hess was; Grade (G) 1:49, G2:46, G3:31, G4:17, G5:14. We also stimulated unilateral temporal branch of the facial nerve of 9 healthy volunteers and identified its course electrophysiologically.

Results: All the 220 aneurysms were clipped successfully. Postoperative Glasgow outcome scale (GOS) of the patients with SAH was GOS1: 20 (12.7%), GOS2: 8 (5.1%), GOS3: 17 (10.8%), GOS4: 30 (19.1%), and GOS5: 82 (52.2%). In the patients group without SAH, GOS was GOS2: (1.1%), GOS3: 1 (1.1%), GOS4: 2 (2.3%), and GOS5: 83 (95.4%). From facial nerve study, mean distances from tragus to the crossing point over the zygomatic arch, and from orbit to the middle rami, were 40.2 mm, and 16.4 mm respectively. Basically the temporal branch of the facial nerve innervates each muscle from posterior to anterior direction.

Conclusions: The keyhole approach offers equal surgical possibilities as conventional approaches in the treatment of anterior circulation aneurysms. From our results, pterion keyhole approach is the best way on the score of avoidance of facial nerve injury.