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## Acute EC-IC bypass for ruptured ICA blood blister-like aneurysms (BBAs)

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**Object:** Internal carotid artery (ICA) blood blister-like aneurysms (BBAs) have fragile aneurysm walls, poorly defined necks and located at the supraclinoid ICA with remarkable tendency of preoperative rebleeding, premature rupture during surgery and enlargement of aneurysmal dome in the acute stage, so surgical treatment is extremely challenging. The authors describe the clinical course of patients with subarachnoid hemorrhage (SAH) caused by ruptured BBAs and emphasize the usefulness of parent artery occlusion (PAO) with or without extracranial-intracranial (EC-IC) bypass in the acute SAH period.

**Methods:** We analyzed the clinical records of 18 consecutive patients (8 male and 8 female) with a mean age of 56 years (range 29-88 years) treated between January 2005 and December 2016.

**Results:** All 18 patients presented with SAHs corresponding to World Federation of Neurosurgical Societies Grades I, II, III, IV, and V in 6, 3, 3, 2 and 4 patient, respectively. All surgery was performed in the acute stage but in 4 of 18 cases we cannot identified BBAs immediately after onset. 3 of the 18 experienced preoperative rebleeding, and repeated angiography revealed remarkable enlargement of the aneurysm. 8 patients underwent PAO with bypass, 6 without bypass and 4 underwent interventional aneurysmal coil embolization. The outcome was excellent and postoperative angiography demonstrated complete obliteration of the BBA in 8 patients, good in 6 and dead in 6. Intraoperative premature bleeding from the BBAs occurred in 2 of 9 patients who underwent surgical trapping.

**Conclusions:** Ruptured BBAs were successfully treated with

PAO during the acute SAH period.

### Recent Publications

1. Meling T R, Sorteberg A, Bakke S J, Slettebo H, Hernesniemi J and Sorteberg W (2008) Blood blister-like aneurysms of the internal carotid artery trunk causing subarachnoid hemorrhage: treatment and outcome. *J Neurosurg.* 108:662–71.
2. Lee B H, Kim B M, Park M S, Park S I, Chung E C, Suh S H et al. (2009) Reconstructive endovascular treatment of ruptured blood blister-like aneurysms of the internal carotid artery. *J Neurosurg.* 110:431–6.
3. Peschillo S, Miscusi M, Caporlingua A, Cannizzaro D, Santoro A, Delfini R, et al. (2015) Blister-like aneurysms in atypical locations: a single-center experience and comprehensive literature review. *World Neurosurg.* 84:1070–9.
4. Peschillo S, Missori P, Piano M, Cannizzaro D, Guidetti G, Santoro A. et al. (2015) Blister-like aneurysms of middle cerebral artery: a multicenter retrospective review of diagnosis and treatment in three patients. *Neurosurg Rev.* 38:197–202.
5. Szmuda T, Sloniewski P, Waszak P M, Springer J and Szmuda M (2016) Towards a new treatment paradigm for ruptured blood blister-like aneurysms of the internal carotid artery? A rapid systematic review. *J Neurointerv Surg.*

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**8:488–94.**

**Biography**

Yasushi Ueno has his expertise in neurosurgery and stroke prevention. Especially he has a lot of clinical data about acute ischemic stroke and

vascular recanalization flowing medical preservation using DOACs (direct oral anticoagulants). He has built this clinical data after years of experience in bed side work, research, evaluation, and administration both in Shinko Hospital and education institutions; Kyoto University.

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