

論文内容要旨

※ 整理番号		(ふりがな) 氏名(自署)	印
論文題目	Efficacy of endoscopic fluorescein video angiography in aneurysm surgery - Novel and innovative assessment of vascular blood flow in the dead angles of the microscope (脳動脈瘤手術における内視鏡下フルオレセイン蛍光血管造影の有用性：顕微鏡死角での新規血流観察法)		
<p>論文内容要旨</p> <p>OBJECTIVE: In surgery for intracranial aneurysm, it is essential to confirm aneurysmal obliteration and the patency of parent and perforating arteries. Recently, intraoperative fluorescence video angiography has been widely adopted for this purpose. However, the observation field of this procedure is limited to the microscopic view, and it is difficult to visualize blood flow obscured by the skull base anatomy, parent arteries, and aneurysm. Consequently, the endoscope has been adopted for microsurgery to enable visualization of cerebral blood vessels in the dead angle areas of the microscope, but the endoscope cannot itself reveal real-time blood flow through the vessel walls. To overcome this problem, we adapted endoscopic indocyanine green (ICG) video angiography for cerebrovascular surgery and reported its efficacy for aneurysm surgery. However, this system and another commercial ICG endoscope system currently available require a diameter exceeding 4.0 mm to gain sufficient fluorescence, which makes it difficult to bring the endoscope into an appropriate position within the limited space available between eloquent areas. In this study, we developed a small-caliber endoscopic video angiography system employing sodium fluorescein, applied this innovative method to aneurysm surgery, and demonstrated its efficacy in this area for the first time.</p> <p>METHODS: Between February 2013 and June 2015, patients of consecutive cases of cerebral aneurysm treated with clipping performed with an endoscopic video angiography system employing sodium fluorescein were enrolled in this prospective study. The craniotomy and subarachnoid dissection were performed</p>			

備考

- 1 ※印の欄には記入しないこと。
- 2 論文題目が英語の場合は、()を付し、和訳を付記すること。
- 3 論文題目が日本語の場合は、()を付し、英訳を付記すること。
- 4 論文内容要旨は、研究の目的、方法、結果、考察、結論の順に日本語(2,000字程度)若しくは英語(半角5,000字程度)でまとめ、文字数を記載してください。(手書き不可)。

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in the usual manner. After the aneurysm neck and sac were exposed, the endoscope was manually introduced with the aid of the microscope to reveal the area behind the parent arteries and aneurysms and was fixed in place with a holding system. Two types of rigid endoscopes with outer diameters of 4.0 mm and 2.7 mm were used with 30° angled lenses. Both microscopic fluorescence angiography and endoscopic fluorescein video angiography were performed before and after clip placement. The findings obtained with endoscopic fluorescein video angiography regarding aneurysms and perforators were compared with those of microscopic fluorescence video angiography and endoscopic imaging without fluorescein video angiography.

RESULTS: Eighteen patients with 18 cerebral aneurysms were enrolled in this study. The subjects were 1 male and 17 female patients ranging from 37 to 78 (mean 63) years of age. Endoscopic fluorescein video angiography provided bright fluorescence imaging even with a 2.7-mm-diameter endoscope and clearly revealed blood flow within the vessels in the dead angle areas of the microscope in all 18 aneurysms. Consequently, it revealed information about aneurysmal occlusion and perforator patency in 15 aneurysms (83.3%) that was not obtainable with microscopic fluorescence video angiography. Furthermore, only endoscopic video angiography detected the incomplete clipping in 2 aneurysms and the occlusion of the perforating branches in 3 aneurysms, which led to the reapplication of clips in 2 aneurysms.

DISCUSSION: We have developed an endoscopic video angiography system employing sodium fluorescein, a strong fluorescence dye, and have demonstrated for the first time that this innovative system provides clear and bright fluorescence imaging of the blood flow hidden in the dead angle areas of the microscope. The efficacy of endoscopic ICG video angiography with commercially available endoscopes for aneurysm surgery has been reported previously. However, to ensure sufficient fluorescence, endoscopes used for ICG video angiography must exceed 4.0 mm in diameter. Therefore, it can be difficult to avoid neural and vascular injuries when inserting the endoscope into the appropriate location in the narrow skull base area. In contrast, fluorescein video angiography can be performed with a 2.7-mm-diameter endoscope, which was safely and adequately employed in all

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cases. Although the quality of the fluorescence images from a 2.7-mm endoscope is not as good as that from a 4.0-mm-diameter endoscope, it is sufficiently clear to confirm blood flow in aneurysm surgery. Moreover, the 2.7-mm-diameter endoscope can be used for simultaneous monitoring with a microscope and endoscope more often than is possible with the 4.0-mm-diameter one.

CONCLUSION: The innovative endoscopic fluorescein video angiography system we developed features a small-caliber endoscope and bright fluorescence images. Because it reveals blood flow in the dead angle areas of the microscope, this novel system could contribute to the safety and long-term effectiveness of aneurysm surgery even in a narrow operative field.

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