

Video Editorial

The First Awake Clipping of a Brain Aneurysm in Malaysia and in ASEAN: Achieving International Standards

Submitted: 30 Nov 2017

Accepted: 31 Dec 2017

Online: 15 Mar 2018

Zamzuri IDRIS^{1,3}, Regunath KANDASAMY¹, NEOH Yee Yik¹,
Jafri Malin ABDULLAH^{1,3}, Wan Mohd Nazaruddin WAN HASSAN²,
Mohd Erham MAT HASSAN²

¹ Department of Neurosciences, School of Medical Sciences, Universiti Sains Malaysia, Jalan Sultanah Zainab 2, 16150 Kubang Kerian, Kelantan, Malaysia

² Department of Anaesthesia, School of Medical Sciences, Universiti Sains Malaysia, Jalan Sultanah Zainab 2, 16150 Kubang Kerian, Kelantan, Malaysia

³ Center for Neuroscience Services and Research, Health Campus, Universiti Sains Malaysia, Jalan Sultanah Zainab 2, 16150 Kubang Kerian, Kelantan, Malaysia



To cite this article: Idris Z, Kandasamy R, Neoh YY, Abdullah JM, Wan Hassan WMN, Mat Hassan ME. The first awake clipping of a brain aneurysm in Malaysia and in ASEAN: achieving international standards. *Malays J Med Sci*. 2018;**25**(1):1–4. <https://doi.org/10.21315/mjms2018.25.1.1>

To link to this article: <https://doi.org/10.21315/mjms2018.25.1.1>

Abstract

World-renowned neurosurgeon, Professor Saleem Abdulrauf, has been featured in several medical journals for his successful “Awake Brain Aneurysm Surgery”. Regarded as a “world first”, this surgery, involves clipping un-ruptured brain aneurysms while patients are awake. Only one or two neurosurgery centres worldwide are capable of this. Performing the surgery while the patient is awake lowers risks of brain ischemia with neurological deficits and ventilator associated morbidities. The technique has been viewed as the start of a new era in brain surgery. Physicians from the Universiti Sains Malaysia (USM) School of Medical Sciences, at the Health Campus in Kelantan, headed by Professor Dr Zamzuri Idris (neurosurgeon) and Dr Wan Mohd Nazaruddin Wan Hassan (neuroanaesthetist), recently performed a similar procedure, the first such surgery in Malaysia and Southeast Asia. The USM team can therefore be considered to be among the first few to have done this brain surgery and achieved successful patient outcomes.

Keywords: un-ruptured, brain aneurysm, awake surgery

World-renowned neurosurgeon, Professor Saleem Abdulrauf, has recently been featured in a number of medical journals for his success in “Awake Brain Aneurysm Surgery”. Regarded as a “world first”, the surgery involves clipping an un-ruptured brain aneurysm while the patient remains awake. Professor Abdulrauf was one of our external examiners in neurosurgery and had taught us techniques for cerebrovascular surgery that is conducted when the patient is awake. Clinical studies have proven that it is feasible and beneficial for some selected patients to remain awake during the surgery in which their brain aneurysms are clipped (1–5). The advantages of awake brain surgery are that it lowers the risks of brain ischemia with neurological deficits (stroke) and ventilator associated morbidities. The technique has been viewed as marking a new era in brain surgery.

Physicians from Universiti Sains Malaysia (USM) School of Medical Sciences in Kubang Kerian Kelantan also recently performed their first awake brain aneurysm surgery. Our local team, headed by Professor Dr Zamzuri Idris (neurosurgeon) and Dr Wan Mohd Nazaruddin Wan Hassan (neuroanaesthetist), had already performed many awake brain surgeries for brain tumours (6, 7), but this was their first awake surgery involving a brain aneurysm. Malaysia is the first nation and region in Southeast Asia where awake brain aneurysm surgery has been done without endotracheal intubation. Indeed,

only two or three centres of neurosurgery are currently capable of doing this specialised awake cerebrovascular surgery on a regular basis. Our centre is, therefore, among the first few to have performed this new brain surgery with success.

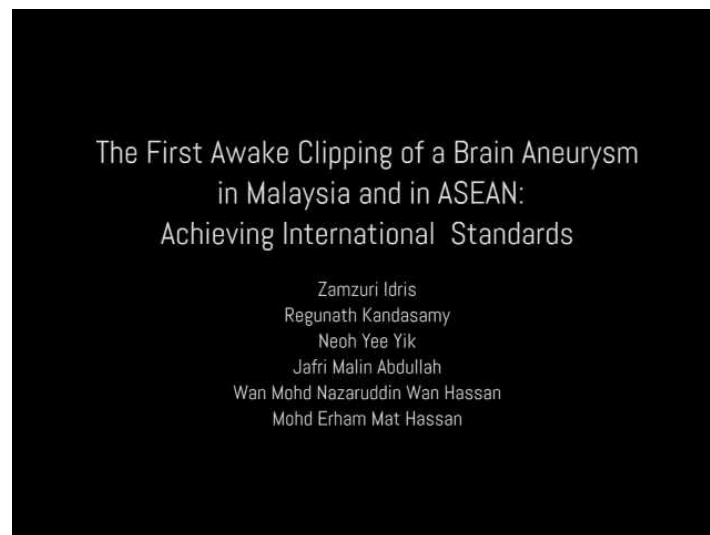
The patient was an adult male who presented to us with a long history of having a right-sided squint and because he had had an abrupt sentinel headache for a week. Magnetic resonance imaging (MRI) and a computed tomography (CT) angiography of the brain revealed a 1.7 cm diameter saccular aneurysm at the junction of the right ICA-anterior choroidal artery (Figure 2A). Awake clipping was considered to be beneficial in ICA-anterior choroidal artery aneurysms because of the high risk of accidentally clipping the anterior choroidal artery together with the aneurysm and therefore causing ipsilateral internal capsule infarction. This type of stroke causes dense hemiplegia, which is troublesome to the patient. Awake clipping with intraoperative neurological assessment appears to be the right option for avoiding this. We gave the patient detailed explanations about the surgery, risks and available choices. He agreed to the awake clipping, and we proceeded on the following day, placing the patient in a supine position with head rotation to the left and without endotracheal intubation. The scalp block and sedation were given while the craniotomy was being performed. The scalp block was performed at six sites of



Figure 1. The intraoperative view of awake clipping during brain aneurysmal surgery using a microscope: Professor Dr Zamzuri Idris is sitting on a chair using the microscope with his assistant, Dr Neoh Yee Yik

the scalp nerve innervations using a mixture of 25 mL ropivacaine 0.75% and adrenaline 5 ug/mL. An additional 20 mL of the same local anaesthetic was infiltrated at the pinning and incision site. The patient then had in-situ bladder catheterisation and head fixation with pins and a Mayfield head clamp. He was in a supine position with his head slightly extended and rotated to the left, and his thorax was elevated to 40° to ensure comfort. Before the craniotomy, conscious sedation was achieved with a dexmedetomidine infusion of 0.2 to 0.5 ug/kg/hr and remifentanyl target controlled infusion of 0.25-to-1 ng/mL. Oxygen was supplied only through a nasal prong during the surgery, and the patient was not intubated. Further local anaesthesia was given intra- and extra-durally

at the region of the right trigeminal nerve. The dissection of the brain (right sylvian fissure) was made without causing the patient any pain. The aneurysm was identified and clipped, cauterised, partially excised and decompressed from the right oculomotor (eye-squint) nerve. While this was being done, the patient was kept awake, and neurological assessments were performed intraoperatively and re-assessed by our second neurosurgeon, Dr Regunath Kandasamy. The immediate feedback obtained from a patient who was awake helped the operating neurosurgeon to remain confident that the surgery was going well. The second CT angiography showed that the aneurysm had been obliterated (Figure 2B). The patient was discharged without any new neurological deficits.



Video 1. This video can be watched by clicking on to the video's title or on YouTube at <https://youtu.be/gvzN92ZjMGk>

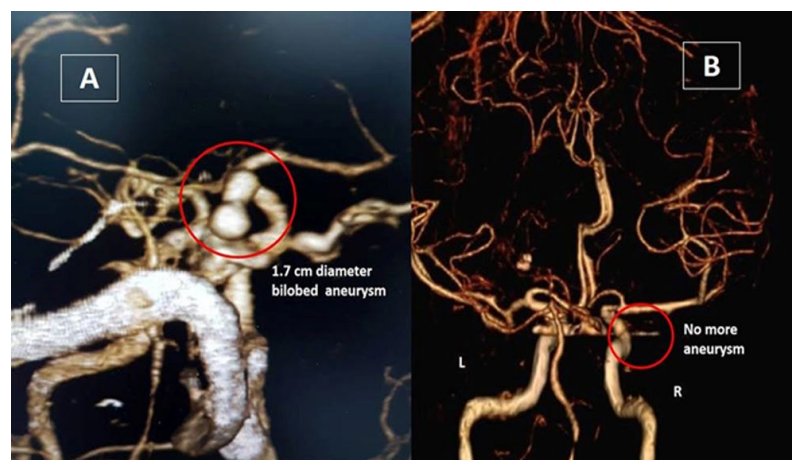


Figure 2. A: Pre-operative CT angiography reveals the presence of a saccular bilobed aneurysm
B: Post-operative CT angiography reveals absence of or obliterated aneurysm

From a technical perspective, this awake cerebrovascular neurosurgery without endotracheal intubation has generally been considered to be a challenging type of brain surgery. However, with the expertise and facilities that are available to us, we have managed to make it a good alternative to ordinary complete-sleep brain surgery that is done under general anaesthesia and in which no immediate neurological assessments of the patient can be made during the surgery. This success story, along with the other few aforementioned cases that have been reported, further underlines the value of awake cerebrovascular neurosurgery for some selected patients. Figure 1 show our clipping brain aneurysm surgery, which was the first to be performed in Malaysia and Southeast Asia.

Authors' Contributions

Drafting of the article: ZI

Critical revision of the article for important intellectual content: RK, MEMH

Final approval of the article: WMNWH, JMA

Administrative, technical, or logistic support: NYY

Correspondence

Professor Dr Zamzuri Idris

MBBCh (Wales) UK

MSurg (Neurosurgery) (USM)

Coordinate Master of Neurosurgery (USM) Program

Fellowship in Endoscopic and Functional

Neurosurgery, Neurosurgery, UZ Gent Belgium (2007)

Department of Neurosciences

School of Medical Sciences and Center for

Neuroscience Services and Research,

Universiti Sains Malaysia

16150 Kubang Kerian,

Kelantan, Malaysia.

Tel: +6019 9387720

Fax: +609 7673833

E-mail: neuroscienceszamzuri@yahoo.com

References

1. Abdulrauf SI, Urquiaga JF, Patel R, Albers JA, Belkhair S, Dryden K, et al. Awake high-flow extracranial to intracranial bypass for complex cerebral aneurysms: institutional clinical trial results. *World Neurosurgery*. 2017;**105**:557–5567.
2. Abdulrauf SI, Vuong P, Patel R, Sampath R, Ashour AM, Germany LM, et al. “Awake” clipping of cerebral aneurysms: report of initial series. *Journal of Neurosurgery*. 2017;**127**(2):311–318.
3. Cannizzaro D, Peschillo S, Mancarella C, La Pira B, Rastelli E, Passacantilli E, et al. Clipping in awake surgery as end-stage in a complex internal carotid artery aneurysm after failure of multimodal endovascular and extracranial-intracranial bypass treatment. *Journal of Stroke and Cerebrovascular Diseases: The Official Journal of the National Stroke Association*. 2017;**26**(6):e114–e118.
4. Passacantilli E, Anichini G, Cannizzaro D, Fusco F, Pedace F, Lenzi J, et al. Awake craniotomy for trapping a giant fusiform aneurysm of the middle cerebral artery. *Surgical Neurology International*. 2013;**4**:39.
5. Suzuki K, Mikami T, Sugino T, Wanibuchi M, Miyamoto S, Hashimoto N, et al. Discrepancy between voluntary movement and motor-evoked potentials in evaluation of motor function during clipping of anterior circulation aneurysms. *World Neurosurgery*. 2014;**82**(6):e739–e745.
6. Idris Z, Hassan WMNW, Mustapha M, Idris B, Ghani RI, Abdullah JM. 2013. Functional MRI, diffusion tensor imaging, magnetic source imaging and intraoperative neuromonitoring guided brain tumor resection in awake and under general anaesthesia, clinical management and evolving novel therapeutic strategies for patients with brain tumors. Dr Terry Lichtor (editor). *InTech*. Available from: <https://www.intechopen.com/books/clinical-management-and-evolving-novel-therapeutic-strategies-for-patients-with-brain-tumors/functional-mri-diffusion-tensor-imaging-magnetic-source-imaging-and-intraoperative-neuromonitoring>.
7. Mohd Nazaruddin WH, Mohd Fahmi L, Laila AM, Zamzuri I, Abdul Rahman IZ, Hardy MZ. Awake craniotomy: a case series of anaesthetic management using a combination of scalp block, dexmedetomidine and remifentanyl in Hospital Universiti Sains Malaysia. *Med J Malaysia*. 2013;**68**(1):64–66.