

LETTER TO THE EDITOR**TO THE EDITOR****Cerebrovascular Neurosurgery in Canada****Keywords:** Canada, Cerebrovascular surgery

I write to clarify some points regarding a paper recently published in the *Canadian Journal of Neurological Sciences* on the history of cerebrovascular surgery in Canada.¹

Edward Archibald, of McGill University, was Canada's first neurosurgeon, and one of the first neurosurgeons in the world.² Archibald trained in Neurosurgery at Queen Square, London, with Victor Horsley, in 1906, after which he became the dedicated neurosurgeon at the Royal Victoria Hospital, in Montreal. He published many papers on neurosurgical topics, and a magisterial, 300-page treatise on the practice of neurosurgery in 1908,³ which rivaled Cushing's own text, published in the same year. Archibald was a founding member of the Society of Neurological Surgeons (SNS) (1920), with Harvey Cushing and 13 other pioneers of North-American neurosurgery. Archibald continued to practice neurosurgery until he recruited Wilder Penfield to McGill University as his replacement, in 1928. At that time, and on the recommendation of Ernest Sachs and Charles Frazier, Archibald became the first senior member of the SNS.

Arthur Elvidge was trained in neurosurgery by Archibald, Wilder Penfield, and William Cone, and he joined the latter two as the third neurosurgeon at the Montreal Neurological Institute (MNI). Elvidge introduced cerebral angiography in North America in 1934, after learning the technique from Egas Moniz in Lisbon; and he published the first North-American monograph on its use—most notably as an aid in the diagnosis of arteriovenous malformations (AVM)—in 1937.⁴ He was also the first to demonstrate the occlusion of an internal carotid artery by angiography, and to correlate it with contralateral hemiplegia.⁵ Elvidge was the first neurosurgeon to clip an anterior circulation aneurysm, in 1946.⁶

Francis Echlin, working toward a Master's degree under Penfield's supervision, discovered that experimental vasospasm can result in cortical infarction, in 1939. Eric Peterson and I, at the University of Ottawa, were the first to describe a chronic experimental model of subarachnoid hemorrhage, in cats and monkeys, in 1973.^{7,8} Peterson was also the first to treat a carotid-cavernous fistula by endovascular means, in 1969, reaching the lesion through the ophthalmic vein.⁹

William Feindel, Lucas Yamamoto, and Charles Hodge, from the MNI, developed the techniques of intraoperative fluorescein angiography and intraoperative radioisotope blood flow studies, which they used as an aid in the treatment of cerebral AVMs. Using these techniques they described the intra-cerebral steal syndrome associated with these lesions. Leblanc and his collaborators at the MNI quantitated the hemodynamic and metabolic aspects of the intra-cerebral steal syndrome using positron

emission tomography, and Leblanc and Meyer were the first to demonstrate the usefulness of functional imaging in the treatment of AVMs.^{10,11}

Further details on the contributions of the MNI in the field of neurovascular surgery, and of neurology and neurosurgery in general, can be found in Feindel and Leblanc, *The Wounded Brain Healed – The Golden Age of the Montreal Neurological Institute, 1934-1984*, Montreal, McGill-Queen's University Press, 2016.

Richard Leblanc

Montreal Neurological Institute, Department of Neurology and Neurosurgery, McGill University, Montreal, QC, Canada

Correspondence to: Richard Leblanc MD, Montreal Neurological Institute, 3801 University Street, Montreal, QC, H3A 2B4, Canada H3A 2B4. Email: richard.leblanc@mcgill.ca

DISCLOSURES

Richard Leblanc has nothing to disclose.

REFERENCES

1. Ramnath S. Cerebrovascular neurosurgery in Canada: an historical review. *Can J Neurol Sci.* 2018;45:227-34.
2. Archibald E. In Feindel W, Leblanc R, *The Wounded Brain Healed – The Golden Age of the Montreal Neurological Institute, 1934-1984*. Montreal: McGill-Queen's University Press; 2016, pp. 40-5.
3. Archibald E. Surgical affections and wounds of the head. In Bryant JD, Buck AH, editors. *American practice of surgery: a complete system of the science and art of surgery, by representative surgeons of the United States and Canada*. New York: William Wood and Co.; 1908, Vol 5. pp. 3–378.
4. Elvidge AR. The cerebral vessels studied by angiography. *Proc Assoc Res Nerv Ment Dis.* 1938;18:110-49.
5. Elvidge AR, Werner A. Hemiplegia and thrombosis of the internal carotid system. *Arch Neurol Psychiatry.* 1951;66:752-82.
6. Elvidge AR, Feindel WH. Surgical treatment of aneurysm of the anterior cerebral and of the anterior communicating arteries diagnosed by angiography and electroencephalography. *J Neurosurg.* 1950;7:13-32.
7. Peterson EW, Searle R, Mandy F, Leblanc R. Reversal of cerebral vasospasm. *The Lancet.* 1973; I:1513.
8. Peterson EW, Searle R, Mandy F, Leblanc R, Bosc M. A chronic experimental model for the production of subarachnoid hemorrhage. *Br J Surg.* 1973; 60:316-17.
9. Peterson EW, Valberg J, Whittingham DS. Electrically induced thrombosis of the cavernous sinus in the treatment of carotid cavernous fistula. In Drake CG, Duvoisin R editors. *Fourth International Congress of Neurological Surgery, 9th International Congress of Neurology*. Amsterdam/New York, NY: Excerpta Medica Foundation; 1969, pp. 20-7.
10. Leblanc R, Little JR. Hemodynamics of cerebral arteriovenous malformations. In Black PN, editor. *Clin Neurosurg.* 1989; 36:299-317.
11. Leblanc R, Meyer E. Functional PET scanning in the treatment of AVMs. *J Neurosurg.* 1990;73:615-619, 1990.