Migraine Surgery: A Mini-invasive Vascular Approach

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Today, Migraine Surgery has been widely accepted as an effective surgical solution for chronic headaches refractory to medical treatment. Indeed, in the past two decades, extra-cranial trigger deactivation for migraine headaches has been used more and more routinely in surgical practice. Our surgical technique will be detailed, underlying indications, results, and complications. We have twelve years of specific clinical experience, with more than five hundreds of operated patients, that is one of the largest and extensive operating casuistry in Europe. Moreover, this study focused on the characterization of the morphological architecture of the superficial temporal and occipital arteries of migraine patients. Fresh biopsies were collected during the minimally invasive surgery procedure and immediately processed for light and electron microscopy analysis. In normal arteries, the tunica intima (endothelial layer) consists of a single layer of endothelial cells surrounded by a connective tissue basement membrane with elastic fibers. The middle layer, the tunica media, is primarily composed by smooth muscle and is usually the thickest layer. Regardless to the type of artery, in all samples analyzed we found tunica intima hyperplasia and internal elastic lamina fragmentation, as well as cellular alterations in the tunica media. In particular, a consistent fraction of vascular smooth muscle cells shifted from contractile versus synthetic phenotype. Vascular smooth muscle cells are highly specialized cells that regulate vascular tone and participate in vessel remodeling in physiological and pathological conditions. Phenotypic conversion from a contractile- quiescent- to 'synthetic' -active- state contributes to vascular pathologies. Taken together, these results support, in selected patients, our mininvasive vascular approach for migraine surgery.