

University of Calgary researcher to test new device that aims to protect the brain from the impact of small vessel disease

StrokeCog Clinical Trial Training Platform fellowship provides Bogna Anna Drozdowska with “an amazing opportunity” to better understand impact of remote ischemic preconditioning

University of Calgary post-doctoral researcher Bogna Anna Drozdowska has been awarded a StrokeCog Research Post-Doctoral Fellowship Award to study a new device that will potentially train the brain to withstand the impact of small vessel disease.

The award, matched with funding from Alberta Innovates, will enable her to launch a Phase 2a clinical trial involving 24 patients. She will test the feasibility, safety and tolerability of a therapy called remote ischemic conditioning (RIC), using an innovative Calgary-made cuff. The device was invented in the lab of her supervisor, Dr. Aravind Ganesh, a clinician-scientist with the Calgary Stroke Program, and is being developed in collaboration with FUEL Biomedical and SnapDx Inc.

“This study is a step towards getting this device on the regulatory pathway, and determining if it has a beneficial, meaningful impact on improving outcomes for people with cerebral small vessel disease,” says Dr. Drozdowska, who has a PhD in cardiovascular sciences from the University of Glasgow, a Master’s in brain injury rehabilitation from the University of Birmingham, and a Master’s in psychology from the Warsaw School of Social Sciences and Humanities.

She calls the StrokeCog fellowship award “an amazing opportunity to get more training in clinical trials delivery. I am really grateful. It shows that people believe in my skills and experience and want me to keep going. It’s a really big deal for me.”

While RIC is not a new idea, most of the research has been in animal models and focused on the heart rather than the brain, Dr. Drozdowska explains. RIC works by restricting blood flow in an arm or leg in order to condition the brain (and the heart, lungs, and kidneys) to withstand a sudden interruption in blood supply.

Research shows that conditioning can decrease inflammation, activate gene expression, protect against cell death, and encourage the formation of new blood vessels. As a result, it may improve cognition, lessen progression of cerebral small vessel disease and potentially prevent or reduce the severity of stroke.

In Dr. Drozdowska’s study, which is expected to begin recruitment in the coming months, participants over age 55 with small vessel disease are trained to use the Calgary device. Then,



they are randomized into two groups and given the device to take home. Participants can't tell if they are in the treatment or control because the device is programmed from a central hub to deliver a similar experience for all users. At the 30-day mark, the control group is switched over to the intervention so that everyone gets the treatment.

For the preconditioning process, the RIC cuff is inflated to 200 millimetres of mercury pressure, then deflated in a series of cycles. The device can remotely monitor whether patients are using it, as well as validate the quality of the data. It can send reminders to participants during the 60-day trial period and "if there are issues, we can troubleshoot on the spot," Dr. Drozdowska says. This smart technology, recently tested in a simulation study at the Northern Alberta Institute of Technology, provides features unavailable in existing devices manufactured outside of Canada.

Study participants will be assessed for adherence, adverse events, and cognitive function before and after the trial. As well, blood samples will analyze different biomarkers to see if changes occur after preconditioning.

The hope is that data from this trial will inform the design of a larger clinical trial

Inspired to pursue this field by her mother, who worked as a speech-language pathologist in Poland with people living with stroke, Dr. Drozdowska says she is excited about the potential of the research, the exceptional team in Calgary, and the valuable input provided by people with lived experience.

"This seems like quite a promising intervention," she says.

