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System stops heart attacks before they happen

Research shows treating patients en route to hospital saves heart muscle

EDMONTON — Damage to heart muscle can be prevented by injecting a clot-buster to abort a heart attack before it happens, ideally during a patient's ambulance ride to hospital, according to new research by local cardiologists recently published in the *Canadian Journal of Cardiology*.

This study of 2,235 patients — led by researchers at the Mazankowski Alberta Heart Institute, the CK Hui Heart Centre and the Faculty of Medicine & Dentistry at the University of Alberta — highlights the life-saving benefits of the Vital Heart Response system, which serves Edmonton and all of northern Alberta to expedite diagnosis and treatment for patients en route to major cardiac facilities at the Mazankowski and the CK Hui at the Royal Alexandra Hospital.

“The Vital Heart Response system is one example of how made-in-Alberta innovations are saving the lives of Albertans and making the province a global leader in the area of cardiac care,” says Stephen Mandel, Minister of Health. “I applaud everyone involved in developing and implementing this life-saving system.”

Vickie Kaminski, President and CEO of Alberta Health Services, says northern Alberta enjoys the country's lowest 30-day mortality rate from heart attacks, at 4.9 per cent, well below the national average of seven per cent, according to the Canadian Institute for Health Information.

“There's no doubt in my mind that innovations such as Vital Heart Response are responsible for these significant gains,” says Kaminski. “It's important to remember what these numbers ultimately mean — that more Albertans are surviving their cardiac episodes and fewer families are losing their loved ones.”

Unique in Canada, the Vital Heart Response system requires co-operation between different parts of the health system. Heart specialists in Edmonton take calls from the ambulance and small community hospitals to co-ordinate care for patients who suffer life-threatening STEMI (ST Elevation Myocardial Infarction) heart attacks — when a blood clot completely blocks the coronary artery, causing the heart muscle supplied by that artery to die.

When a patient presents with chest pains, for example, cardiologists and EMS work in tandem to diagnose the issue while the patient is still in the ambulance — and decide whether to inject a clot-buster on the spot, or to mobilize a hospital team to perform an emergency procedure (such as angioplasty to clear the artery and restore blood flow) upon the patient's arrival at hospital.

“Our research shows it's possible to avoid a major heart attack with really no heart muscle damage in patients who present early with symptoms and are treated early with effective therapies in the ambulance prior to arrival at the hospital,” says Dr. Kevin Bainey, one of the study's authors, an interventional cardiologist at the Mazankowski Alberta Heart Institute and an assistant professor in the Department of Medicine at the U of A.

“In fact, if you receive fibrinolysis (a clot-busting drug) within the first hour of symptoms, you have roughly a 30 per cent chance of aborting a heart attack with minimal, if any, heart muscle damage — and far superior outcomes compared to those who didn't abort their heart attack.

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“The success of this AHS pre-hospital Vital Heart Response program has put us on the map internationally,” says Dr. Bainey.

His study co-authors include Dr. Robert Welsh, founder and co-chair of Vital Heart Response.

“Understanding the complexity of disease and developing solutions to improve patient care requires collaboration and insight from many disciplines,” says David Evans, Vice-dean of Research at the Faculty of Medicine & Dentistry. “Drs. Welsh and Bainey have taken landmark discoveries made in Edmonton and ensured Albertans are receiving the best quality of care.”

Debbie Robertson says she’s alive today because of the quick treatment she received last September after experiencing severe upper back and neck pains.

“The paramedics did an ECG right away and gave me an injection in the ambulance,” says the 57-year-old mother of three. “Within 10 minutes, I felt great; the pain had gone. I just feel the care was excellent. I truly believe they saved my life.”

At the Mazankowski, cardiologists further decided to put stents in two of Robertson’s arteries to restore fuller blood flow. “I got my stents the first day. As I’ve said to many friends and relatives, if you’re going to have a heart attack — have it here,” she says.

Community support has played a pivotal role in this field of research overall. With a \$225,000 seed grant from the University Hospital Foundation, researchers were able to conduct initial studies, and leverage their findings into additional funding over the past several years.

The resulting Vital Heart Response system ties directly to the Foundation’s commitment to support cardiac research that has positive and real impact on patients.

“We are deeply grateful for the tremendous community support that makes leading-edge cardiac research possible,” says Joyce Mallman Law, President of the University Hospital Foundation. “The University Hospital Foundation is committed to funding innovative medical research fields that has a direct and tangible impact on our patients — accelerating excellence in health care.”

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The University Hospital Foundation raises funds to support innovation and excellence at Edmonton’s University of Alberta Hospital, Kaye Edmonton Clinic and Mazankowski Alberta Heart Institute.

The Faculty of Medicine & Dentistry at the University of Alberta is one of the world’s top 100 medical schools where faculty members are committed to improving patient care through teaching and research.

Alberta Health Services is the provincial health authority responsible for planning and delivering health supports and services for more than four million adults and children living in Alberta. Its mission is to provide a patient-focused, quality health system that is accessible and sustainable for all Albertans.

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