Local doctors hopeful that new treatment will increase the odds of surviving sepsis

Mac Horsburgh would never have guessed that a finger infection could threaten his life in 2016. But it did. It resulted in septic shock, a severe consequence of infection that requires treatment with life-support while antibiotics are given to control the infection. Doctors only gave him a 10 per cent chance of surviving.

Emily Rimmer and Ryan Zarychanski are two Winnipeg doctors leading a nationwide clinical trial of a procedure known as plasma exchange therapy to treat septic shock patients like Horsburgh.

“Many types of infections, especially untreated bacterial infections, can progress to septic shock,” said Rimmer, an assistant professor of hematology at the University of Manitoba and CancerCare Manitoba.

Sepsis effects 75,000 people a year in Canada and kills up to 18,000 people annually, according to the Canadian Sepsis Foundation.

In an interview, Zarychanski and Rimmer described how they’ve been working on this research for several years. Together they are leading the study in collaboration with a network of doctors across the country. The trial is set to begin in January 2023.

“Plasma is the liquid part of the blood that helps us heal and fight infection,” said Zarychanski, an associate professor of hematology and critical care at the University of Manitoba and CancerCare Manitoba. “When the infection becomes severe, the body’s response can go into overdrive causing extreme inflammation and organ failure,” he said.

“In some people, the body’s reaction to the infection can be worse than the infection itself,” added Rimmer.

“Patients with septic shock require life support and up to 30 per cent of them will die despite treatment,” said Rimmer.

This was what Horsburgh, aged 67 at the time, experienced. “The infection got into my bloodstream which later caused a blood vessel to burst. Infected blood poured into my abdomen. I went into septic shock and my organs began shutting down. I spent a week in a coma hovering between life and death,” he said.

“Hospital staff were telling my wife and family that if I survived this, I would suffer from brain damage and kidney failure. I spent three weeks in the ICU, intubated and heavily medicated. I am one of the fortunate few who survived,” Horsburgh said.

Horsburgh was lucky to survive, but most patients that sick would likely have died. Plasma exchange therapy might have prevented Horsburgh from becoming so critically ill, according to Zarychanski.

Plasma exchange is a procedure whereby plasma from infected patients is replaced with normal donor plasma, according to Rimmer. “Plasma exchange is expected to reduce inflammation, improve organ function and decrease the need for life support in patients with septic shock,” she said.

“I don't know if plasma exchange therapy would have helped me, and neither do the doctors,” Horsburgh said, “but the point of clinical trials is to try to determine, using scientific methods, if plasma exchange therapy can improve outcomes for septic shock patients,” he said.

“It’s important to note, this treatment is not intended to replace antibiotics and is only being studied in the sickest patients,” said Rimmer.

Plasma exchange is a common procedure used to treat a variety of immune and blood disorders but has never been rigorously studied in patients with severe infections. According to Rimmer, researchers began doing small studies using the technique in the 1990s, but none were able to provide a conclusive answer.

Funding for the study comes from the Health Sciences Centre Foundation, the University of Manitoba Department of Internal Medicine, the Canadian Institutes for Health Research and is facilitated by the Lyonel G. Israels Research Chair in Hematology held by Zarychanski.

In terms of the cost of the treatment, “It is enormously expensive for patients to be treated in the intensive care unit, so it is important to get sick people better so we can save lives and reduce healthcare costs,” Rimmer said.

Rimmer, Zarychanski, and their team are exceptionally hard working and are trying their best to solve the challenging medical problem of sepsis, according to Horsburgh. “Getting the public on board to understand what their research is about is very important. Scientific evidence based on statistical probabilities and analysis and a large sample of patients is most credible,” he said.

“Beyond antibiotics, we don't have very good therapies for treating severe infection and the mortality rate remains high. Our clinical trial gives those individuals hope that they may be able to get home to live out the rest of their lives free of infection and functional enough enjoy their friends and families,” Zarychanski said.

“In a world where the population is aging and severe infections are increasing, plasma exchange may help the sickest of the sick in our province and around the world. Our trial will test this hypothesis and hopefully increase the proportion of patients who leave the hospital alive,” said Zarychanski.

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