

Vitamin C: A potential life-saving treatment for sepsis

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Physicians caring for patients with sepsis may soon have a new safe and cost-effective treatment for this life-threatening illness. Research led by Dr. Karel Tynl and his colleagues at The University of Western Ontario and Lawson Health Research Institute have found that vitamin C can not only prevent the onset of sepsis, but can reverse the disease.

Sepsis is caused by a bacterial infection that can begin anywhere in your body. Your [immune system](#) goes into overdrive, overwhelming normal processes in your blood. The result is that small blood clots form, blocking blood flow to vital organs. This can lead to organ failure. Babies, the elderly and those with weakened immune systems are most likely to get sepsis. But even healthy people can become deathly ill from the disease.

According to Dr. Tynl, a professor at Western's Schulich School of Medicine & Dentistry, patients with severe sepsis have a high mortality rate, nearly 40 percent, because there is no effective treatment.

"There are many facets to sepsis, but the one we have focused on for the past 10 years is the plugging of capillaries," says Dr. Tynl. Plugged capillaries prevent oxygenation and the supply of life-supporting materials to your organ tissue and stop the removal of metabolic waste product. Plugged capillaries are seen in organs of septic patients. These organs may eventually fail, leading to multiple organ failure and death. Dr. Tynl's lab was the first to discover this plugging by using intravital microscopy, a technique Dr. Tynl pioneered in Canada.

According to Dr. Tyml's most recent publication, oxidative stress and the activated blood clotting pathway are the major factors responsible for the capillary plugging in sepsis. Through his research, Dr. Tyml has discovered that a single bolus of [vitamin C](#) injected early at the time of induction of sepsis, prevents capillary plugging. He has also found that a delayed bolus injection of vitamin C can reverse plugging by restoring [blood flow](#) in previously plugged capillaries.

"Our research in mice with sepsis has found that early as well as delayed injections of vitamin C improves chance of survival significantly," explains Dr. Tyml. "Furthermore, the beneficial effect of a single bolus injection of vitamin C is long lasting and prevents capillary plugging for up to 24 hours post-injection."

Dr. Tyml and his colleagues are eager to find appropriate support to move this research from the bench to the bedside to see if these findings translate to patients with sepsis.

The potential benefit of this treatment is substantial. "Vitamin C is cheap and safe. Previous studies have shown that it can be injected intravenously into patients with no side effects," says Dr. Tyml. "It has the potential to significantly improve the outcome of sepsis patients world-wide. This could be especially beneficially in developing countries where [sepsis](#) is more common and expensive treatments are not affordable."

Provided by University of Western Ontario

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