

Thornhill's Clearmate device a breath of fresh air for victims of CO poisoning

By David Godkin, Staff Writer

TORONTO – It's portable, spurns electrical wires, batteries and complex AI algorithms and according to its inventor has the potential to revolutionize treatment of carbon monoxide (CO) poisoning. The FDA and Health Canada-approved Clearmate developed by Ontario-based Thornhill Medical Inc. resulted from company co-founder Joe Fisher's observations while studying ways to regulate CO₂ in his science lab.

"It dawned on me that we could devise a device about the size of a briefcase that pushes air into a patient's lungs where it acts as a kind of dialysis membrane eliminating CO," Fisher told *BioWorld MedTech*. "And because our device is smaller and more portable than existing technologies ER staff could treat people immediately."

Better access to emergency care

Globally, CO poisoning is the most common form of poisoning and occurs when CO molecules block the ability of the blood to take up oxygen and deliver it to the body. The only remedies to date have been delivery of oxygen via mask and the hyperbaric chamber first developed in Aberdeen, Scotland to displace CO molecules attached to hemoglobin.

"Hyperbaric chambers displace CO, but by the time you get to a chamber you've been asphyxiated for so long there's not much left to save," said Fisher. And even if you could get to a hyperbaric chamber in time, there are only about 300 chambers in the U.S. to serve a population of more than 325 million, Fisher added.

"You can call an ambulance and have the patient taken to an ER within 15 minutes only to be told they don't have a hyperbaric chamber. If you know the patient is suffering from CO poisoning you take one of these devices with you in the ambulance and treat the patient right there."

Fisher acknowledged CO can be eliminated using an oxygen mask, "but this is only marginally better than giving them nothing," he commented. In ethically approved clinical trials conducted in China where CO poisoning is nearly pandemic, 25% to 40% of CO affected patients coming out of hyperbaric chambers suffered from delayed neurologic sequelae (DNS), a cerebral condition producing symptoms as diverse as severe headache, movement disorders, alteration in consciousness and amnesia.

That compares with a DNS rate of 3% among patients who'd



Clearmate. Credit: Thornhill Medical Inc.

undergone treatment using the Clearmate during those studies, said Fisher. "After about two years of follow up on the first cohort who'd undergone hyperbaric treatment, 75% to 80% of patients were doing good to excellent. For those who got the Clearmate, the good to excellent rating was up to 99%."

At US\$15,000, the Clearmate is also quite a bit lower in price than hyperbaric chambers which can come in at US\$100,000, not including the cost of facilities to house them, said Fisher.

Why wait?

Approved for use in North America and Europe, Clearmate is now under review by Excite International Hospital and Healthcare Inc., commissioned by Thornhill Medical to survey experts on the Clearmate's potential use in Canada, the U.S. and overseas.

"They're trying to see how this could be best marketed because so few people know about the device," Fisher explained. "It's something that society should adopt widely because it's the only truly effective treatment for CO poisoning."

Continues on next page

Continued from previous page

Authors of a 2017 U.S. study from the *American Journal of Respiratory and Critical Care Medicine*, titled “Carbon Monoxide Poisoning: Pathogenesis, Management, and Future Directions of Therapy,” concluded CO poisoning is widespread “with no available antidotal therapy,” and that better therapies for “an unmet clinical need” are required to treat the condition.

To illustrate his growing impatience getting Clearmate into the marketplace Fisher cited the accidental discovery in 1928 of mould found in a Petri dish belonging to Alexander Fleming. Fleming’s discovery led to the development of penicillin to combat infections like pneumonia and rheumatic fever. “It took years for that to be adopted,” said Fisher.

“The same is true of anesthesia. Twenty years after anesthesia was discovered, people were still undergoing surgery just being held down on the table.”

Fisher doesn’t think people who’ve contracted CO poisoning will want to wait that long with “an effective treatment only yards away” in Clearmate. He’s counting on Excite’s interviews with

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Joe Fisher
Co-founder, Thornhill Medical Inc.

“the movers and shakers and the clinical thought leaders in clinical care,” to fast track the Clearmate’s widespread adoption. “Here’s a perfect treatment. It’s portable. It’s inexpensive. There are no perceivable side effects. It’s got like everything to address this condition.” Fisher expects this to be borne out by survey results for the Clearmate once they’re released sometime this fall. ♦