

## **Keeping hearts pumping with 'LifeFlow'**

November 5 2009

When paramedics rush to the scene of a multi-car pileup or a terror attack, their first task is to assess who needs immediate care. But blood hemorrhaging can obscure damage, and the gruesome mess means paramedics can't always determine who should be treated first.

Tel Aviv University's new LifeFlow device, currently in development, could become the paramedic's new best friend — and save many lives in the process. The technology is based on a highly sophisticated mathematical algorithm which, when applied to a computer-controlled I.V. drip, can accurately assess what percentage of a person's <u>blood</u> stores are left. The device then administers the proper amount and type of I.V. fluid, permitting the paramedic to move on to the next disaster victim with fewer worries -- and more confidence that the first victim will remain stable before arriving at the emergency room.

"It's practically impossible for a well-trained paramedic to assess an individual's loss of blood, especially at a scene where there are already mass casualties," says Prof. Ofer Barnea of TAU's Department of Biomedical Engineering. "When paramedics approach a disaster scene, they have little to no idea how much blood a person has lost. They check a pulse to see if it's weak or strong, and tend to administer fluids automatically when there is any blood loss. But this can be a big medical mistake, since fluid overload can have a grave outcome."

## Made-to-measure IVs

An automatic one-size-fits-all intravenous infusion of liquids for severe



blood loss is not always the best way to proceed, he says. When a person's blood reserves are meager, the infusion can dilute the blood, reducing its oxygen-carrying capacity. Blood pressure rises from the I.V., the heart starts to pump harder, and infusion-induced oxygen deficit can ensue — resulting in a preventable fatality.

And it's not only important for the paramedic to know how much fluid to administer, stresses Prof. Barnea. "It's important to have a device that can determine the kind of fluid needed for a wounded body. A patient could need either a crystalloid I.V. or a colloid I.V. to combat the loss of blood. Our device will make this determination automatically," he says.

Other drugs, such as painkillers, could be added to the LifeFlow device as well. "Our final goal is to develop a device that controls the amount, rate and type of infusion fluid by measuring a number of different parameters."

So far the system has been validated in tests with pigs, and Prof. Barnea's team is working to take LifeFlow to the next level of development in conjunction with the Israel Defense Force's Medical Corps and a grant from the Israeli Ministry of Health. The team is currently planning new animal experiments and hopes LifeFlow can be ready for field deployment within the next few years if investment goals are met. It is being licensed by TAU's technology transfer arm, Ramot (ramot.org).

"It's a solution that's good for any American city threatened by terror. It's good for remote medical clinics in Alaska. It's good for soldiers in Iraq and Afghanistan, and it's good for hospitals in developing nations," says Prof. Barnea, "especially when you have to take care of a lot of wounded people at once."

Source: Tel Aviv University (<u>news</u> : <u>web</u>)



Citation: Keeping hearts pumping with 'LifeFlow' (2009, November 5) retrieved 28 April 2024 from <u>https://medicalxpress.com/news/2009-11-hearts-lifeflow.html</u>

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