

Device for Preventing Deaths From Multiple Organ Dysfunction Syndrome

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SUNY Upstate Medical University is actively seeking a partner interested in commercializing a novel device promising to help patients with sepsis avoid the deadly multiple organ dysfunction syndrome.

Current problem

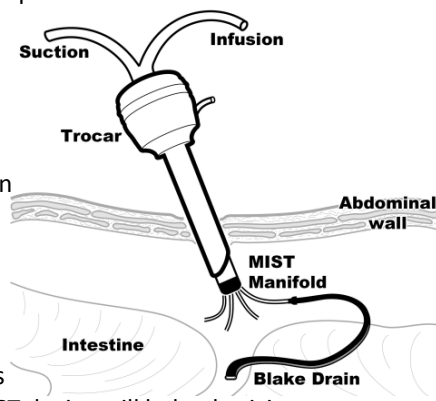
About 215,000 people in the United States, and a like number in Europe, die each year from multiple organ dysfunction syndrome (MODS), with most cases caused by sepsis, a potentially deadly medical condition characterized by a whole-body inflammatory state (called a systemic inflammatory response syndrome or SIRS) and the presence of a known or suspected infection. The annual healthcare costs of sepsis is over \$16 billion. SIRS also often afflicts patients without the presence of an infection, such as those with burns, chemical pneumonitis, and multiple severe traumas.

One cause for the high morbidity from sepsis and SIRS is an extreme buildup of fluids in the peritoneal cavity known as ascites. It has been shown that ascites is highly inflammatory and perpetuates SIRS, ultimately leading to the onset of MODS. Both the pressure and presence of fluids are problematic, and it is essential for patient recovery to drain them completely. Unfortunately, no device is currently available for completely draining these fluids, which tend to pool in hard-to-reach parts of the peritoneal cavity.

Upstate's solution

Upstate's minimally invasive suction therapy (MIST) device is designed specifically to remove deadly peritoneal ascites before the onset of MODS. Recently published research from Upstate reports that complete removal of peritoneal ascites will prevent MODS in an animal model (see *Shock*). MIST consists of a solid manifold, with multiple suction arms and a single infusion arm, designed to be inserted through a Trocar in the abdominal wall. After insertion drains (e.g., Blake drains) are connected to the arms using laparoscopic instruments, one end of each drain connected to a suction arm, the other placed in a paracolic gutter (where the fluids pool between the colon and the abdominal wall).

Once the drains have been connected and placed, the Trocar and laparoscopic instruments are removed and the MIST is sewn into place. A low level of suction is applied to the manifold via the suction port while saline or medicated solution is slowly infused into the abdomen through the infusion port. This fluid allows for the envelopment of all peritoneal organs, dilution of dangerous ascites fluid, topical application of antibiotics and other therapeutics, and creates a movement of solution in the peritoneum that aids in draining. Most importantly for patients, the MIST device will help physicians prevent ARDS and MODS by allowing them to remove toxic ascites before it causes morbidity and proactively create an abdominal environment conducive to healing.



Benefits of MIST device

- Improved patient outcomes through both removal of toxic ascites and infusion of treatment fluids directly into the peritoneal cavity
- Minimally invasive yet effective at draining fluids throughout abdominal cavity

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Peritoneal negative pressure therapy prevents multiple organ injury in a chronic porcine sepsis and ischemia/reperfusion model, Shock Augusta Ga (2010), Volume: 34, Issue: 5, Pages: 525-534
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