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Innovative Multiple Channels-Enhanced Ventricular Decompression Vent for Cardiac Surgery

Stanford doctors have developed an innovative left ventricular decompression vent with multiple-channels design that significantly enhances blood removal during cardiac surgery. This next-generation vent technology increases suction surface area up to tenfold compared to traditional perforated drains, providing superior left ventricular decompression, improved surgical field visualization, and reduced risk of occlusion. Available in multiple sizes for both pediatric and adult applications, this technology has the potential to enhance outcomes for patients undergoing cardiac surgery.

Left ventricular decompression is a critical component of most open-heart surgeries, with vents being utilized in a significant portion of the approximately 900,000 cardiac procedures performed annually in the United States alone. During cardiac surgery, effective left ventricular drainage is essential for optimal surgical exposure, protection of heart muscle by preventing excessive dilation, and ensuring proper air removal during the procedure. Current commercially available left ventricular vents typically feature simple perforated designs that have remained largely unchanged for over 30 years. These conventional devices often suffer from limited drainage capacity, potential for occlusion during surgery, and challenges in achieving optimal positioning within the heart chambers. A more efficient venting solution could significantly improve surgical outcomes by enhancing visualization of the operative field and minimizing trauma to surrounding cardiac tissues.

The multiple channels-enhanced ventricular decompression vent features an innovative design that significantly increases drainage surface area compared to traditional perforated vents. This geometry ensures consistent performance even during partial occlusion, while the integrated metal rod enables precise positioning

with minimal repositioning. Designed in multiple sizes (10-18 French) for both pediatric and adult applications, the vent provides surgeons with superior field visibility and consistent ventricular decompression. These advancements address key limitations in current ventricular drainage technology, enabling cardiac surgeons to perform procedures with improved precision and potentially leading to better outcomes for patients undergoing open heart surgery.

Stage of Development:
Prototype

Applications

- Left ventricular decompression during open heart surgery
- Blood removal for improved surgical field visibility
- Prevention of ventricular distension during cardiopulmonary bypass
- Air evacuation from cardiac chambers
- Compatible with both adult and pediatric cardiac procedures

Advantages

- Multiple-channels design provides 10x greater suction surface area
- Maintains function during partial occlusion
- Pre-bended and bendable designs with integrated metal rod or a guiding wire for precise positioning
- Multiple size options (10-18 French) for all patient populations
- Minimizes repositioning, reducing tissue trauma

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