

By Gregory P. Marelich, MD, FACP, FCCP, Terry Vierra, RRT, RCP, and Bill Miller, RRT, RCP

The shoe box-sized resuscitator gives clinicians an extra hand.

Good Things Come in Small Packages:

Vortran's RespirTech PRO™ Resuscitator

Our respiratory care department is extensively involved in testing new technologies. Given this, when we heard of the RespirTech PRO™, a disposable, gas-powered resuscitator that was smaller than a shoe box, we were intrigued. Such a device is very useful in pre-hospital care because standard bag ventilation requires an extra hand that isn't always available. And if the device is light, disposable and inexpensive, it's all the more attractive.

DEVICE TESTING

When Vortran Medical Technology 1 Inc. first told us about the RespirTech PRO, the device was not yet FDA-approved. Since we couldn't use it on patients, we connected it to a Michigan Instruments test lung and tested it for about two hours. Following its FDA approval, however, we used the device

in the ICU with patients in respiratory failure and found it to function exactly as billed.

RespirTech PRO is a two-knob, flow-limited, pressure-cycled resuscitator. Set-up consists of attaching the unit to a gas source, setting a peak pressure and connecting to a patient. The user estimates inspiratory time using a sweep second watch hand or by counting off, and estimates tidal volume by referring to a table glued to the device. Spirometers confirmed that our estimates were fairly accurate.

The clinician adjusts pressure to fine tune tidal volume and then uses the other knob to set a respiratory rate. With practice (about two hours of fiddling on our part) we could set up this device on a patient in less than 5 seconds after attaching tubing and flowmeter.

The most common reaction from passersby was, "That's a ventilator?" Even after we corrected them (RespirTech is approved as a resuscitator), the next comment was usually about its size. This device weighs about 70 grams and measures less than 7 inches by 4 inches by 3 inches.

PRODUCT TRADE-OFFS

There are naturally a few trade-offs for

the RespirTech's simple, compact design. For example, clinicians cannot set duty cycle (Ti/Ttot), which varies with peak pressure and set respiratory rate. For tidal volumes above 0.8 L, respiratory rates about 14 or so can push Ti/Ttot above 0.5 and lower tidal volumes may be necessary if air trapping occurs.

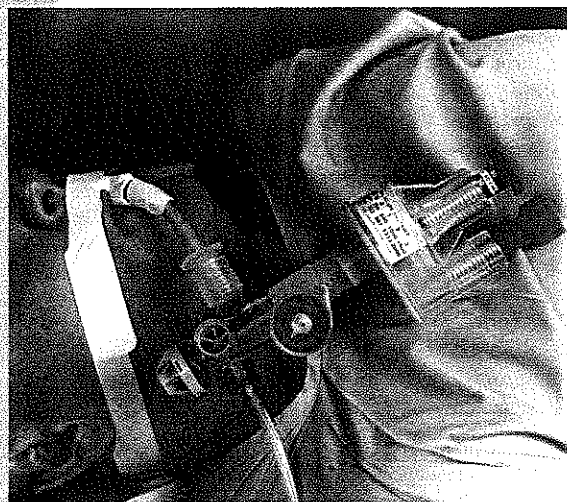
PEEP is automatically 10 percent of peak pressure and cannot be adjusted. We think this device would work well on most patients, but we would prefer a standard resuscitation bag with a PEEP valve to a transport ventilator for patients with significant lung dysfunction.

The device also uses compressed gas quickly. Our E tank lasted only about 12 minutes achieving an 8 L/minute ventilation using a gas flow of 40 L/min on a test lung. But with a 25 L/min gas flow delivering a smaller minute ventilation, an E cylinder can offer 20 to 25 minutes of operation.

There are no alarms or calibrated gauges on the RespirTech. Vortran offers an optional inline manometer, which is recommended to verify peak pressure. We believe clinicians would also need to use a spirometer to ensure adequate ventilation during prolonged use. However, RespirTech's design precludes a standard spirometer connection. Therefore, once RespirTech is set up and functioning, monitoring really depends on the experienced operator using his or her eyes, ears and good clinical judgement.

The unit certainly represents a significant advance in respiratory care technology. Although it has a few limitations, it may have a significant impact on the pre-hospital care and for temporary use within hospitals as well.

Dr. Marelich is assistant professor of clinical internal medicine, division of pulmonary and critical care medicine, University of California Davis Medical Center, Sacramento, Calif. Terry Vierra and Bill Miller are respiratory therapists in the facility's respiratory care department.



Vortran's RespirTech PRO™ disposable, gas-powered resuscitator offers a hands-free alternative to standard bag ventilation. photo/courtesy Vortran Medical Technology 1 Inc.