

Technology & Clinical REPORT

Summer 1997

Vol. IV, No. 1

Advances in
pulmonary management of
the critically ill infant

 **bunnell**
INSPIRED INFANT CARE

Inside this Issue

HFJV Literature
Review

LifePort Update

Research Support
Available

New Service
Notification
Program

Where is Your Life Pulse ?

If your hospital has a perfectly good Life Pulse Jet ventilator sitting in the back of your equipment storage area, we want to talk to you!

With capital budgets tighter than ever and operating budgets being squeezed for every penny, all existing resources need to be utilized to their maximum capability. The Jet has been proven to be a valuable life saving tool in the hands of properly trained clinicians. Someone at your hospital appreciated the Jet's benefits enough to spend thousand of dollars to purchase it. We want to make sure those benefits are realized.

No ventilator has proven more effective at treating pulmonary interstitial emphysema (PIE) than the Jet. It is specifically indicated for early intervention in PIE and is frequently used to rescue patients with PIE who have not responded to other high frequency ventilators. Rescue has always been associated

with the Jet from its initial clinical trials to present day. It has been especially useful in centers where ECMO is not readily available.

A good example of the Jet's ability to rescue is the experience of Dr. Michael Stanley, Cook Children's Hospital, Ft. Worth, Texas. Dr. Stanley uses the Jet when transferring patients to Cook Children's for ECMO. Patients who have been on high frequency oscillation at the referring hospital have often improved so dramatically on the Jet that they do not require ECMO by the time they reach Cook Children's.

Training is the Key

It doesn't matter why the Jet got taken out of service. What matters is that you have an opportunity to put it back into service and make a real difference in patients' lives. The key to this re-introduction is training. That's where Bunnell can help!

We can provide training at your hospital at no cost. All we require is your commitment to using the Jet when

indicated. A majority of NICU physicians and clinical staff must be willing to attend the training sessions provided by Bunnell. If the hospital has Jet supplies in stock there will be no charge for training. Otherwise, a minimum order for supplies must be placed before training can be scheduled.

The Jet is used to save several thousand infants each year. With a little training it can do the same at your hospital. Who knows, you might discover, like many of our current users, the Jet can be a lot more than a "last resort." As one respiratory therapist put it, "lungs respond to high frequency ventilation much better before they are badly damaged, so we have learned to use high frequency sooner rather than later."

There's gold in them there hills! To discover the valuable benefits the Jet has to offer call Evan Richards, Education and Clinical Services Manager at 1-800-800-4358. Schedule training at your hospital today.

436 Lawndale Drive
Salt Lake City, UT 84115
1-800-800-4358
www.bunl.com

HFJV Literature Review

“High-frequency jet ventilation acutely improves oxygenation, ventilation, and oxygen index in neonates with persistent pulmonary hypertension. This may prove useful during stabilization of the conditions of severely ill patients.” This was the conclusion of an article Randomized Comparison of High-Frequency Jet Ventilation and Conventional Ventilation in Neonates with Respiratory Failure and Persistent Pulmonary Hypertension” by Dr. W.A. Engle, *et al* of Riley Hospital for Children in Indianapolis published in the *Journal of Perinatology*, Vol. 17, No. 1, 1997.

Their motivation for the study was stimulated by encouraging results from other researchers demonstrating that high-frequency jet ventilation (HFJV) reduced the need for extracorporeal membrane oxygenation (ECMO) for infants with persistent pulmonary hypertension (PPHN). However, previous studies were retrospective. Dr. Engle and his colleagues wanted to evaluate efficacy and safety of HFJV compared to conventional ventilation (CV) in a randomized, controlled trial. Specifically, they were interested in examining

the acute effects of HFJV on oxygenation and ventilation.

Inclusion criteria required infants weigh greater than 2000 gm and be equal to or greater than 35 weeks gestational age. The infants had to be diagnosed with pulmonary hypertension by echocardiography and be in respiratory failure defined by an oxygenation index ≥ 25 for 2 hours on an FiO_2 of 1.0. Twenty-four patients met inclusion criteria with 11 randomized to the HFJV group and 13 to the CV group. Because of the critical nature of these infants, crossover was not allowed; when they fail the randomized form of ventilation they were treated with ECMO.

Dr. Engles' group recommended that “future randomized trials of the high frequency ventilation should focus on patients within specific diagnostic categories and include comparison of high frequency jet ventilation, high frequency oscillatory ventilation and conventional ventilation.”

This material is provided by Bunnell Incorporated as an educational service. The information distributed herein may include research not monitored by Bunnell Incorporated and Bunnell does not endorse or recommend the use of the Life e Pulse High-Frequency Ventilator beyond its labeling as stated in its operator's manual.

LifePort Update

Is the performance of the LifePort adapter and the Hi-Lo Jet endotracheal tube (Hi-Lo tube) identical? NO! The performance is similar. The LifePort and the Hi-Lo tube measure pressure at opposite ends of the E.T. tube. Our goal was to match their pressure signals so the Life Pulse ventilator would respond in a similar way to both. *You should always adjust the peak inspiratory pressure (PIP) on the Jet to achieve the desired PaCO₂ for your patient.*

LifePort vs. the Hi-Lo tube

In response to several calls we received, regarding performance concerns with the LifePort, we did a number of studies to characterize the differences between the LifePort and the Hi-Lo tube. The testing revealed two areas where LifePort performance differences might have clinical implications.

1. Monitoring on conventional PIP to determine the start-up PIP on the Jet.

2. Switching to the Hi-Lo tube from the LifePort adapter.

In the first case, determining the starting PIP, it may be necessary to use slightly high PIP than anticipated when switching from conventional ventilation to the Jet. Remember, *always titrate the PIP on the Jet to the desired PaCO₂. If the PaCO₂ is not responding to the PIP you have selected don't be afraid to go up on PIP.* The tidal volume associated with the PIP on

the Jet is approximately ten times smaller than the same PIP on the conventional (inspiratory time 0.02 sec vs. 0.3 sec. respectively.) If you have to use the same PIP or even a high PIP on the Jet than on the conventional, you are still delivering a much smaller tidal volume.

Making the Switch

Switching to the Hi-Lo tube *from* the LifePort. If you do this, you should be aware that ventilation may increase (PaCO₂ may decrease) at the same PIP. More Servo pressure is required to obtain the same PIP using the Hi-Lo tube compared to the LifePort adapter. PIP can be adjusted, to maintain Servo pressure in the same range, according to the following guidelines.

When switching to the Hi-Lo tube *from* a:

2.5 mm LifePort - lower the HFJV PIP 20% titrate to PaCO₂

3.5 mm LifePort - lower the HFJV PIP 10%, titrate to PaCO₂

>3.5 mm LifePort - use the same HFJV PIP, titrate to PaCO₂

Response to the LifePort has been overwhelmingly positive. Our records indicate 90-95% of all Jet patients are treated using the LifePort. It is our hope that this new information will make your future Jet experiences even more positive and effective. Don't get stuck on what the PIP should be; let your patient's PaCO₂ determine the PIP and give them what they need. *They will still get the benefits of HFJV: smaller tidal volumes and lower alveolar pressures.*

Service Contracts

Make \$ense

It is critical to your staff and to the well being of your patients that the Life Pulse Jet ventilator is always available and operational when needed. Our service contract provides regular maintenance and emergency back up to virtually eliminate down time.

A service contract covers parts and labor for all preventative maintenance and repairs that result from normal operations. A loaner Life Pulse is available at no charge upon request, for emergency backup or routine service. We can deliver a loaner in 1-4 hours to most locations with the U.S.

The service contract makes good economic sense too! If you had to send your Jet in for service just one time during the year and pay for a rental during the average service interval (10 days), you would pay for about 80% of a service contract. For an additional 20% you are covered for an entire year.

For more information on service contracts, contact Ken Hekking @ 1-800-800-4358.

Research Support Available

Many hospitals now own more than one type of HFV. We know that patients are switched from one type to another and improve even though the same strategy is employed with both systems. Can this improvement be predicted, under what circumstances, and is the improvement significant in terms of morbidity, mortality or cost?

Bunnell will support clinical research comparing different types of high frequency ventilators in infants with the same diagnosis. After 16 years of clinical use we believe it is time to replace personal preference with data. It is our hope that guidelines can be developed that will help clinicians determine which type of high frequency offers the best potential benefits for a given diagnosis.

Bunnell will provide support for well controlled

clinical trials in the following forms: protocol development, statistics, equipment, supplies, and financial reimbursement. The level of support will be determined by the nature and scope of the study proposed. Protocols must be submitted to Bunnell for review and approval before support can be discussed.

Interested clinical researchers should contact David Platt at 1-800-800-4358.

New Service Notification Program

Like all ventilators, the Bunnell Life Pulse High Frequency Jet Ventilator and Patient Box require preventative maintenance to help maintain safe and reliable operations. A survey of factory maintenance records revealed that a large number of systems were not receiving periodic maintenance. The Service Notification Program was developed to encourage regular service by implementing several mechanisms that make it

easier to track service intervals.

Many of you may have already received one of our service notification letters. These letters will be sent out annually to remind you when service is due on your Bunnell equipment. A second feature of this program is a calibration sticker. The sticker indicates the month and year when the last calibration was performed at the factory. Checking Bunnell equipment for stickers and verifying the dates on stickers should make it easy to determine which components need service and by what date.

It is our hope that this new program will enhance the safety and reliability of your Life Pulse ventilator system. Your participation in the program is critical to making it a success.

If you have any questions or comments regarding the notification program please contact Ken Hekking at 1-800-800-4358.

© Copyright, Bunnell, Inc. 1997