

## With closed-loop control, you know the patient is being supported even when the unit is busy

### Interview with Dr. Yuh-Chin Tony Huang, Duke University Health System

*Dr. Huang has used closed-loop ventilation on almost all his ventilated patients in the Duke Health System Durham Regional Hospital in North Carolina, USA since August 2006. Because closed-loop ventilation requires fewer setting changes, Dr. Huang has more time to devote to assessing the patient's respiratory status and his other activities in the ICU.*

Q: Dr. Huang, what is particularly easy or difficult about using the GALILEO ventilator?

A: The GALILEO is pretty easy and intuitive. I don't have to read the manual.

The GALILEO has two knobs, one for monitoring and one for controls. At first this was not clear, but it became clear after using the GALILEO once.

One of the unique things about the GALILEO is its trending function, which monitors changes in any respiratory parameter. It's a very useful function and an advantage. Very few people know about this trending function. You can see what's happened in the past 12 hours.

I would, however, change the default settings for trending. In ASV, I typically monitor P<sub>insp</sub>, f<sub>Total</sub>, f<sub>Spont</sub>, and possibly VTE.

Q: Did you have concerns about using closed-loop ventilation?

A: No, because I had used ASV before in Asia. (*Editor's note: Closed-loop ventilation mode ASV has been available outside the USA since 1998.*) People who have not used ASV before might have concerns about setting %MinVol to an appropriate level. I came across the ASV mode when I was a visiting professor in a university hospital in Taiwan several years ago. I had never heard of ASV before since it was not available in the US at the time. I was fascinated by this mode when the doctors there explained to me how it worked.

**"You leave settings as they are and you don't have to worry about them"**

Q: Has closed-loop ventilation changed the way you work?

A: Closed-loop ventilation gives me more time to do other things. You leave settings as they are and you don't have to worry about them. You just check the ventilator periodically to see if it interacts with



The Durham Regional Hospital, a member of the Duke University Health System, is a 369-bed acute care hospital in North Carolina, USA. The intensive care unit currently has 24 beds. There is one attending physician 24 hours a day. There are also two respiratory therapists who cover the ICU and ER and handle blood gas measurements, one pulmonary fellow, and medical residents for some patients. The ICU has 12+ GALILEO ventilators.

Dr. Tony Huang is a faculty member in the Division of Pulmonary and Critical Care Medicine at Duke University Medical Center. He is involved primarily in clinical research.

the patient appropriately. It's a pretty automated mode. My interactions with RTs have also changed from simply asking them to change the mode to discussing patient's mechanics and clinical conditions.

# User Report

When the unit is busy you know the patient is being supported. You know the patient is making progress. Unlike with a conventional mode, you don't have to write orders to change from one mode to the other.

## "My overall impression is that the time on the ventilator for the patients is shorter"

Q: How do your patients respond?

A: In general they do fine.

Q: Did you observe reduction in the patient's total time on the ventilator since the introduction of closed-loop ventilation?

A: My overall impression is that the time on the ventilator for the patients is shorter. The RTs say that the patients get off much faster, although we don't have studies to back this up.

Q: Do you find that less sedation is required with ASV?

A: Patients are probably sedated less, but we don't have data to back this up.

## "This mode doesn't need a protocol to set"

Q: How do you adjust settings in ASV?

A: You determine %MinVol by matching the patient's minute ventilation requirement. What I suggest are two settings – an acute setting and a recovery setting. It's difficult to get people used to setting %MinVol for acute respiratory failure. People are kind of scared to set %MinVol to, say, 200%. What they need to pay attention to is the actual minute ventilation to which %MinVol corresponds. You don't need to start at 100% and adjust it upward. You can turn it to 80 or 100% as they get better.

You don't have to worry about blood gases. ABG is no problem in this mode – as long as you match the minute ventilation at the beginning, then blood gases will always be good.

The algorithm in the manual about how to adjust %MinVol is a bit cumbersome to follow; however, a pocket-sized card with a simple algorithm to quickly adjust %MinVol is now available to users. The perception is that one needs a protocol, but this mode doesn't need a protocol to set. ASV is a combination mode of two simple modes. Use your knowledge of pressure support and pressure IMV to manage this mode.

Q: On what patients do you use ASV?

A: We use ASV on almost all patients.

## "All patients in general do very well on ASV"

Q: Have you found ASV to work particularly well for certain patient types?

A: All in general do very well. There have been one or two patients whose central drive is very strong. These patients don't do as well on ASV, because the calculation is off when the patient generates a lot of negative pressure during inspiration. The calculation of RC expiration, however, is still accurate.

Q: Which of the advanced monitoring parameters (e.g., rapid shallow breathing index (RSB), P0.1, inspiratory pressure time product (PTP), imposed work of breathing (WOBimp)) do you often use in your daily work? Do you use any of the advanced monitoring and trended monitoring of the GALILEO?

A: For research these parameters are helpful. In clinical use resistance and compliance can be useful. P0.1 can be used in a small number of patients.

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