

# Automation assists the weaning process

## SmartCare™ provides customised ventilation settings

**I**t sometimes happens that the full significance of a development in technology is only revealed when it is tested in the hospital setting and this is what occurred with the SmartCare™/PS, Dräger Medical's knowledge-based weaning system. It is the subject of a study at the Bristol Royal Infirmary, Bristol, UK which was carried out by Dr Tim Gould, consultant and head of the hospital's general intensive care unit.

SmartCare was used in a lab set-up with Evita 4 and the Automedon system. Later it was integrated in Evita XL from which it continuously takes data, and uses the mean parameter values to make decisions, on whether to adapt pressure support, at two or five minute intervals. The device is the first member of the new SmartCare option and it features automated clinical guidelines based on recognised medical expertise. The system was developed in close collaboration with Professor Laurent Brochard, Hôpital Henri Mondor, and Dr Michel Dojat, Institut National de la Santé et de la Recherche Médicale, Créteil, France. It is used to standardise the weaning protocol for each patient. This part of the study is under the control of the system's computer.

Bristol Royal Infirmary is an 1,100-bed teaching hospital. The general ICU has seven intensive care, and five high dependency beds. The hospital also has a 19-bed cardiac care unit and an 18-bed paediatric facility.

The ICU policy at the hospital is to wean aggressively as early as possible. Many patients are breathing spontaneously within the first 24 hours, which is facilitated by effective nursing protocols for weaning and sedation. However, Dr Gould was intrigued when he heard about the SmartCare design and it was decided to study the system under everyday clinical conditions.

### NINE MONTH TRIAL

Around 45 patients were placed on the SmartCare system over a period of nine months on a trial basis. It was used when appropriate, the aim being to familiarise doctors and nurses with the system and see how patients responded to it. There have been three different



Dr Tim Gould and nurse discuss the specific SmartCare setting before adjusting it for a particular patient.

patient responses. The first group had normal respiratory physiology and breathed spontaneously early. Most were undergoing major elective surgery and SmartCare could be started immediately. The second group were patients who had been on the ventilator for several days with a more acute respiratory problem such as ARDS (Acute Respiratory Distress Syndrome) or pneumonia. As they drew nearer to the point of spontaneous breathing mode, Dr Gould used SmartCare to see how easily it could capture their weaning status, control ventilation and optimise the level of ASB (Assisted Spontaneous Breathing) appropriate at that stage. The third group were those who had a central respiratory drive towards tachypnoea. When they breathed rapidly, SmartCare tried to capture them, by using progressively higher levels of Pressure Support (PS) within the threshold of the protocol and the set alarm limits.

Dr Gould points out that the main advantage to the patient was that the ventilation settings were being customised for each one. This is possibly better than if the patient was managed by a nurse-driven protocol. Certainly the opportunity to reduce pressure support and move down to the next setting will be tested and achieved more rapidly

and frequently than with most nurse or clinician driven protocols, he explained.

According to Dr Gould their recent experience to date has indicated that SmartCare was certainly beneficial to patients with physiologically normal lungs. This would be useful in ICUs that frequently care for elective surgery patients. The system will wean patients who are surgically well enough very rapidly, often in as little as one hour.

Regarding specific settings and patient information for weaning with SmartCare he believes that for ordinary patients the settings would be essentially the same as for those with normal lungs and physiology. However, the settings can be customised for patients with chronic obstructive pulmonary disease (COPD). There is also a third setting for head injury patients with neurological insult. The flexibility of the system allows it to be customised for most patients. Initial findings from the study indicate that this could save staff time which represents a major cost factor in the ICU budget.

**Correspondence to:**  
**Guy Wallis, Editorial Director**  
**e-mail:**  
**g.wallis@greycoatpublishing.co.uk**