

Patient comfort and rapid weaning with SmartCare®/PS

A case description of a patient who was difficult to wean.



Andreas Möhlendick, senior consultant of the Anesthesiology and Critical Care Department at the Skaraborg Hospital in Skövde, discusses a specific case and shares his experience using the SmartCare®/PS option. Weaning and improved patient comfort are the biggest advantages the system has to offer.

A 15-year-old girl with no prior illnesses was vacationing in Thailand. She developed stomach pain and vomiting and was initially treated successfully there.

After her return to Sweden, however, the patient developed nausea, vomiting and diarrhea that persisted for two days, eventually bringing her to the emergency room of the hospital in Skövde.

The result of the initial diagnosis indicated unstable blood pressure with concomitant respiratory insufficiency. Massive indications of sepsis required her transfer to the ICU.

Due to worsening respiratory insufficiency, the patient required ventilation. After successful intubation, ventilation was optimized using a lung-protective ventilation strategy. Treatment included a PEEP of up to 20 mbar (cmH₂O).

The patient's overall condition improved over the next few days, allowing the invasiveness of the ventilation to be incrementally reduced.

On the fifth day, a PEEP of 10 mbar (cmH₂O) and FiO₂ 0.35 was set using the

SmartCare/PS option of the EvitaXL. With spontaneous ventilation, the PEEP was further reduced to 5 mbar (cmH₂O).

After ten hours, SmartCare/PS finally recommended extubation. Since it was late in the evening, the patient was not extubated until the following morning. She was extremely weak and exhausted. To be on the safe side, ventilation was continued noninvasively with the Evita NIV option. This treatment was discontinued after five hours and replaced by intermittent CPAP therapy.

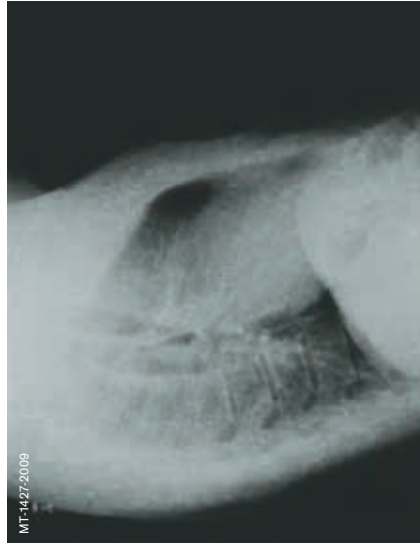
Andreas Möhlendick is the senior consultant of the Anesthesiology and Critical Care Department at the Skaraborg hospital in Skövde, Sweden. After completing his anesthesiologist education in Germany he moved to Sweden in 2000. His clinical focus is ventilation therapy of ICU patients.



Andreas Möhlendick



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Two weeks after the initial lung x-ray, things have returned to normal.

Overall opinion of the SmartCare®/PS application

The very rapid and positive improvement is certainly due to the consistent and aggressive treatment of the sepsis. At the same time, a high PEEP combined with spontaneous breathing lead to rapid recruitment. As a result, the patient's respiratory situation improved quickly.

Using SmartCare/PS during the weaning phase definitely shortened the weaning process. Without the recommendation to extubate from SmartCare/PS, Möhlendick reports he would not have risked extubating the patient so soon after respiratory failure; he would have waited another two to four days.

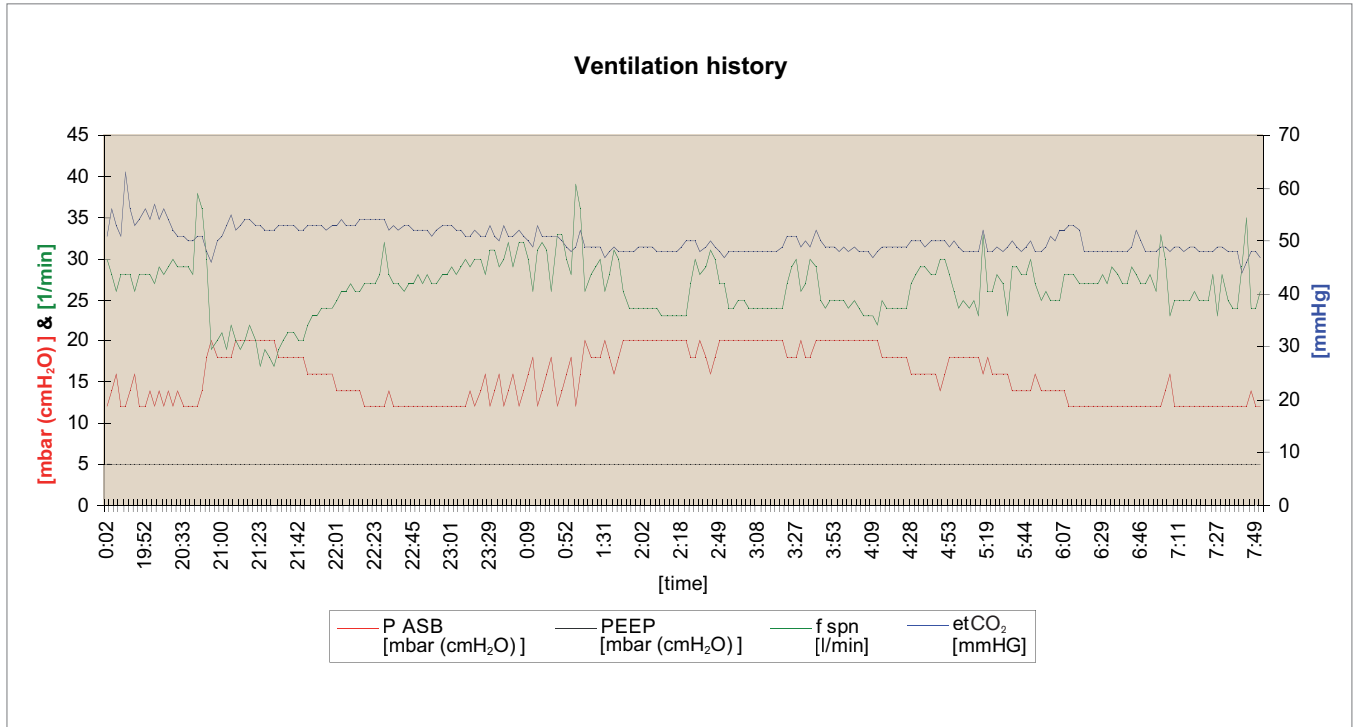
The SmartCare/PS option was installed on the Skaraborg hospital's Evita XL ventilators in summer 2005 and has since been used for all patients who need to be weaned after several days of ventilation. Although the hospital is very well-staffed,

with at least one nurse for each bed, Smart-Care/PS can change the ASB (Psupp) pressure setting considerably faster than doing it manually. This is true both for reducing ASB (Psupp) support as well as increasing it if the patient shows signs of exhaustion. "Since we started using SmartCare/PS, I have found that we used to set the ASB (Psupp) support too high at the beginning of ventilation," says Möhlendick.

He feels using the automatic weaning protocol offers two major advantages:

1. More frequent changes of the pressure support considerably speeds up weaning.
2. Because the need for respiratory support is detected quicker, patients remain more comfortable.

If indications warrant, SmartCare/PS can be used for nearly all patients, however there are a few exceptions. In one case of end-stage scleroderma, SmartCare/PS attempted to increase support in response to the high respiration rate. Without SmartCare/PS, for this patient we weaned the patient off the respirator through consistent reduction of the ASB (Psupp).



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The history graph at the end of ventilation clearly indicates how quick and effective SmartCare®/PS reacts to the patient's varying support requirements. Initially the SmartCare®/PS increases the ASB (P_{supp}) pressure quickly in response to the high respiration rate and then attempts to reduce ventilation support again. The graph shows the same response when the breathing frequency increases again. In this instance, the CO₂ graph remains relatively flat.



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Skaraborg Hospital in Skövde / Sweden

The hospital provides care for the approx. 265,000 residents of the former county of Skaraborg. It has over 550 beds, 3,000 employees and offers nearly all specialties, with the exception of neuro, cardiac and thoracic surgery. The ICU is staffed by approx. 110 nurses and includes a day-surgery unit with 10 beds and 3 recovery rooms, one of which offers round-the-clock care for patients recovering from major surgery. There is also an 8-bed interdisciplinary unit.

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