Intensive care effect of sedation and solution

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Sedation of ventilator treated critically ill patients was historically introduced to avoid any patients/ventilators asynchrony with the older ventilators, which were not as sensitive as the machines that are in use today. Another benefit of sedation is reduced oxygen consumption.

With the introduction of infusion pumps, continuous infusion of sedative drugs for the sedation of critically ill patients became routine treatment. Within the last 13 years, however, several important studies have challenged the need for deep sedation in critically ill patients. The American clinical practice guidelines from 2002 for the use of sedative drugs mentioned that sedation of agitated critically ill patients should be started only after providing adequate analgesia and treating reversible physiological causes.

Though the sedation scoring scales such as the Ramsey score were developed years ago, it has been well documented that critically ill patients are often, in spite of the sedation scores, over-sedated.

Kollef et al. [1] showed in 1998 in a retrospective study that the use of continuous intravenous sedation as compared with bolus administration of sedation was associated with a prolongation of the time on mechanical ventilation. Similarly Brook et al. were able to demonstrate that the introduction of a nursing implementation protocol not only reduced the duration of mechanical ventilation, but also reduced the length of stay in the ICU and in the hospital. It has however been difficult to confirm this observation in other studies. Thus Elliot et al. were unable to show any effect of a nurse-implemented sedation protocol on duration of mechanical ventilation. This was probably because of a lower level of baseline sedation.

An important study was published in 2000 by Kress et al. [2] They demonstrated that a daily interruption of sedative infusion until the patients either were able to perform a simple set of commands or were clearly uncomfortable, reduced both the time the patient received mechanical ventilation and the length of stay in the ICU. Girard. et al. compared patients, who received the spontaneous breathing trial without a wake-up trial to patients, who received a combined breathing trial and wake-up trial. The authors found, maybe not surprisingly, that the time spend on the ventilator was reduced in the group with combined wake-up trial and spontaneous breathing trial. In this study the duration of stay in the ICU and the total length of stay in the hospital, were, however, also reduced in the patients who received a spontaneous breathing trial as well as a wake-up trial. There has been some concern whether the routine interruption of sedative infusion in mechanical ventilated patients with coronary risk factors might precipitate myocardial ischaemia. Kress et al. [3] were, however, in 2007 able to demonstrate that a daily wake-up trial in mechanical ventilated patients with established coronary arterial disease risk factors was not associated with an increased occurrence of myocardial ischaemia.

In the ICU in Odense University Hospital, Denmark, it gradually became obvious that critically ill patients did not need heavy sedation. We therefore decided not to sedate critically ill patients as routine. To demonstrate the benefit of not sedating critically ill patients a prospective randomized trial was conducted [4]. In our study a total of 140 patients (70 in each group) were randomized to no-sedation, but bolus doses of morphine and haloperidol compared to a control

group, who was sedated with a daily wake-up trial and comparable bolus doses of morphine. The study was performed in a mixed intensive care unit with medical as well as surgical patients. The patients were severe ill with an APACHE II score of 26 in both groups. We were able to demonstrate that the number of ventilator free days significantly improved in the no-sedation group. In additional the total hospital length of stay was significantly shorter than the no-sedation group. Mortality in the ICU was 22% in the no-sedation group as compared to 38% in the sedated group (P = 0.06). To explain the shorter total hospital length of stay in the no-sedated group we retrospectively analysed the data. It was observed that patients from the sedated control group had a lower urine output compared to the no sedated intervention group [5]. Thus sedation might not only affect the brain, but also have an effect on other organs such as the kidneys.

Our study had, however, some limitations. 18% (10 patients) from the intervention group needed sedation in a period during their stay in the ICU. These patients mainly suffered from severe ARDS, and needed sedation to accept the high settings from the ventilator. This might be in accordance with a study by Papazian et al. [6] who observed that patients with severe ARDS benefited from not only sedation, but also treatment with neuromuscular blocking agents for 48 hours. Though we had to sedate 18% of the patients in a no-sedation group, this small number needs to be put into prospective, since 82% of the patients could be managed with no sedation.

When daily wake-up trials are performed or when patients are not sedated during critically illness and ventilator treatment, it is important to evaluate post-traumatic stress (PTSD) and other psychological aspects associated with the stay in the ICU. Several studies, however, suggest that even relatively unpleasant memories for real events during critical illness may give some protection from the later development of PTSD. Kress et al. [7] performed a psychological follow-up of patients treated with daily interruption of sedation. The psychological follow-up showed that patients who received a daily wake-up trial, had less PTSD compared to the continuously sedated control group. Treggiari et al. observed the same tendency towards less PTDS, when they compared light sedated patients to deep sedated patients. We also performed a psychological follow-up study of the patients participating in our study. The surviving patients were interviewed by a neuropsychologist who was blinded to which form for sedation to which the patient had been treated. There was no difference between the groups, and we concluded that a protocol of no sedation applied to critically ill patients undergo a mechanical ventilation was not associated with any risk of long-term psychological sequelae [8].

To reduce the level of sedation we have to educate the ICU nurses to use sedation scores such as the Ramsey score and reduce the infusion of sedatives according to the prescribed sedation level. To perform a daily wake-up trial we need to educate not only the ICU nurses, but also the ICU doctors in such a way that they are familiar with a wake-up trial. When introducing a strategy of no sedation to the ICU, in addition to educating your ICU nurses and doctors, they would probably benefit by a short visit to an ICU where this no-sedation strategy is routine such as the ICU in Odense University Hospital. To perform a no-sedation strategy in the ICU it is probably also necessary to have a nurse to patient ratio of 1:1 as is common practice in most university ICUs in Scandinavia.

ICU patients are treated in a multidisciplinary way involving not only ICU nurses and doctors, but also doctors from other departments such as surgery. By keeping the ICU patient awake, it is possible for doctors to communicate with the ICU patients instead of relaying only on monitors and laboratory values. Using a strategy of no sedation offers a unique opportunity for the multidisciplinary team to monitor the function of the brain. In critically ill patients it is standard to

monitor oxygenation, haemodynamics and diuresis. No proper monitoring device exists to monitor the functional status of the brain unless the patient is awake. The underlying disease which resulted in the patients been brought to the ICU can elicit the multi-organ dysfunction syndrome affecting the lungs, the circulation and the kidney function. It is often forgotten that the brain also can develop acute brain dysfunction, which can give an expression of the severity of the underlying disease. Keeping the patient awake gives a unique opportunity for the multidisciplinary team to communicate with the patient and to monitor the function of the brain.

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