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Pressure ulcers in critically ill patients – Preventable by non-sedation? A substudy of the NONSEDA-trial

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ABSTRACT

Objective: Pressure ulcers still pose a significant clinical challenge to critically ill patients. This study is a substudy of the multicenter NONSEDA-trial, where critically ill patients were randomised to sedation or non-sedation during mechanical ventilation. The objective of this substudy was to assess if non-sedation affected the occurrence of pressure ulcers.
Design: Retrospective assessment of data from a single NONSEDA-trial site.
Setting: Mixed intensive care unit.
Outcome measures: The occurrence of pressure ulcers, described by grade and location.
Results: 205 patients were included. Patients with pressure ulcers in the two groups were comparable with regards to baseline data. There were 44 ulcers in 32 patients in the sedated group and 31 ulcers in 25 patients in the non-sedated group ($p = 0.08$). 64% of the ulcers in sedated patients were located on sacrum and heels, whereas 68% of the ulcers in non-sedated patients were related to equipment ($p = 0.03$).
Conclusions: Non-sedation did not significantly reduce the number of pressure ulcers. Non-sedation significantly affected the location of ulcers: non-sedated patients mainly had ulcers related to equipment, whereas sedated patients mainly had ulcers on the sacrum and heels.

Implications for Clinical Practice

- Pressure ulcers pose a significant threat to critically ill patients.
- Non-sedation in this patient population did not significantly prevent pressure ulcers, however a trend towards fewer and more superficial pressure ulcers in the non-sedated patients was seen.
- Non-sedation during mechanical ventilation significantly affected the location of pressure ulcers – non-sedated patients mainly developed ulcers in relation to equipment, whereas sedated patients mainly developed ulcers at sacrum and heels.
- If using sedation for critically ill patients, extra attention is needed to prevent the classic pressure ulcers on sacrum and heels.

Introduction

A pressure ulcer is a localised injury to the skin, the underlying tissue or both, usually over a bony prominence, developing as a result of pressure or pressure in combination with shear (Cooper et al., 2015; Hoogendoorn et al., 2017; National Pressure Ulcer Advisory Panel et al., 2014). Pressure ulcers are graded 1–4 according to severity, 4 being the worst (Grey et al., 2006; National Pressure Ulcer Advisory Panel et al., 2014). Despite major refinements within medical technology and intensive care nursing during the past decades, pressure ulcers continue to be a highly relevant clinical challenge. The prevalence of pressure ulcers in intensive care unit (ICU) patients ranges from 14 to 56% (Keller et al., 2002; Cooper, 2013) (medical and surgical ICU-patients). Consensus is that most, but not all pressure ulcers are preventable and that it is a multifactorial problem (Black et al., 2011). ICU-patients face many of the risk

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factors for developing pressure ulcers, such as long-term immobility, haemodynamic instability and subsequent use of vasopressors, nutritional deficiencies, decreased consciousness leading to a loss of sensory perception or decreased ability to react appropriately in response to discomfort (Cooper, 2013). This can have dire consequences, since pressure ulcers cause great discomfort, increase the patients' risk of serious infections, are associated with increased length of stay in hospital and with increased mortality (Graves et al., 2005; Redelings et al., 2005; Grey et al., 2006). The economic issues related to pressure ulcers are also considerable. The annual cost of pressure ulcer care in the United Kingdom (UK) has been estimated to be as high as two billion pounds (McBride and Richardson, 2015; Grey et al., 2006). A recent systematic review, including more than 19.000 patients admitted to intensive care units, identified sedation as one of the major risk factors for the development of pressure ulcers (Serranoa et al., 2017).

This study is nested within the NONSEDA-trial, a randomised multicenter trial. Patients in seven ICU's in Denmark, Sweden and Norway were randomised to either usual care of sedation with a daily wake-up attempt or to non-sedation with sufficient pain management (Toft et al., 2014). This trial comprises data from a single trial-site subpopulation of the NONSEDA-trial. Through clinical experience with both sedated and non-sedated patients, we noticed that non-sedated patients seemed to change position in bed more often and were easier mobilised. We therefore hypothesised that non-sedation decreases the occurrence of pressure ulcers. The aim of this substudy of the NONSEDA-trial was to assess whether non-sedation affects the occurrence of pressure ulcers.

Methods

The NONSEDA-trial is a multicenter, randomised trial, taking place in seven ICUs in Denmark, Sweden and Norway. It is designed to include 700 mechanically ventilated, adult (age 18 or above) patients (some sites are still including patients per October 2017, where 680 patients have been included). This substudy of the NONSEDA-trial comprises data from a predefined subpopulation of 200 NONSEDA-patients. These patients were all included, stratified, randomised and treated in a single NONSEDA-trialsite (Kolding, Denmark), a mixed ICU with 11 ICU- and three intermediary beds in a secondary-care, teaching hospital (without neuro- or thoracic surgery critical care) between January 2014 and January 2017 (Fig. 1).

Intervention

Within the first 24 hours from intubation and initiation of mechanical ventilation, patients were randomised (using an internet-based, 24-hour access system) to one of two groups: the intervention group receiving no sedation, but bolus doses of morphine in case of pain or pharyngeal discomfort or the control group receiving continuous sedation (propofol for the first 48 hours, then midazolam) with bolus doses morphine for pain and a daily interruption of sedatives (a wake-up call). Patients in the control group were sedated to a target of RASS score −2 to −3 (Sessler et al., 2002). Patients were stratified per trial site, age (above or under 65 years) and presence of shock at admission. For delirium, non-pharmacological interventions were first choice and, if unsuccessful, haloperidol was used. If patients were uncomfortable, it was possible to call for an extra person to be present at the bedside to comfort the patient. If, despite these measures, a patient from the non-sedation group could not tolerate being awake, sedation was used, and reevaluated daily during the wake-up call. As soon as (or, if) the patient could tolerate being non-sedated, the infusion of sedatives was stopped. All patients were placed on air-filled, pressure relieving mattresses. All patients were mobilised

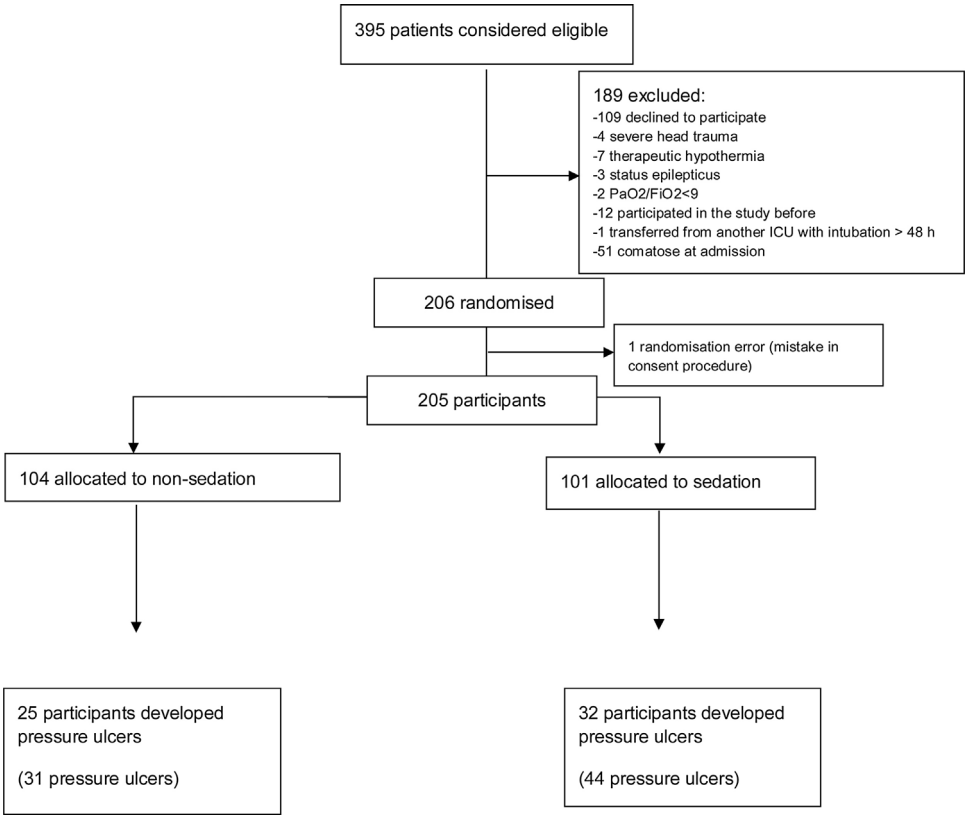

Fig. 1. Flow diagram.

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