

Dexmedetomidine vs Midazolam for sedation during prolonged mechanical ventilation in burn patients.

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Introduction:

Practice patterns regarding sedation monitoring and type of medications in ICU setting vary widely worldwide. Although causal relations between the level of sedation and the patient outcomes are difficult to be determined, many studies suggest that the excessive use of sedatives and analgesics could account, in part, for the increased requirements of vasoactive agents and prolonged duration of mechanical ventilation. Evidences from randomized, controlled trials and recent SCCM guidelines consistently supports the use of the minimum possible level of sedation [1].

The choice of certain medications for sedation could be influenced by many factors, including:

1. the severity of patient's illness,
2. the foreseeable duration of mechanical ventilation, and
3. the habits and resources of each center.

Recent recommendations suggest that the choice of sedative agent used in ICU patients should be driven by:

1. specific indications and sedation goals for each patient;
 2. the clinical pharmacology of the drug in a particular patient, including the side effect profile; and
 3. the overall costs associated with using a particular sedative .
- adverse reactions.

Recommendations suggest that non benzodiazepine sedatives (either propofol or dexmedetomidine) should be preferred over sedation with benzodiazepines (either midazolam or lorazepam) aiming to improve clinical outcomes in mechanically ventilated ICU patients [1]. Dexmedetomidine, a highly selective α_2 -adrenoceptor agonist, has advantages over benzodiazepines, since it produces analgesia while causing less respiratory depression and less delirium. Dexmedetomidine has an acceptable tolerability profile; hypotension, hypertension and bradycardia are the most commonly reported adverse reactions.

A systematic review on the use of dexmedetomidine in burn patients identified four prospective randomized studies on the use of dexmedetomidine in burn patients [2]. This meta-analysis included 266 patients with burn injuries which were evaluated for analgesia and sedation as well as for changes of hemodynamic parameters. The main results suggest that dexmedetomidine may be an efficient adjunct to analgesic treatment during dressing changes. A statistically significant better sedation and lower incidence of hypotension were achieved with dexmedetomidine, however there were no differences in analgesia scores in comparison with other therapeutic approaches.

Goal:

The goal of the study was to determine the efficacy of dexmedetomidine vs. midazolam in reducing duration of mechanical ventilation in patients with severe burn injury.

Method: All adult ICU patients receiving sedation and mechanical ventilation for more than 72 hours, admitted during 2015-2016 were included in this retrospective study. We tested whether dexmedetomidine was superior to midazolam with respect to the duration of mechanical ventilation at the target sedation level measured by Richmond Agitation-Sedation Scale. Patients data were compared by using t-test, $p < 0.05$ was considered to represent a statistically significant difference.

Results: Data of 27 patients were evaluated retrospectively (14 patients in dexmedetomidine group and 13 patients in midazolam group). There was no difference in mean duration of mechanical ventilation between patients with midazolam and dexmedetomidine. Similar length of ICU stay was observed. Dexmedetomidine patients had more bradycardia episodes in comparison to the patients with midazolam sedation (3/14 [21%] vs 0/13). There was no difference in percentage of time within the target RASS range between patients with midazolam and dexmedetomidine (70% vs. 67%). No unplanned extubations were observed in both groups.

Conclusions:

- Dexmedetomidine did not reduce duration of mechanical ventilation compared with midazolam among burn ICU patients receiving prolonged mechanical ventilation.
- Dexmedetomidine seems to be safe and effective for sedation of burn patients on prolonged mechanical ventilation however close cardiovascular monitoring should be used to detect bradycardia.
- Further studies are warranted to evaluate the effectiveness and safety of dexmedetomidine used for sedation of patients with burn and to confirm whether using this particular agent improves outcomes in comparison to other commonly used sedative and analgesic drugs in burn ICU population.

Table 1. Patients' data

| | Age, years | male/ female | TBSA, % | SOFA | treatment duration, days | duration of M.V., days | length of ICU stay, days |
|-----------------------------------|------------|-----------------|---------|---------|--------------------------------|---------------------------|--------------------------------------|
| dexmedetomidine group, n=14 | 39.4±17 | 11/3 | 42.8±15 | 2.8±1.1 | 6.9±4 | 10.8±5.9 | 25±18 |
| midazolam group, n=13 | 48±20 | 11/2 | 35.3±10 | 2.6±1.8 | 7.9±4 | 11.5±4.9 | 21±10 |

Bibliography

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