

Modification of ICU environment is associated with reduced incidence of delirium - Results from the VITALITY study

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Abstract

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Introduction

Delirium is the most frequent psychiatric syndrome in the Intensive Care Unit (ICU). This form of acute brain dysfunction predicts higher mortality rates and is associated with worse global cognition after ICU discharge [1]; [2]. Therefore, delirium prevention bundles have become an integral part of guideline recommendations. Clinical trials investigating pharmacological strategies have failed to demonstrate consistent results in terms of patient outcomes. Hence, focus has moved towards non-pharmacological approaches.

Objective

Within an interdisciplinary project, we developed a new ICU room concept. In 2013 we finished the renovation of 2 double ICU rooms (Fig. 1 and 2). Beside interventions aimed at noise reduction, workflow optimisation and infection control, we developed a new light ceiling that enables clinicians to apply patient individualised light therapy [3]; [4]. We hypothesised that the delirium incidence for patients treated in the modified rooms is significantly lower when compared to patients treated in the standard rooms.



Figure 1: ICU at Charité - Universitätsmedizin Berlin with standard rooms and the 2 modified double bed rooms.



Figure 2: Pictures from one of the 2 modified ICU rooms (A and B) and the observation room (C).

Methods

After sample size calculation, 74 mechanically ventilated patients with an expected ICU length of stay >48 hours were included in this prospective cohort study ([NCT02143661](#)). Amongst other reasons, patients with a substantial recent ICU exposure [2], patients who were unlikely to survive for 24 hours and patients who could not be reliably assessed for delirium were excluded from study participation. Delirium was assessed every 8 hours by research physicians with the Confusion Assessment Method for the ICU (CAM-ICU).

Results

The incidence of ICU delirium was significantly lower among patients treated in the modified rooms (46%) compared to patients treated in the standard rooms (76%, $p = 0.017$) (Table 1). The association between the modification of ICU environment and the delirium incidence was statistically significant (odds ratio, 0.15; 95% confidence interval, 0.04 – 0.66; $p = 0.012$) after adjusting for covariates.

Patient Characteristics and Outcomes	Standard Room (n=37)	Modified Room (n=37)	<i>p</i>
Age, yr	59 (43 - 71) ^a	57 (42 - 67) ^a	0.5665 ^b
Male, <i>n</i>	14	16	0.8130 ^c
Emergency admission, <i>n</i>	27	25	0.8000 ^c
APACHE II on admission	24 (15 - 29) ^a	22 (12 - 16) ^a	0.3866 ^b
Surgical, <i>n</i>	21	21	1.0000 ^c
Delirium, <i>n</i>	28	17	0.0170 ^c
ICU length of stay, d	14 (9 - 23) ^a	11 (5 - 20) ^a	0.3408 ^b
Hospital length of stay, d	23 (15 - 38) ^a	23 (18 - 38) ^a	0.6495 ^b
Discharge to home, <i>n</i>	14	20	0.2430 ^c
In hospital mortality, <i>n</i>	4	3	1.0000 ^c

Table 1: Basic Characteristics and Outcomes of Patients in the Standard and Modified Rooms.

APACHE II = Acute Physiology And Chronic Health Evaluation II.

^aValues are presented as medians with an interquartile range (25th to 75th) in parentheses.

Intergroup analysis: ^bexact Mann-Whitney U test; ^cFisher exact test.

A $p < 0.05$ was considered significant.

Conclusion

This study is the first to show that a modification in ICU environment is significantly associated with a reduced delirium incidence. Further analysis is needed to investigate which of the room interventions may contributed to this clinical effect.

Supplemental Material

For more informations on the study please visit our [study website](#).

References

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