Supplemental Digital Content 1: Additional Methods Details

Measurements

Partial pressure of end-tidal carbon dioxide was measured at the distal end of the endotracheal or tracheostomy tube using a mainstream capnometer (Alice, Respironics, Pittsburgh, PA). Pulse oxymetry was recorded continuously with a finger probe. The motion of the rib cage and abdomen was measured using respiratory inductive plethysmography (Alice, Respironics). Electroencephalogram (C4/A1, C3/A2, O1/A2, O2/A1), right and left electrooculogram, submental electromyogram, and electrocardiogram signals were amplified, filtered recorded, and stored with other signals in a data acquisition system (Alice, Respironics,).

Fluorescence polarization immunoassay (AxSYM, Abbott analyzer, Ramsey, MN) and gas chromatography–mass spectrometry (Agilent Technology J&W Scientific, Santa Clara, CA) analyses were performed for blood detection of benzodiazepines (*i.e.*, midazolam) and propofol, respectively.

Data analysis

Sleep architecture was scored manually in 30-s period epochs according to standard criteria[1]. Sleep efficiency was calculated as the ratio between the total sleep time and the total recording time and expressed as %. Total sleep time was defined as the sum of total time spent in all sleep stages during the total time monitored [1]. The percentage of time spent in each stage of sleep during total sleep time was calculated. Electroencephalogram arousals were defined as an abrupt shift in Electroencephalogram frequency consisting of theta, α, and/or frequencies greater than 12 Hz lasting 3 s or longer [1]. Awakenings were defined as electroencephalogram features

compatible with wakefulness and lasting > 15 s of an epoch preceded and followed by an epoch of sleep [1]. Sleep fragmentation index was calculated as the sum of arousals and awakenings per hour of sleep [1]. Central apneas were defined as the absence of airflow, based on pneumotachography, for 10 s or longer, occurring in the absence of detectable respiratory effort on respiratory inductive plethysmography [1].

References

1. The AASM manual for the scoring of sleep and associated events: Rules, terminology, and technical specification. 1st ed. ed. Iber C A-IS, Chesson A, Quan SF, eds., editor: Westchester, IL: American Academy of Sleep Medicine; 2007