The global and evident need to increase the validity and uniformity when performing drug-induced sleep endoscopy

Letter to the Editor entitled:

"The global and evident need to increase the validity and uniformity when performing drug-induced sleep endoscopy"

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In reply to: ""Is Observed Upper Airway Obstruction Patterns During Drug-Induced Sedation Endoscopy Dose-Dependent?"

In answer to: "'Depth-dependent changes of obstruction patterns under increasing sedation during drug-induced sedation endoscopy: results of German monocentric clinical trial.' By Kellner et al.

KEYWORDS

anaesthesiology, bi-spectral monitoring, EEG, endoscopy, ENT, obstructive sleep apnea, otorhinolaryngology, pharyngeal collapsibility, sedation, sleep-related breathing disorders

Dear Editor,

In recent years drug-induced sleep/sedation endoscopy (DISE) or sedated endoscopy, first described as sleep nasendoscopy [1], has gained momentum as a tool used both in clinical practice as well as in research studies in order to document the level, degree and the pattern of collapse within the collapsible segment of the upper airway in patients with sleep-disordered breathing (SDB) [2-7]. The literature on DISE indicates that this safe examination comes with a good test-retest reliability, and, a moderate to substantial intra- and interrater reliability, while experience in DISE is necessary to obtain reliable observations [8-10]. The adoption of DISE seems to be most relevant when considering tongue base surgery or oral appliance therapy whereas success rates with most non-CPAP treatment options are reported to increase when using DISE as part of the work-up and decision making [11-13].

Kellner and colleagues need to be congratulated with their study that investigates the collapsibility of the upper airway during DISE with regard to the level of sedation [14]. In the reported study, sedation was applied using bolus application of propofol and bi-spectral (BIS) monitoring was used to measure the level of sedation [14]. The latter provides an EEG-derived index calculation from 0 to 100 allowing assessment of the depth of sedation and anaesthesia, and, if available, can be used, while BIS levels between 50 and 70 are supposed to correlate most closely with the appropriate level of sedation for the DISE procedure [7, 15]. Out of the available methods of administration of propofol, the preferred option might be to use target-controlled infusion (TCI) but if this is not available, then either a standard pump system or manual bolus technique, such as in the study by Kellner et al., can be used [7, 16]. Kellner's innovative and well-designed study is indeed the first to address the crucial question concerning the relationship between the depth of sedation, indissolubly connected with choice of the applied sedation drug(s) and their method of intravenous administration, and, the degree of upper airway collapsibility as well as potential changes in pattern(s) and level(s) of collapse related to changes in depth of sedation [14].

Interestingly, the results of the reported study show a negative linear correlation between the cumulative dose of propofol and the BIS level, irrespective of SDB severity [14]. In addition, the findings suggest a higher degree of pharyngeal collapsibility during DISE in SDB patients under increasing levels of sedation [14]. Obviously, the limitations of the study include the use of bolus infusion of propofol rather than the more preferable TCI as the drug delivery system [7, 16]. Another notable limitation is the fact that BIS was not used in combination with golden standard measurement of sleep and its depth, being electroencephalography (EEG), possibly as part of a poly(somno)graphic real-time monitoring during DISE. The results of recent studies that did apply simultaneous polysomnography during propofol-induced sleep indicate that with propofol mainly sleep stage N2 is achieved, and, in comparison with natural sleep, N3 sleep is increased while REM sleep gets totally extinguished with

propofol [17, 18]. Furthermore, one should not forget that endoscopy during natural sleep still needs to be regarded as the golden standard method for upper airway evaluation in SDB patients [19, 20]. The technique of DISE has emerged as an alternative method to dynamically investigate the upper airway in patients with SDB notably because of the labor-intensive nature of natural sleep endoscopy [3, 7, 10].

In the Letter to the Editor entitled “Is Observed Upper Airway Obstruction Patterns During Drug-Induced Sedation Endoscopy Dose-Dependent?” the authors accurately point out that, indeed, upper airway obstruction patterns will also be dependent on the method of administration of propofol (reference letter). The authors strongly question the interpretability and comparability of DISE studies that use different methods of administration of sedative drugs while the one study uses EEG-derived indices to assess depth of sedation and most others do not objectively measure this parameter.

In my opinion, the findings of the reported study reinforce the importance of further research on the validation of using EEG-derived indices during DISE, or, if proven superior, poly(somno)graphic real-time monitoring of depth of sedation and sleep using EEG itself. In the meantime differences regarding methods of administration of the sedative drugs will remain because of practical and medicolegal issues. Larger, well-controlled studies that use golden standard measurements such as the application of EEG during DISE and natural sleep endoscopy for comparison, can generate more information in order to facilitate the comparability of the results of different studies at the international level.
Finally, the call for a globally agreed standard protocol for DISE scoring, as well as a global agreement on dosimetry and sedation administration strategy during DISE, as mentioned by the authors in their Letter, with reference to the European Position Paper on DISE published in the journal ‘Sleep and Breathing’ in 2014, is highly relevant and indisputable, and needs to be fully supported [reference letter + [7]].

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