"Awake" or "Sedated": Safe Flexible Bronchoscopic Intubation of the Difficult Airway

Thomas Heidegger, MD, DESA,* and Thomas W. Schnider, MD†

Awake intubation is a recommended technique for airway management in patients with a known difficult airway, or those in whom intubation before anesthetic induction is indicated. In both cases, flexible bronchoscopic intubation is the most common approach.[1–3] However, many "awake" intubations are performed under levels of sedation ranging from anxiolysis to near-complete obtundation of airway reflexes. This variability in the depth of sedation used to perform "awake" bronchoscopic intubation creates a gray zone between awake and sedated bronchoscopic intubation and may cause the risk of bronchoscopic intubation to vary considerably depending on sedation level.

LEVELS OF SEDATION

The American Society of Anesthesiologists has defined the different levels of sedation/analgesia as a continuum from "minimal (anxiolysis)" to "moderate/analgesia" (conscious sedation) and "deep sedation/analgesia."[4] The deepest level of this continuum is general anesthesia. These levels are defined using terms such as "responsiveness," "airway," "spontaneous ventilation," and "cardiovascular function" and refer to how each is affected by sedation depth. Because these levels reside on a behavioral continuum rather than a discrete, time-predictable, step-by-step progression, it is evident that the patient's responsiveness to stimuli, airway reflexes, and ability to sustain spontaneous ventilation may be dangerously impaired, particularly between moderate and deep sedation and between deep sedation and general anesthesia.

ACHIEVEMENT OF DIFFERENT LEVELS OF SEDATION FOR BRONCHOSCOPIC INTUBATION

The anesthesia literature contains numerous descriptions of how to perform awake bronchoscopic intubation.[5–11] However, the depth of sedation recommended in these articles varies across a spectrum from fully awake to moderate or even deep levels of sedation. Nevertheless, and unfortunately—as this is a misnomer—most of them are mistakenly categorized as "awake" intubation.[12]

Not surprisingly, many techniques for achieving these different levels of sedation for "awake" bronchoscopic intubation have also been described. In a 2013 review of the awake fiber-optic intubation literature, Johnson et al[13] described a wide variety of drugs commonly used for "awake" fiber-optic intubation including benzodiazepines, opioids (fentanyl, remifentanil), propofol, α2-adrenoreceptor agonists (dexmedetomidine), and ketamine. Most of the studies in the review, however, were performed in small numbers of patients, often fewer than 50. Therefore, the generalizability of Johnson's findings is unclear.[14]

The most popular sedative agent for "awake" bronchoscopic intubation, dexmedetomidine, was itself the subject of a recent meta-analysis of 13 randomized controlled trials with 591 patients.[15] Again, a marked limitation was the small sample size, with 11 of the 13 studies containing fewer than 50 patients.

A recent retrospective analysis of 1085 awake bronchoscopic intubations found that midazolam was used in almost 75% and fentanyl in 44% of cases.[3] A large prospective cohort study with 955 patients described a combined technique: awake bronchoscopy using only topicalization, local anesthesia, and no sedation followed by induction of general anesthesia with etomidate before advancing the endotracheal tube.[11]

The rate of failed intubation in these 2 studies was between 1% and 2% and is in line with other large studies of bronchoscopic intubation.[2,16]

RISKS OF A MISMATCH BETWEEN LEVELS OF SEDATION AND REQUIREMENTS FOR BRONCHOSCOPIC INTUBATION

It is easy to see that both inadequate and excessive sedation can increase the difficulty and risk of bronchoscopic intubation and worsen the success rate. Poorly managed sedation was a contributory factor in the failure of bronchoscopic intubation in the fourth National Audit Project (NAP4) from the United Kingdom, a large 2011 survey of all major airway events during 1 year.[17] A key challenge in successful "awake" bronchoscopic intubation is to preserve a balance between "adequate" sedation for the particular procedure (topicalization, local anesthetic application via cricothyroid membrane, bronchoscopy, advancement of the endotracheal tube) and avoiding the risks of too deep sedation (inadequate spontaneous ventilation, obstruction of the airway, loss of responsiveness).

From the *Department of Anaesthesia, Intensive Care & Resuscitation, Spitalregion Rheintal Werdenberg Sarganserland, Grabs, Switzerland; and †Department of Anesthesiology, Intensive Care, Rescue and Pain Medicine, Kantonsspital St. Gallen, Switzerland.

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Drs. Heidegger and Schnider contributed equally to this article.

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Address correspondence to Thomas Heidegger, MD, DESA, Department of Anaesthesia, Intensive Care and Resuscitation, Spitalregion Rheintal Werdenberg Sarganserland, Spitalstrasse 44, 9472 Grabs, Switzerland. Address e-mail to thomas.heidegger@srrws.ch.

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In this regard, clinicians should consider not only the depth of sedation, but also the level of (local) anesthesia and analgesia and different sedation requirements for different parts of the case. It may be possible, for example, to advance the bronchoscope under topical anesthesia but not the endotracheal tube because the latter maneuver may require a deeper level of sedation. Although it is possible to perform the entire bronchoscopic intubation in the unsedated patient, it is also possible to lose the airway because of inadequate topical anesthesia in a nonsedated patient.[18] If topical analgesia is incomplete or has not had enough time to act, sedation may not prevent adverse reactions, such as coughing or even endotracheal perforation because of bronchoscopic stimulation of the vocal cords or trachea.[19] An inexperienced practitioner might increase the level of sedation in response to such reactions. However, doing so may then lead to inadequate spontaneous ventilation, obstruction of the airway, loss of responsiveness, and consequent desaturation.

How might clinicians accurately access the amount of sedation and topical anesthesia needed to minimize complications of under- and oversedation? Experience and routine are 2 successful strategies in our institutions. Our department performs >2000 flexible bronchoscopic intubations annually and employs a clear structured approach involving transcricoidal local anesthesia for bronchoscopy and general anesthesia for passing the endotracheal tube over the bronchoscope.[20] In this way, the institutional skill level is kept high and practitioners are well versed in administering topical and local anesthesia required for bronchoscopy and the assessment of the proper time for actual intubation. Other successful techniques, including the "spray as you go" approach where the bronchoscope is used to direct topical lidocaine spray onto the cords and trachea to facilitate endotracheal tube passage, also require practice and routine.

The challenge of a safe and efficient bronchoscopic intubation in a patient with a known difficult airway is thus the choice and management of the sedation technique. The depth of sedation will be determined by the stimulation intensity and may change during the procedure. Regardless of the technique used, a backup plan must always be available. Safe and efficient bronchoscopic intubation with minimal inconvenience for the patient is based both on well-maintained skills and experience with the technique used.

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Name: Thomas W. Schnider, MD.
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