

## Atelectasis After Endoscopic Resection: Relations and Prediction

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Dear Editor,

We read with great interest the study by Choe et al. regarding factors predictive for atelectasis following endoscopic resection [1]. We congratulate on their management of this study, and we are writing to discuss some aspects of the study.

First, endoscopic resection requires the application of a highly skilled treatment technique because it carries the risk of perforation or other complications that may result from slight body movements. Generally, deep sedation is recommended for these procedures (Ramsey score 4–5) [2]. However, at this level of consciousness, the patient can respond to painful stimuli and sometimes respiration can be impaired. Endoscopic resection is associated with pain. Due to endoscopic insertion and manipulation, the gastric wall becomes overextended causing pain [2]. Patients, therefore, need an analgesic treatment. Short acting remifentanyl or alfentanil can be added to propofol instead of midazolam. Propofol alone maintains safety and stability not only during the procedure but also in the recovery room and ward. Midazolam provides additive sedation, and the cumulative effect can result in an overdose. Midazolam should be reserved for short-term sedation [2–4]. Therefore, selecting a drug that provides both sedative and pain relief effects would be better for this kind of operation.

Second, for patients with a high body mass index (BMI), if the actual body weight is used to determine dosage, over sedation may occur. In obese patients, it is recommended that the injected dose should be based on a calculated standard weight. In this study, the authors should state whether they have calculated standard weight. In addition, the statistical significance of BMI among the study groups creates a bias for the presence of atelectasis. Because obesity is one of the significant risk factors for atelectasis, in our opinion, obese patients should have been excluded from this study [5].

Another point is bispectral index (BIS) guided sedation in which level of BIS values range between 60 and 80 has been suggested to contribute to avoidance of over dose of sedatives as well as to manage better postoperative awaking [6]. Another aspect to consider is knowledge of the parameters of lung function in the study patients. This is an important issue for patients with a diagnosis of chronic pulmonary obstructive disorder or obesity. In addition, information on gas exchange parameters is also important to interpret the observed results and hypoventilation phenomena associated with the type of sedation used [7]. Finally, there are likely unknown aspects in patients presenting with a diagnosis of atelectasis and fever after the procedure that may help us extrapolate the results.

Many patients undergoing gastric resection are deeply sedated, and therefore, more accurate monitoring is required. The guidelines issued by the American Society for Gastrointestinal Endoscopy recommend the use of pulse oxymetry during all endoscopic procedures. However, it must be kept in mind that it cannot detect hypercapnia [4]. In addition, under deep sedation, inadequate tidal volume and insufficient ventilation may cause atelectasis. Due to the inappropriately selected drugs, patients, and inadequate

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monitoring, further prospective randomized clinical trials are warranted to confirm these results.

#### Compliance with ethical standards

**Conflict of interest** All authors declare that they have no conflict of interest.

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