How Does a Respiratory Sound Monitor Fits in Non-Intubated Intravenous Sedation—Results of a Questionnaire Survey
呼吸音監測器在非插管靜脈麻醉中的效用—問卷調查結果

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Introduction Clinical guidelines recommend using tracheal auscultation to monitor the ventilatory function of a patient undergoing a diagnostic or surgical procedure under non-intubated intravenous sedation. However, tracheal auscultation has been marginalized because of the limitations of a conventional stethoscope and the popularity of a vital signal monitor and capnography. A new respiratory sound monitor, Airmod, developed by Heroic Faith Medical Science, featuring digital data transmission and ambient noise cancelling, respiratory sound playback and broadcasting, and an AI algorithm to detect apnea and upper airway obstruction, has been launched to Taiwan's market recently. In this study, we conducted a questionnaire survey to investigate how Airmod fits in tracheal sound monitoring in clinical practices of non-intubated intravenous sedation.
Methods Seventeen early users of Airmod were asked to fill out a questionnaire based on their firsthand user experience. Thirteen Likert 9-point scale questions were designed to compare Airmod with a vital sign monitor, capnography and a conventional stethoscope. One open-ended question asked about any other benefit of using Airmod not mentioned in the other questions. Krippendorff's alpha coefficient was computed to indicate the inter-rater agreement.
Results The 17 questionnaire respondents included 4 anesthesiologists, 1 nurse anesthetist, 1 non-anesthesiologist physician, 5 operating room nurses, 1 dentist and 5 dental assistants. Seven of the respondents had used Airmod for more than 50 times.

The respondents used Airmod mostly in plastic surgeries, dental procedures, and endoscopy examinations. The response rate for all the 1–9 scaled questions was higher than 94.1% though no one answered the open question. Summarily, compared to a conventional vital sign monitor or capnography, Airmod can let them earlier detect oversedation by reading respiratory rate or hearing apnea alarm (mean score of 8.4±0.9) or by recognizing upper airway obstruction signs (mean score of 8.5±0.9); procedure team can more clearly know the respiratory status by listening to the broadcasted respiratory sound (mean score of 7.2±1.8) and watching the spectrogram (mean score of 8.2±1.4); although the respondents agreed that using Airmod can reduces the times of procedure pauses (mean score of 7.1±1.5) and more accurately control the administered dose of sedatives (mean score of 7.4 ± 1.5), they disagreed the surgery/examination time (mean score of 5.6±1.0) and post-anesthesia recovery time (mean score of 3.9±2.1) can be reduced; the respondents strongly agreed Airmod can enhance patient safety during non-intubated intravenous sedation (mean score of 8.8±0.5) and agreed it can reduced the risk of respiratory adverse events caused by respiratory tract secretion (mean score of 7.4±1.5); all respondents were willing to keep using Airmod as an additional respiratory monitor (mean score of 8.6±0.6). Compared to a conventional stethoscope, Airmod was more convenient to use (mean score of 8.0±1.0) and less susceptible to ambient noise interference (mean score of 8.8±0.7). Krippendorff's alpha coefficient was 0.52.

Conclusion The survey shows the effectiveness of Airmod in respiratory monitoring during non-intubated intravenous sedation.