Continuous Monitoring of Ventilation by Diaphragm Ultrasonography with a New Tool During Procedural Sedation, A Pilot Study

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Background and Goal of Study:

Respiratory monitoring allows for initiation of interventions to prevent complications during sedation. The respiration is primarily driven by the diaphragm motion and ultrasound can be used for assessment of the diaphragm (1). We report on a novel technique for continuous monitoring of ventilation by diaphragm ultrasonography with a new tool during procedural sedation.

Materials and Methods:

After receiving local ethic committee approval and written informed consent of patients we conducted a prospective, observational study of patients (N=15) ASA I to III (>18) who were scheduled to undergo procedural sedation. We made a probe-holder for continuous visualization of diaphragm motion with simple materials. The probe is held with flexible soft rubber band without metal parts. It has an adjustable velcro band according to different body shapes. Visualization of changes in thickness of the diaphragm during inspiration and expiration used for detecting respiratory pauses by a clinician who was blinded to the capnography and patient (figure 1). Another clinician retrospectively reviewed the records of ultrasonographic examinations and capnography.

Results and Discussion :

Retrospective analysis showed 37 respiratory pauses were detected by capnography from 7 (46,6%) patients. Diaphragm ultrasonography was simultaneously detected all respiratory pauses when ensuring an open airway.

Conclusions:

Diaphragm ultrasonography may provide assessment of continuous monitoring of respiration during procedural sedation with a non-invasive tool which provides stable fixation of an ultrasound probe to the body.

Figure 1. A) Sonogram of the diaphragm during expiration and (B) inspiration.