Comparisons of the efficiency of respiratory rate monitoring devices and acoustic respiratory sound during endoscopic submucosal dissection

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During moderate sedation for gastrointestinal endoscopic submucosal dissection (ESD), monitoring of ventilatory function is recommended. We compared the following techniques of respiratory rate (RR) measurement with respiratory sound (RRa): capnography (RRc), thoracic impedance (RRi), and plethysmograph (RRp). This study enrolled patients aged ≥ 20 years who underwent esophageal (n = 19) and colorectal (n = 5) ESDs. RRc, RRi, RRp, and RRa were measured by Capnostream™ 20P, BSM-2300, Nellcor™ PM1000N, and Radical-7®, respectively. In total, 413 RR data were collected from the esophageal ESD group and 114 RR data were collected from the colorectal ESD group. Compared with RRa during colorectal ESD, that during esophageal ESD had larger bias [95% limit of agreement (LOA)] with RRc [1.9 (- 11.0-14.8) vs. - 0.4 (- 2.9-2.2)], RRi [9.4 (- 16.8-9.4) vs. - 1.5 (- 12.0-8.9)], and RRp [0.3 (- 5.7-6.4) vs. 0.2 (- 3.2-3.6)]. Of the correct RR values displayed during esophageal ESD, > 90% were measured as RRa and RRp. Moreover, RRc was a useful parameter during colorectal ESD. To maximize patient safety during ESD under sedation, endoscopists and medical staff should know the feature and principle of the devices used for RR measurement. During esophageal ESD, RRa and RRp may be a good parameter to detect bradypnea or apnea. RRc, RRa and RRp are useful for reliable during colorectal ESD.Trial registration UMIN-CTR (UMIN000025421).