Tracheal intubation with the AirwayScopeTM videolaryngoscope using straight vs curved reinforced tubes

Toshiyuki Minonishi, MD · Hiroyuki Kinoshita, MD, PhD · Kazuaki Tange, MD · Noboru Hatakeyama, MD, PhD · Naoyuki Matsuda, MD, PhD · Toshiharu Azma, MD, PhD · Yoshio Hatano, MD, PhD

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To the Editor,

The AirwayScopeTM (AWS-S100; IMI Co., LTD., Koshiyaya Saitama, Japan) is proposed as an alternative to the classical Macintosh laryngoscope for tracheal intubation in patients with cervical spine instability and/or neck stiffness, because it offers a better laryngeal view with less cervical spine movement.^{1–3} Its introducer, the INT-LOCKTM, gives the straight reinforced tube a downward orientation, whereas the curved tube points upwards. Therefore, intubation difficulties may be more frequent with the straight tube because of more likely impingement with the arytenoids (Fig. 1).

We compared straight and curved reinforced endotracheal tubes in terms of intubation success rate, delay of intubation, incidence of impingement with the arytenoids, and postoperative sore throat and hoarseness. After obtaining approval from the Research Ethics Committee of Wakayama Medical University and written informed patient consent, 55 patients (45–84 yr) American Society of Anesthesiologists' physical status I–III undergoing lumbar spine surgery had their tracheal intubation performed with

an AWS using a tube size 7.5 for females (F) and 8.0 for males (M). Patients were assigned to the curved group (curved reinforced tube; Covidien, Mansfield, MA, USA), $n = 25$, M/F = 14/11, or to the straight group (straight reinforced tube; Fuji Systems Co., Bunkyo-ku, Tokyo, Japan), $n = 30$, M/F = 14/16. If intubation did not succeed at the first attempt, another insertion was allowed by adjusting the AWS direction upward. Twenty-four hours after surgery, severity of sore throat and hoarseness were graded. Sample size calculation was performed using the time from laryngeal view to intubation as the primary end point. Twenty-five patients were needed for an 89% power to detect changes of 4.8 sec at a significance level of 0.05; standard deviation (SD) = 5.2. Statistical analysis was performed using the Mann–Whitney U test or the χ^2 test.

Patients in both groups had similar characteristics, including sex ratio, age, body mass index, Mallampati score, and duration of anesthesia. The intubation success rate was greater in the curved group than in the straight group (100% vs 83.3%, respectively; $P < 0.05$). When failure of tracheal intubation occurred in the straight group, it was due to the arytenoid cartilages interfering with the tube advancement and not due to an inadequate view of the larynx. The time from laryngeal view to intubation lasted longer in the straight group than in the curved group (11.1 ± 5.2 sec vs 6.3 ± 4.7 sec, respectively; mean $\pm$ SD; $P < 0.05$), whereas the time until the glottic view did not differ between groups (10.2 ± 7.0 sec vs 9.8 ± 5.9 sec, respectively). These results suggest that intubation delay in the straight group was not due to the inadequate laryngeal view. The number of insertion attempts was greater in the straight group than in the curved group (2.4 ± 1.4 attempts vs 1.2 ± 0.5 attempts, respectively; $P < 0.05$), reflecting the need for more upward adjustments of the introducer tip

T. Minonishi, MD · H. Kinoshita, MD, PhD (✉) · K. Tange, MD · Y. Hatano, MD, PhD
Wakayama Medical University, Wakayama, Japan
e-mail: hkinoshi@nike.eonet.ne.jp;
hkinoshi@wakayama-med.ac.jp

N. Hatakeyama, MD, PhD
Toyama University School of Medicine, Toyama, Japan

N. Matsuda, MD, PhD
Kyoto University, Kyoto, Japan

T. Azma, MD, PhD
Saitama Medical University, Saitama, Japan

Fig. 1 Representative images of the different tip directions of the straight and curved reinforced tubes from the disposable introducer INTLOCK™ of the AirwayScope™

The straight reinforced tube

The curved reinforced tube

the INTLOCK™

Different tube tip angles

position in the straight group. The number of cases with the arytenoid cartilages impinging on tube advancement was greater in the straight group than in the curved group (18 cases vs 3 cases, respectively; $P < 0.05$). Postoperative severity of sore throat and hoarseness did not differ between the groups, and no cases of dental damage, arytenoid laceration or other airway injury were noted.

In conclusion, the curved reinforced endotracheal tube appears to have an advantage over the straight tube in allowing for easier intubation using the AWS. The difference is probably due to the distinct angles of these endotracheal tubes from this videolaryngoscope. To effectively use the AWS in clinical practice, anesthesiologists should be aware of the different angles associated with the reinforced endotracheal tubes that are mentioned in this study.

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Conflicts of interest None declared.

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