Tracheal intubation in a manikin: comparison of supine and left lateral positions†

M. H. NATHANSON, N. M. GAJRAJ AND C. D. NEWSON

Summary

Tracheal intubation in the left lateral position may be necessary in some circumstances. Using a manikin we demonstrated that anaesthetic trainees found tracheal intubation in the left lateral position was more difficult and took longer than in the supine position. However, the time to successful tracheal intubation decreased with practice, indicating the presence of a learning curve. We suggest that tracheal intubation in the left lateral position should become part of training in the management of the difficult airway. (Br. J. Anaesth. 1994; 73: 690–691)

Key words

Intubation tracheal training. Position, intubation

The ability to intubate the trachea is an important skill taught to trainee anaesthetists, other medical staff, nurses, paramedical staff and students. Training is usually given using both manikins and patients undergoing elective surgery. In both cases the “patient” is usually placed in the supine position. However, there are occasions in which it is necessary to intubate patients placed in other positions. Intubation in the left lateral position is still recommended by some authorities as the safest technique for post-tonsillectomy haemorrhage in a child [1], and may be necessary with posteriorly placed injuries or foreign bodies. We recently encountered such a patient who required general anaesthesia after a stab injury to the back. The knife was embedded in the posterior chest wall and protruded through the skin medial to the right scapula. After rapid sequence induction of anaesthesia, tracheal intubation was attempted in the left lateral position. However, the junior anaesthetic personnel present were not familiar with this technique and a senior (staff) anaesthetist performed the intubation. After this incident we decided to assess the ability of trainee anaesthetists to perform intubation in the lateral position using a manikin.

Methods and results

We studied 40 anaesthetic residents who had undergone between 3 months and 3 yr of training using a standard, unmodified manikin (Laerdal Airway Management Trainer) designed for teaching tracheal intubation. The manikin is attached to a baseboard and the “head and neck” may be manipulated to achieve the optimum intubating position. The manikin was placed in the lateral position by holding the baseboard at 90° to the horizontal plane.

After a brief standardized explanation, the residents were asked to intubate the trachea of the manikin using a Macintosh laryngoscope with a size 3 blade and a cuffed 8.0-mm id tracheal tube with a stylet in place. After intubation, the “lungs” were inflated using a self-inflating bag. The manikin was intubated three successive times in both the supine and left lateral positions. The order in which the two series of intubations was attempted was determined randomly. Each intubation was timed from the moment the laryngoscope was picked up until visible inflation of the “lungs” was observed. After each set of three intubations the residents were asked to score the ease of intubation using a 100-mm visual analogue scale (VAS), with 0 = easy and 100 = very difficult. “Oesophageal” intubations were noted and the attempt repeated. Results were analysed using the Wilcoxon matched pairs signed ranks test and Fisher’s exact test, with \( P < 0.05 \) considered statistically significant.

Thirty-two (80%) of the residents had no prior experience of intubation in the lateral position. The remaining eight had performed a maximum of two intubations in the lateral position. The VAS scores (table 1) demonstrated that the trainees found intubation in the lateral position more difficult than

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<tr>
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<th>Supine position</th>
<th>Left lateral position</th>
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<tbody>
<tr>
<td>Ease of intubation (mm)</td>
<td>17 (4–71)</td>
<td>42 (4–75)**</td>
</tr>
<tr>
<td>Time of first intubation (s)</td>
<td>16 (10–28)</td>
<td>22 (11–50)**</td>
</tr>
<tr>
<td>Time of third intubation (s)</td>
<td>14 (7–23)†† ††</td>
<td>16 (10–48)**††††</td>
</tr>
<tr>
<td>Overall intubation time (s)</td>
<td>15 (7–28)</td>
<td>18 (10–59)**</td>
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Table 1 Visual analogue scale scores for ease of intubation and times to successful intubation (mean (range)); **\( P < 0.01 \) compared with supine position, ††\( P < 0.01 \) compared with first intubation.

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in the supine position. Intubation times were significantly longer in the lateral position. In both positions the third intubation was significantly faster than the first. The reductions in intubation times from the first to the third attempts were 12.5% and 27.3% for the supine and left lateral positions, respectively. There were five “oesophageal” intubations in the lateral position, but none in the supine position ($P = 0.054$).

**Comment**

The use of a manikin in the lateral position does not fully replicate tracheal intubating conditions in patients as the anatomical structures in the manikin are not subject to the influence of gravity as they are in humans. Therefore the relative difficulty of intubation in the lateral position compared with the supine position in patients may be different from that in the manikin. However, the use of manikins to teach and retain skills in intubation and to investigate new equipment and techniques is accepted [2-4]. We considered that it would be wise to demonstrate the benefit of practising such intubations in a manikin, before performing a similar study in patients.

Anaesthetic trainees found that intubation in the left lateral position was more difficult and took longer compared with the supine position. However, the reduction in intubation time from the first to the third attempt in each position suggested that there was a learning curve which appeared to be greater for the left lateral position. Similar learning curves for tracheal intubation have been demonstrated with the use of unfamiliar equipment, such as the Belscope laryngoscope [4], and during assessment of the intubating skills of medical students [5]. Prior experience of difficult intubation may lead to a greater chance of success when the technique is required in an emergency. In a review of the management of the difficult airway, Cobley and Vaughan suggested creation of simulated difficult intubations (for example, by withdrawing the laryngoscope so that a Cormack and Lehane grade I laryngoscopic view becomes grade III or IV) to aid training [6]. We suggest that training programmes would benefit from the use of both manikins and patients to teach tracheal intubation in the left lateral position. Our finding that oesophageal intubations may be more common in the left lateral position suggests that such training could reduce patient morbidity and even mortality.

**References**