



Fig. 1. Legend. (a) simulated subdermal tissue, and (b) obese invasive airway model.

at the point of manual ventilation after cricothyrotomy. The number of cricothyrotomy attempts was recorded for both tracheal and failed airway management. Failed cricothyrotomy was defined as placement of the device outside the trachea [3]. The study was designed as a randomized crossover trial to minimize the learning effect. Each participant performed four trials and the order was randomized using a random number table.

Results were compared using the Mann-Whitney *U* test for intubation time, and Fisher's exact test for the number of attempts. Data are presented as mean \pm SD. $P < 0.05$ was considered statistically significant.

For the normal (non-obese) model, all participants succeeded on the first attempt with both devices and airway management time did not differ significantly between devices (QT 16.3 ± 4.3 s, Melker 19.3 ± 4.0 s; $P = 0.06$). In the obese model trials, the number of attempts was significantly higher with QT compared to Melker (QT 1.7 ± 1.0 times, Melker 1.1 ± 0.3 times; $P = 0.012$). Moreover, airway management time was significantly longer in QT trials compared to Melker trials (QT 30.7 ± 9.5 s, Melker 21.6 ± 3.3 s; $P = 0.004$).

In previous studies using pig larynxes, cricothyrotomy time was shorter with QT compared to Melker, with QT having fewer complications [2]. In contrast, airway management time was significantly longer in QT trials compared to Melker trials in the present study using the obese model. This might be explained by direct puncture with the cannula-over-needle method due to the thick subdermal tissue, whereas guide-wire and catheter insertion can be performed without issues even in the obese model.

This study has several limitations worth noting. First, the simulations do not account for factors such as bleeding during attempts at invasive airway management. Second, there may be additional challenges associated with using QT or Melker in patients with difficulty extending the neck. In the future trial, it may be significant to compare these devices in ultrasound-guided manner. The accumulation of clinical experience and controlled randomized clinical trials will be needed to confirm our results.

Author contributions

M.H., N.K., and H.K. performed this study and prepared the manuscript. T.M. approved the final version for submission.

Conflict of interest

None to report.

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What pediatric intubation technique is most optimal for direct laryngoscopy? Pilot data



To the Editor,

Endotracheal intubation has for many years been recognized as the gold standard for airway management [1]. However, as with any procedure, it requires appropriate training [2]. The average learning curve for direct laryngoscopy as shown by studies of Buis et al. is about 50 endotracheal intubations [3]. Studies by Aghamohammadi et al. have shown that the learning curve for videolaryngoscopy is much shorter than for direct laryngoscopy [4]. However, due to the high cost of a videolaryngoscope, standard laryngoscopes with Miller or Macintosh blades are the main type of devices used for endotracheal intubation in the operating theatre, intensive care department and prehospital conditions. An additional

difficulty during endotracheal intubation may be cardiopulmonary resuscitation of the patient or the inability to align the anatomical structures using the sniffing position in the case of trauma patients [5,6]. An inexpensive option to facilitate endotracheal intubation in the case of direct laryngoscopy may be the use of an endotracheal tube stylet [7]. However, it is important to bear in mind that a wrong profile of the stylet can have the opposite effect and make endotracheal intubation more difficult, making it more traumatic for the patient. Therefore, the aim of the study was to compare the efficacy of the first intubation attempt with and without the endotracheal tube stylet during simulated intubation performed by novice paramedics.

The study included 64 paramedics who participated in courses in airway management. The criterion for inclusion in the study was voluntary participation in the study and less than one year work experience in emergency medicine. During the training, all participants participated in lectures standardizing endotracheal intubation based on direct laryngoscopy. Then they participated in 30-minute training workshops during which they performed endotracheal intubation with the use of an adult's respiratory tract model. On the next day after the training they were to perform endotracheal intubation in a manikin representing 5-year-old child. For this purpose, a Pediatric HAL® S3005 simulator (Gaumard® Scientific, Miami, FL, USA) was used, whose tongue was inflated to simulate difficult airway. The Macintosh blade no. 2 was used for intubation, as studies show that both the Miller blade and Macintosh blade are equally effective in pediatric patients. Participants performed randomized crossover intubation with and without an endotracheal tube stylet. Before each test, the stylet was profiled so that the 3 cm distal stylet were bent at 45°. The participants performed the intubation first with one method and then after 30 min they performed the intubation with another technique. Among other parameters, the effectiveness of the first intubation attempt and the time of the first intubation attempt, defined as the time from the introduction of the laryngoscope in patients mouth to the moment of an effective ventilation attempt confirmed by the manikin's chest lift, were evaluated.

The efficacy of the first intubation attempt with and without the endotracheal tube stylet was varied and amounted to 93.8% vs. 79.7%, respectively ($P < .001$). The mean time of intubation when using the endotracheal stylet was 17.5 ± 5.5 s and was statistically significantly shorter than when the guide was not used 28.5 ± 6 s ($P < .001$). All participants of the study concluded that intubation with the use of a stylet is a more optimal method of intubation of a patient with difficult airway.

In the simulation study, the use of the endotracheal tube stylet was associated both with higher effectiveness of the first intubation attempt and shorter duration of intubation, which in the conditions of real rescue operations may translate into the reduction of hypoxia as well as the reduction of potential intubation-related injuries.

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Antibiotic stewardship: The treatment of uncomplicated lower limb cellulitis



Cellulitis commonly causes patient emergency department visits and hospital admits in the United States. Since the emergence of Methicillin-resistant *Staphylococcus aureus* (MRSA) infections, many practitioners are reluctant to take a conservative approach to treating cellulitis. Some studies have shown an incidence as high as 204 cases per 100,000 people for emergency department cellulitis visits [1,2]. The expense of these visits is vast and places avoidable strain on health care dollars. The average hospital stay (5 days) for patients treated for cellulitis costs roughly \$7341 [1,3].

Often, fear of poor outcomes and MRSA infections lead to inappropriate antibiotic choices. One study revealed that 14% of cellulitis admits met standard criteria for outpatient treatment but instead received inpatient care [4]. In this article we lay out a straightforward method for determining and give recommendations for treating simple cellulitis.

The diagnosis of cellulitis is often a clinical diagnosis, made from history and physical exam. The patient often has a tender, erythematous, demarcated rash in the areas of concern. Difficulty arises in determining if a case of cellulitis is quantified as simple or complicated and choosing the appropriate care. Simple cellulitis can be briefly described as: immunocompetent host (no uncontrolled diabetes, no cancers, etc.), no significant skin breakdown or trauma (epidermis is intact or has minimal erosions), systemic inflammatory response syndrome (SIRS) criteria are not met, mentation is normal, and the patient is hemodynamically stable. For these criteria, inpatient treatment of cellulitis is generally unnecessary. For such patients, treatment with penicillin VK, cephalosporin, or clindamycin is acceptable when accompanied by outpatient follow-up. If unsure which category patients fall into, guidelines such as those published by the Infectious Diseases Society of America (IDSA) can be referenced.

Much of the fear regarding cellulitis comes from an apprehension of missing MRSA. Cultures have shown however that MRSA is less likely to cause cellulitis, with up to 79% of infections caused by beta hemolytic strep. Even when MRSA was cultured, 91% of patients treated with non-MRSA covering antibiotics had proper responses. The risk of MRSA in such situations is low therefore MRSA coverage is unnecessary [5].

In summary, cellulitis accounts for a significant health and cost burden in the emergency department. A large percentage of these cases can be treated as outpatients. Following societal guidelines, published by