sessions were conducted from March to July 2019, in which a short lecture and a live demonstration were given, followed by hands-on practice by the participants. The participants were trained on cannula cricothyrotomy with Melker conversion, jet oxygenation through cannula cricothyrotomy, and scalpel–bougie cricothyrotomy. All participants were given a pre- and post-training survey form to complete. Ethics approval was not required as advised by the institutional review board.

Fifty-four anaesthetists participated in the refresher training with years of anaesthetic experience from fewer than five to more than 10. Only one person had previously performed an emergency front-of-neck access. We evaluated their confidence in performing the various CICO techniques before and after the training, on a scale of 1 (not confident at all) to 5 (extremely confident). The results are illustrated in Figure 6. Feedback was favourable and the participants were keen for such CICO refresher sessions to be conducted regularly.

Although CICO crises are rare, it is crucial that anaesthetists maintain the knowledge, decision-making, and procedural skill sets to perform emergency cricothyroidotomies quickly and safely. Moving forward, we aim to enhance the training using different airway models to simulate difficult airway anatomy, and to integrate it with simulation software providing real-time dynamic changes in oxygen saturation to make the scenarios more realistic.

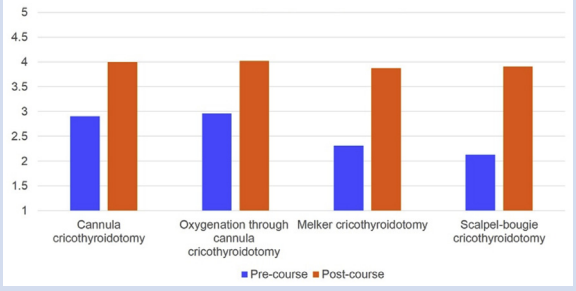

Fig. 6 Pre- and post-course confidence levels in performing emergency cricothyroidotomy.

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Randomised comparison of the clinical performance of Ambu Auragain and Teleflex LMA Protector

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This study was designed as a prospective randomised clinical study comparing two supraglottic airway (SGA) devices, the Ambu Auragain and the Teleflex LMA Protector, in elective patients with normal airway anatomy. Device characteristics evaluated were SGA insertion, functionality of SGA as a ventilatory device and as an intubation conduit, functionality of the gastric drainage channel, and oropharyngeal leak pressure (OLP). Additionally, a fibreoptic assessment, utilising the Ambu aScope 3 Slim, of the glottic view via the SGA device and signs of airway morbidity were investigated. The primary outcome was successful SGA insertion on first attempt, whereas secondary aims were SGA insertion time, number of insertion attempts, ease of SGA insertion, rate of successful ventilation and intubation (by using the SGA as an intubation conduit), anatomical fit of SGA (displacement, bloodstaining), and fibreoptic assessment of the glottic view via the SGA device.

Patients included in this study were adult surgical candidates, ASA 1–3, age >18 yr, Mallampati I–III, BMI $\leq$ 30 kg m^{-2}. The exclusion criteria included: ASA 4–5, age <18 yr, surgery in the prone position, planned operating time >4 h, high risk of regurgitation, exhibition of respiratory tract pathology, or preoperative sore throat. Once informed consent was obtained (IRB #2017-0449), the randomisation process was performed using an institutional software, CORe (Clinical Oncology Research System).

In total, 53 patients were included in this study. The overall success rate of device insertion on the first attempt was 92%. The success rate was higher in the Ambu Auragain group than in the LMA Protector group (96% *vs* 88%, respectively; difference=0.09; 95% confidence interval [CI] [−0.06, 0.23]; $P = 0.260$). All patients in the Ambu Auragain group exhibited a POGO score of 100%, whereas patients in the LMA Protector group achieved a POGO score of 83% ($P = 0.046$ Fisher's exact test). There was no significant difference in the time to place the tracheal tube (~90 s for both groups) or reported ease of use. Passage of a 16F gastric tube was significantly easier in the Ambu Auragain group (P=0.01; 100% *vs* 86% in LMA Protector group); there were six failures and one gastric tube passage with resistance in the LMA Protector group.

This study showed that both the Ambu Auragain and the LMA Protector have a high successful first attempt placement success rate. In general, the Ambu Auragain had better performance scores and fewer adverse events, as compared with the LMA Protector. Future study is warranted in a larger patient population and in patients at higher risk for difficult airway management.

Does infrared red intubation system improve the fibreoptic intubation conditions? A randomised control trial

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National Audit Project 4 (NAP4) identified cases where fibreoptic intubation (FOI) was indicated but not performed, and recommended that this technique be used more widely by anaesthetists.[1] The infrared red intubation system (IRRIS) is a small device which is placed in front of the neck and emits infrared light through the cricothyroid membrane that can be seen in the glottis by a fibreoptic camera. Kristensen and colleagues[2] performed a small retrospective case series in patients with difficult airways and found the device was of assistance in performing FOI. The Difficult Airway Society has developed an

airway device evaluation project team (ADEPT) guidance on the selection of airway devices. It recommends at least level 3b evidence for airway devices that are used in clinical practice[3].

After approval by the institutional research ethical committee and written informed consent, 58 ASA 1 and 2 adult patients, age >18 yr were enrolled in the study. Randomisation was done using sealed envelope technique and patients were divided into 29 each IRRIS group and control group (non-IRRIS). All patients received TIVA with target-controlled infusion propofol and neuromuscular block with vecuronium bromide. Our primary outcome was total time to pass a fibrescope from the mouth to glottic opening, and the secondary outcomes were the number of manoeuvres such as head tilt, chin lift, jaw thrust, and lingual traction.

The time taken was 30 s to complete the first 25% of the IRRIS patients, compared with more than 40 s for controls. This time difference becomes wider when we reach the 50% completed mark, with 50% of IRRIS patients completed in just under 40 s, against 57 s for the controls. Meanwhile, 75% of IRRIS patients complete in just more than 50 s, whereas the controls take 80 s. The time difference to pass the fibrescope through the glottic opening was significant in both groups (P=0.011). Head tilt plus chin lift was the common manoeuvre used in both groups; 20 times in the IRRIS group and 14 times in controls. Head tilt plus chin lift plus jaw thrust was used five times in both groups. In two patients of IRRIS group head tilt plus chin lift plus jaw thrust plus lingual traction was used as compared with a similar number of manoeuvres used six times in controls. We conclude that the IRRIS device can be a great addition for anaesthetists who are less familiar with FOI. We also suggest that, by using the IRRIS device, we can reduce hypoxia time in difficult airway patients with respiratory compromise.

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Evaluation of the McGrath MAC™ and Macintosh laryngoscope for tracheal intubation

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Direct laryngoscopy (DL) using a Macintosh blade is the first choice for tracheal intubation in many hospitals. The value of videolaryngoscopy using a Macintosh-shaped blade for routine intubation is currently unclear; few RCTs comparing this technique with DL are currently available.[1] We hypothesised that using the McGrath MAC (McG; Medtronic, Dublin, Ireland) for routine intubation in the operating room results in a higher first-pass intubation success rate (FPS) compared with conventional DL.

This trial was a multicentre, open-label, patient-blinded, randomised controlled clinical trial and approved by the ethics committees of participating centres before patient recruitment. Patients who had elective surgery with tracheal intubation were included in this study. Patients were excluded if a difficult intubation was expected, age <18 yr, ASA 4, and a high-risk of aspiration. The primary end point was FPS; the secondary endpoints were the influence of the provider experience, time to intubation, Intubation Difficult Score (IDS >5 points: difficult intubation), and adverse events (e.g., hypoxaemia or soft tissue injury).[1] A χ^2 test was used to compare FPS between the two groups. Data are expressed as median (inter-quartile range [IQR]).

A total of 2171 patients (McG, n=1084; DL, n=1087) were included. FPS was higher with the McG (1019/1084; 94%) compared with DL (896/1087; 82%) (P<0.0001). Time for intubation was significantly shorter with DL (34 s; IQR, 26–45) compared with McG (36 s; IQR, 26–47) (P=0.0005). The IDS was higher (>5) using DL (61/1087; 5.6%) compared with the McG (13/1084; 1.2%) (P<0.0001). There were no significant differences in intubation-associated adverse events between groups (P=0.15).

These results reflect the effectiveness of using videolaryngoscopy as a first choice for routine intubation in a large controlled trial for elective surgery patients with anaesthesiologists at various levels of experience. Intubation time was shorter using direct laryngoscopy; however, we do not consider this to be clinically relevant. Based on these results, videolaryngoscopy using a Macintosh-shaped blade can be recommended as a first choice instrument in elective surgery patients.

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Virtual reality simulation to teach videolaryngoscopy: a preliminary validation study

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Virtual reality (VR) is a technology increasingly used in the field of medicine to teach specific skills and procedures. It has been shown to improve the learning experience compared with various simulation models for airway management. [1–3] Videolaryngoscopy (VL) requires specific skills and a dedicated understanding of the patient airway and equipment. Type of blade, tracheal tube, and need for stylet or bougie have been shown to be an important part of success depending on the clinical situation.

The aim of this study was to report about an innovative airway management VR simulator, which assesses the choice