identify the CTM with ultrasound was relatively short (38 [17.6] s).

In conclusion, when ultrasonography is readily available, ultrasound-assisted identification of the CTM in a non-palpable porcine larynx model resulted in a shorter vertical incision without affecting procedural time and complication rate. Ultrasonography-assisted might be useful when performing a FONA in patients with non-palpable neck landmarks.

Funding

Research Grant of Society of Airway Management.

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Cannula cricothyroidotomy in simulated cannot intubate-cannot oxygenate scenarios using a live anaesthetised pig model

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Despite limited evidence to guide cannot oxygenate, cannot oxygenate (CICO) management, support is growing for scalpel over cannula-based techniques.[1] The Australian and New Zealand College of Anaesthetists continues to support both techniques and encourages regular CICO training.[2] Our group conducts training where live anaesthetised pigs are used to recreate CICO scenarios. The porcine neck represents an impalpable anatomy model. We report a study of cannula cricothyroidotomy in simulated CICO scenarios using live anaesthetised pigs.

Ethics approval was gained from both institutions, and all participants gave consent for inclusion in the study. Forty two anaesthetists were given comprehensive teaching based on the Royal Perth Hospital (RPH) CICO algorithm[3]. After cadaver training, each candidate was placed into a high-fidelity airway simulation. Under the management of veterinary anaesthetists, pigs were rendered apnoeic. When Spo_2 decreased to 92%, candidates were instructed to gain immediate front-of-neck access after the RPH CICO Algorithm assuming impalpable anatomy (up to three attempts at cannula cricothyroidotomy within 1 min followed by a scalpel–finger–cannula technique).

Percutaneous cannula cricothyroidotomy had a low success rate, with ability to re-oxygenate a hypoxaemic porcine model (SpO_2>90%); highest at first attempt (first=29%). Second and third attempts had a declining ability to re-oxygenate (21% and 12%, respectively) because of critical hypoxaemia necessitating euthanasia. Percutaneous attempts (first, second, third) were started at 44, 84, and 131 s, respectively. With a successful first cannula, average time to re-oxygenation was 110 s. After three failed percutaneous cannulas, all participants performed a scalpel–finger–cannula technique, started at 166 s on average with a 44% re-oxygenate rate. Average pig weight was 16.2 kg (range 11–24 kg) with an internal tracheal diameter of 11 mm (range 9–15 mm).

By following a CICO management algorithm, cannula cricothyroidotomy and scalpel-finger-cannula technique can be used to successfully ventilate and re-oxygenate a hypoxaemic 'impalpable anatomy' pig model. Percutaneous cannula cricothyrotomy can be swift but participants may fixate on performing additional percutaneous attempts at the expense of transitioning to scalpel-finger-cannula. Live animal simulation is an invaluable training tool that may help prepare anaesthetists for this rare, life-threatening emergency.

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Cric-Guide™: a more effective scalpel for surgical cricothyroidotomy

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The scalpel–bougie–tube (SBT) technique for emergency cricothyroidotomy, recommended by the Difficult Airway Society, may fail when the bougie does not follow the scalpel blade into the airway.[1] Cric-Guide™ is a novel scalpel device, designed to replace the standard size 10 scalpel; improving the technique by guiding the bougie into the airway.

The blade is stainless steel, and U-shaped in cross section. The tip is as sharp as a scalpel and flattened to make a 9 mm crescent-shaped incision. Once inserted, the inside of the blade creates a 6 mm wide channel to guide the passage of a bougie into the trachea. The curvature of the blade ensures that the bougie tip slides within its channel preventing a false passage and guiding it into the airway.

The handle is made of a three-dimensional printed Nylon. Depth guards, on each side of the blade, limit insertion to protect posterior structures (Fig. 7). Three sizes of Cric-Guide™ in the pack each have a different depth limit, with choice depending on patient's weight.[2] The insertion technique is available to view on https://youtu.be/bW-GLZjTzVY.

A Cric-Guide™ prototype was evaluated in the obese porcine model. Compared with SBT technique, the Cric-Guide™ required fewer attempts and created fewer false passages.[3] After design modification, Cric-Guide™ was more successful at accessing the airway in obese manikins than SBT 20/28 *vs* eight/28 (p=0.003) compared with slim manikins 27/28 *vs* 25/28.[4]

After Ethics Committee approval was obtained, Crawley and Maini[5] assessed participants using the Cric-Guide™ in 12

† Cric-Guide™ Inventor

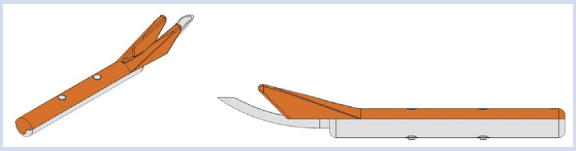

Fig 7 Cric-Guide™.

Thiel cadavers. The first attempt success rate was 12/12 with the median (IQR [range]) procedure time of 41.4 (28.8–47.6 [20.9–82.9]) s. Videoscope images of the tracheal mucosa were assessed by eyes, ears, nose throat (ENT) surgeon. There was no evidence of false passage and one incidence of posterior mucosal damage. Responses to a post-procedure questionnaire were favourable with 75% of participants stating Cric-Guide™ as their device of choice in the future; commenting on its stability in the neck and definite 'give' on entering the airway.

Funding

R. Vanner Ltd. P3 Medical Ltd.

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Tracheostomy performance in critical care; tracking the decline in rate

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The TracMan Trial[1] in 2013 showed no mortality benefit in performing early tracheostomy in ventilated UK intensive care patients. In 2014 National Confidential Enquiry into Patient Outcome and Death (NCEPOD)[2] published a report reinforcing this message, and showed that only a small proportion of UK critical care patients undergo a trial of extubation before tracheostomy. It advised that all patients have a trial of extubation, or have contraindications clearly documented. These publications may have led to attitude change and a reduction in the number of tracheostomies performed.

The Royal London Hospital has >2000 admissions to critical care each year, including >800 ventilated patients. The tracheostomy rate was reviewed in the years before and after the publication of the NCEPOD report. Numbers of patients with tracheostomy insertion during their critical care stay and total numbers of ventilated patients were ascertained from Intensive Care National Audit and Research Centre data for the Royal London Hospital from 2010 to present. Fisher's exact test was used to compare tracheostomies performed as a proportion of total ventilated patients in 2010–2013 compared with 2015-2018. Relative risk confidence intervals were determined using Koopman's asymptotic score.

The proportion of tracheostomies performed in ventilated patients fell from 19.8% (697/2686) in the 4 yr preceding to 13.1% (473/2756) in the same period after the report ($P<0.0001$). This is a relative reduction of 34% in the periods compared. The rate of tracheostomy in our ventilated critical care patients has fallen after the publication of NCEPOD, the most recent UK publication to offer an accurate annual tracheostomy figure.

Tracheostomy is not without complications; equally there are risks with both prolonged intubation and trial of extubation, which may necessitate expedited/emergent re-intubation. Dysphonia, pain, dysphagia, laryngeal dyspnoea and stridor are all common after extubation[3], with greatest risk after repeated trials of extubation. Anecdotally, we have observed an increase in complications in patients who had one or more trials of extubation before tracheostomy, including a patient who had unexplained bilateral vocal cord palsies after two trials of extubation. This likely represented an injury sustained at repeated intubation and resulted in a prolonged and complex tracheostomy wean requiring glottic surgery and intense speech and language therapy input (patient consent provided).

Further data are needed to ascertain whether our declining rates are observed elsewhere and whether the recommendation to trial extubation is leading to the unintended consequence of glottic and subglottic trauma.

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Emergency front-of-neck airway: an update from the Airway App

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Emergency front-of-neck airway (eFONA) is an essential component of advanced airway management, yet for many clinicians performing an eFONA procedure is exceedingly rare.