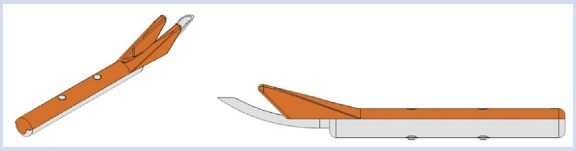

Fig 7 Cric-Guide™.

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.

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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.

Table 7 First-pass success rate of emergency front of neck airway procedures in 'can't intubate can't oxygenate' and 'non can't intubate can't oxygenate' events. Results are reported as FPS/Total Attempts (Success %: 95% confidence interval). If denominator was <5 or if FPS=100%, 95% confidence intervals were not calculated.

	Non-CICO (n=85)	CICO (n=174)
Bougie-assisted cricothyroidotomy	32/36 (89: 79–99)	81/96 (84: 78–91)
Surgical cricothyroidotomy	18/23 (78: 61–95)	20/32 (63: 46–80)
Cannula cricothyroidotomy	4/4 (100)	14/20 (70: 50–90)
Wire-guided cricothyroidotomy	3/3 (100)	7/13 (54: 27–81)
Percutaneous tracheostomy	3/4 (75)	2/3 (66)
Open tracheostomy	13/13 (100)	4/6 (66: 28–100)
'Slash' tracheostomy	1/2 (50)	1/3 (33)
Quicktrach II		0/1 (0)

Data are presented as n/N (%).

Which eFONA procedure has the highest first-pass success (FPS) rate is currently unknown, particularly during a 'can't oxygenate, can't oxygenate' (CICO) emergency.

Smartphone technology enables 'crowdsourcing' of observational data about infrequent eFONA events. The Airway App collects anonymised first-hand details regarding eFONA procedures via a free, smartphone, or desktop application. Further details of the Airway App methodology and ethical considerations of anonymous data-gathering are previously published.[1] The data is necessarily non-verifiable, but this is a limitation of many databases of rare events.

Over a 37-month period (June 16, 2016–July 16, 2019) the Airway App was accessed > 6000 times. Of these, 303 recorded 'report a real case'; 259 from 37 countries were judged internally consistent. The three most common themes were male patients (76%), CICO events (67%), and obstructing airway pathology (44%). In the 174 CICO emergencies, non-surgeons undertook 88% of eFONA procedures, a supraglottic airway (SGA) was attempted in 39%, and neuromuscular block was used in 44%. eFONA FPS in non-CICO *vs* CICO reports were 87% and 74%, respectively (P=0.02). Table 7 shows FPS by procedure type in both non-CICO and CICO reports. Despite eventual eFONA success in 229 reports, 15% of these patients died.

In conclusion, our data suggest SGA use and patient paralysis are underutilised in CICO management despite recommendations.[2] eFONA FPS is significantly lower during CICO compared with non-CICO settings. Of all techniques used during CICO, only bougie-assisted cricothyroidotomy approached a FPS 95% lower-limit confidence interval of 80%, which the authors believe to be an acceptable eFONA FPS rate.

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High-flow nasal oxygen reduces the incidence of hypoxaemia and intra-procedural interruptions during gastrointestinal endoscopy

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Safe and effective delivery of procedural sedation for gastrointestinal endoscopy requires a balance between good analgesia and sedation whilst preventing airway obstruction and hypoxia from over-sedation. We report a prospective, two-cycle service improvement audit to evaluate the use of high-flow nasal oxygen (HFNO) to prevent desaturation during procedural sedation in our endoscopy unit.

We collected information on patient characteristics, ASA physical status and Body Mass Index (BMI). We recorded incidences of intra-procedural apnoea (on clinical assessment and capnography trend), hypoxaemia (SpO_2 <94%), and any airway rescue manoeuvres performed. The first audit cycle was conducted (March–June 2016) using standard nasal cannula, delivering oxygen at a rate of 2–6 L min^{-1}, in keeping with our standard practice at that time. In the second audit cycle (July–October 2016) we delivered HFNO via Optiflow™ (Fisher & Paykel Healthcare) nasal cannulae, which had just been introduced into routine practice in our anaesthetic department. HFNO was started at 20 L min^{-1}, over 2 min increased to 60 L min^{-1}, as tolerated by the patient. In both cycles, the mouth was kept open with an I-Guard bite block, with a jaw thrust manually applied throughout the procedure. Formal ethics committee approval was sought but was deemed unnecessary.

Each audit cycle involved 82 patients; mean age at treatment was 58 (standard deviation: 17.2) yr. Twenty-one patients had recorded BMI >30 kg m^{-2}. There were nine and eight episodes of intra-procedural apnoea lasting >30 s during the first and second audit cycles, respectively. In the first cycle, 13 patients experienced desaturation (SpO_2<90%) for >30 s), compared with none in the second cycle. Fifteen intra-procedural interruptions for rescue oxygenation were recorded in the first cycle, compared with none in the second cycle. The independent risk factor for desaturation (SpO_2<94%, any duration) was intra-procedural apnoea (OR 31.7, 95% CI 3.9–260) and the use of HFNO was strongly protective (OR 0.012, 95% CI 0.002–0.071).

There are published reports indicating the pooled incidence of intra-procedural hypoxaemia as 5% during colonoscopy, 8% in upper gastrointestinal endoscopy and 20% in endoscopic retrograde cholangiopancreatography. HFNO was more protective against desaturation during procedural sedation than standard nasal cannula oxygen therapy.

Complications of cricothyrotomy and tracheostomy in emergency surgical airway management: a systematic review

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