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ORIGINAL RESEARCH

Case series and review of emergency front-of-neck surgical airways from The Australian and New Zealand Emergency Department Airway Registry

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Abstract

Background: An emergency front-of-neck access (eFONA), also called can't intubate, can't oxygenate (CICO) rescue, is a rare event. Little is known about the performance of surgical or percutaneous airways in EDs across Australia and New Zealand.

Objective: To describe the management of cases resulting in an eFONA, and recorded in The Australian and New Zealand Emergency Department Airway Registry (ANZEDAR).

Methods: A retrospective case series and review of ED patients undergoing surgical or percutaneous airways. Data were collected prospectively over 60 months between 2010 and 2015 from 44 participating EDs.

Results: An eFONA/CICO rescue airway was performed on 15 adult patients: 14 cricothyroidotomies (0.3% of registry intubations) and one tracheostomy. The indication for intubation was 60% trauma and 40% medical aetiologies. The intubator specialty was emergency medicine in eight (53.3%) episodes. Thirteen (86.7%) cricothyroidotomies and the sole tracheostomy (6.7%) were performed at major referral hospitals with 12 (80%) surgical airways out of hours. In four (26.7%) cases, cricothyroidotomy was performed as the primary intubation method. Pre-oxygenation techniques were used in 14 (93.3%) episodes; apnoeic oxygenation in four (26.7%).

Conclusions: Most cases demonstrated deviations from standard difficult airway practice, which may have increased the likelihood of performance of a surgical airway, and its increased likelihood out of hours. Our findings may inform training strategies to improve care for ED patients requiring this critical intervention. We recommend further discussion of proposed standard terminology for emergency surgical or percutaneous airways, to facilitate clear crisis communication.

Key findings

- First descriptive study of emergency front-of-neck surgical or percutaneous access airway management in Australian and New Zealand EDs.
- eFONA rate of 0.31% comparable to other series.
- Only 47% of eFONA/CICO rescue airways had a typical indication for potentially needing surgical access.
- Consensus on crisis airway terminology is needed.

Key words: *airway complication, airway registry, can't intubate, can't oxygenate rescue, cricothyroidotomy, emergency front-of-neck access, surgical airway.*

Introduction

Emergency front-of-neck access (eFONA) for airway management can be defined as the securing of a patent airway via the anterior neck to facilitate emergency alveolar oxygenation.[1] This terminology is recommended by the UK Difficult Airway Society; however, it has been argued that use of the term 'access' and not 'airway' makes the term non-specific for airway management.[2,3] In addition, eFONA is not well recognised in medicine and other clinical disciplines, and thus

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will often not be understood in a crisis situation. In Australia, the abbreviation CICO 'can't intubate, can't oxygenate' is widely used, and the use of 'CICO rescue' to describe a surgical or percutaneous emergency airway situation is used in the Vortex approach[4] and seems logical; however, 'surgical airway' remains the dominant terminology being used by ED clinicians. Our study will use both the UK Difficult Airway Society and Australian terminology. eFONA is the final lifesaving step in tracheal intubation algorithms whether for anticipated or unanticipated difficult airway, and in the Vortex approach using a visual conceptual model.[1,4–6] A key cognitive step is recognising the CICO scenario, in order to reverse hypoxia and prevent resulting brain injury, cardiac arrest and death. The rarity of this life-threatening emergency makes it a challenging event; firstly, to recognise the CICO scenario, and secondly, declaring and performing an unfamiliar procedure in a highly stressful crisis situation. On occasions, the 'surgically inevitable' airway will be recognised, where standard techniques will have a very high likelihood of failure at the outset, such as for patients with upper airway obstruction from tumours, traumatic injuries and severe airway oedema.[1] Leadership, situational awareness and avoidance of task fixation are fundamental to the management of the 'difficult airway'.[7] Reported rates of eFONA performed in EDs are 0.05–1.7% of tracheal intubation attempts, in comparison to rates of 0.002–0.02% in the operating theatre.[8,9] A failed tracheal intubation, defined as three or more attempts at tracheal intubation, occurred at a rate of 3.6–11.0% in ED, 6.6–9.0% in intensive care unit and 0.9–1.9% in operating theatres, respectively.[8,10] It is recognised that the cohorts of patients in ED requiring a definitive airway are higher risk patients, often critically unwell, with poor physiological reserve and distorted anatomy. Other factors proved to affect the success of intubation include the skill and experience of the intubator and the team leader.[10,11]

Acute airway obstruction or oedema, maxillofacial trauma, respiratory and facial burns,[12] and anatomical deformities are the most common scenarios in which surgical airways are performed. Despite a comprehensive airway assessment predicting an 'easy' airway, the possibility of the scenario deteriorating to CICO still remains,[13] and an emergency physician should be psychologically prepared for such an occurrence.

The aim is to describe a case series of 15 surgical airways recorded as part of The Australian and New Zealand Emergency Department Airway Registry (ANZEDAR) over a 5-year period with a focus on incidence, indication, staff speciality and seniority, technique, complications and factors prompting the performance of a surgical airway.

Methods

The present study is part of a prospective, observational multi-centre research project identifying the practice of airway management in EDs in Australia and New Zealand. The data in the present study were extracted from the ANZEDAR with a focus on patients who underwent surgical airways from 2010 to 2015. The methods for ANZEDAR data collection, standard definitions used and quality control have been described previously.[10,11] Briefly, the intubator completed the ANZEDAR form, which is designed to capture information on patient demographics, indication for intubation, prediction of airway difficulty, vital signs at the time of decision to intubate and immediately after intubation. Details regarding oxygenation, patient positioning, medication, intubator seniority and experience, use of a pre-intubation checklist, devices and blades used, intubation manoeuvres, intubation complications and patient disposition were also captured. Different techniques were used by the principle investigator (PI) to ensure a complete dataset was captured. This included checking cases collected with records in resuscitation room and medications log books. In an event where missing or incomplete forms were submitted, the PI contacted the intubator regarding the data and had it completed. PIs at all sites completed a census to identify the ratio of patients included in the study. Site compliance with a data set of 90% or more of all intubations for a minimum period of 6 months was required for inclusion. An episode of intubation was defined as the process of intubation for each patient, whereas an attempt at intubation was a single passage of the laryngoscope blade into the mouth. For the present study, all records where eFONA was performed in the ED were identified if the designated checkbox for surgical airway under airway manoeuvres was ticked or if indicated at the relevant attempt at intubation section. The ANZEDAR project was approved by the Northern Sydney Local Health District Human Research Ethics Committee.

Results

The ANZEDAR contained records of 5726 intubation attempts from 4806 patients collected between June 2010 and June 2015 from 44 EDs in Australia (n = 40) and New Zealand (n = 4). These EDs have various Australasian College for Emergency Medicine role delineation levels; 18 (41%) Major Referral, 12 (27%) Urban District and 14 (32%) Regional based with annual patient census from 20 000 to 120 000. One ED was paediatric-only and two EDs were adult-only centres. Overall, 14 (32%) of the participating sites were major trauma centres.

During the study period, 15 (0.31%) adult patients underwent eFONA. No paediatric eFONA was reported. In nine (60%) patients, trauma was the indication for intubation, whereas medical indications were present for six (40%) patients. There were 14 (93%) males and one (7%) female (median age 54 years; IQR 44 to 59 years). The average estimated weight (mean ± standard deviation) for all patients was 82 ± 17 kg and three (20%) patients had an estimated weight equal or above 100 kg. Almost all eFONA were performed at major referral trauma hospitals with only two occurring at rural centres.

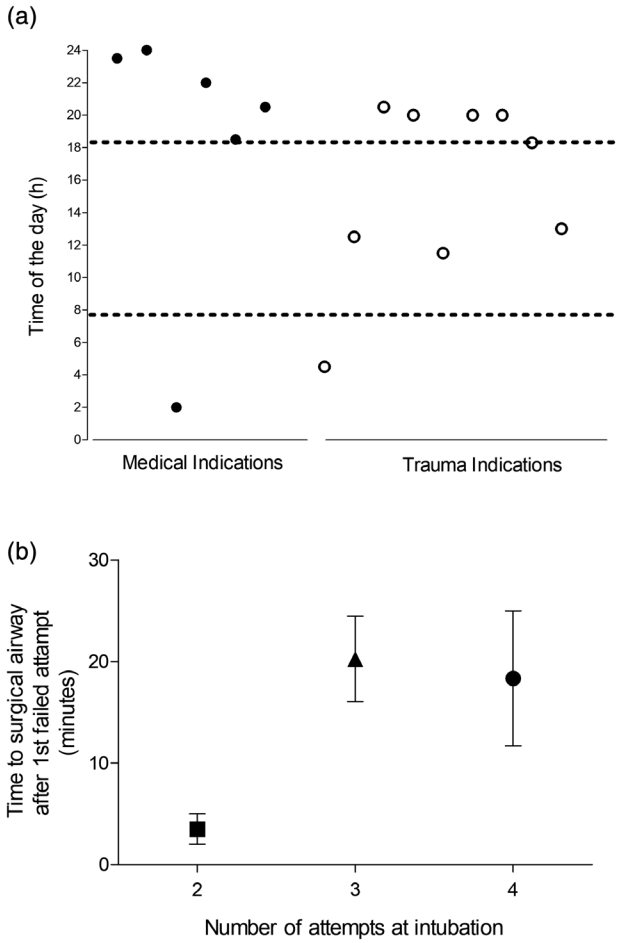

Figure 1. *(a) Time of the day emergency front-of-neck surgical access (eFONA) cases occurred: (●), medical* (n = *6); (○), trauma* (n = *9) and (b) time to eFONA after first failed attempt: (■),* n = *2; (▲),* n = *4; (●),* n = *3.*

Twelve (80%) eFONA were performed out of hours between 18:00 and 08:00 (Fig. 1a) compared to 46% of the total intubations recorded in the ANZEDAR within the same time frame.

The proportion of patients with abnormal vital signs immediately before induction of anaesthesia and the pre- and post-oxygenation devices used are presented in Table 1. Of note, seven (47%) patients were already hypoxic with saturations of <93% prior to induction.

Cricothyroidotomy was performed as the initial method of definitive airway management in four (27%) trauma patients with no previous attempt at laryngoscopy, and as a rescue procedure after two or more failed intubation attempts in 10 (67%) patients (Table 2). One patient underwent tracheostomy as a rescue procedure, which was performed after transfer from ED to the operating theatre. There were no percutaneous airways performed.

Eleven patients had a formal airway assessment performed prior to induction of anaesthesia: three (75%) of the 'surgically inevitable' primary cricothyroidotomy group and eight (73%) of the rescue cricothyroidotomy group. A pre-intubation checklist was used in one (25%) patient of the primary group and four (36%) patients of the rescue group.

For 10 (67%) patients, the intubator was a consultant specialist doctor and for five (33%), an advanced specialty trainee. The intubator specialty was emergency medicine for eight (53%) patients, intensive care for four (27%), anaesthetics for two (13%) and general practice for one (7%) patient (Table 2).

Of the nine patients who received a paralytic agent, suxamethonium was the paralytic agent of choice for eight (89%). When cricothyroidotomy was performed as the first airway attempt, two of four patients did not receive an induction agent and the procedure was performed 'cold' without anaesthesia or sedation (Table 3).

Complications occurring during intubation episodes included oxygen desaturation in 10 (67%) patients, three (20%) occurrences of vomiting with aspiration of vomitus and three (20%) cardiac arrests (Table 4).

For rescue procedures, the mean time between the first failed attempt and the surgical airway being secured increased with the number of attempts at intubation, being 20 min and 18 min for third and fourth attempt, respectively (Fig. 1b). For the case undergoing a tracheostomy in the operating theatre, the time the airway was secured was not recorded. This patient had an airway obstruction with significantly distorted neck anatomy secondary to ENT surgery, radiotherapy and a previous tracheostomy. Ventilation in this case was maintained temporarily with a laryngeal mask airway, with the airway management being 'surgically inevitable' rather than having fully transitioned to a CICO situation.

Eight (53%) patients went to the operating theatre, five (33%) went to the intensive care unit and two (13%) died in the ED (Table 4).

Discussion

To our knowledge, this is the first study to describe the characteristics of emergency surgical airways performed in Australian and New Zealand EDs. The rate of eFONA performed in the present study was 0.31%, which is consistent with that previously reported for EDs 0.05–1.7%.[8,9,14] Trauma indications accounted for a greater proportion of eFONA, also previously described.[15] We note, however, that

TABLE 1. *Patient vital signs before induction, and oxygenation devices used*

	eFONA (n = 15), n (%)	All intubations (n = 4791), n (%)
Vital signs before induction		
GCS <9	10 (67)	3120 (70)
SBP <90	5 (33)	541 (13)
Pulse >100	8 (53)	1917 (46)
SpO_2 <93%	7 (47)	789 (17)
Respiratory rate		
<8 breaths/min	4 (27)	400 (11)
>20 breaths/min	10 (67)	1310 (35)
Pre-oxygenation device used		
Not used	1 (7)	500 (11)
BVM	8 (53)	2284 (50)
BVM+PEEP	2 (13)	535 (12)
NRBM	2 (13)	1040 (23)
CPAP/BiPAP	1 (7)	275 (6)
Laryngeal mask airway	1 (7)	145 (3)
Apnoeic O_2		
Not used	10 (67)	1352 (29)
Nasal prongs	5 (33)	2325 (51)
BVM	–	546 (12)
CPAP/BiPAP	–	87 (2)

–, not used; BiPAP, bilevel positive airway pressure; BVM, bag valve mask; BVM+PEEP, positive end-expiratory pressure attached to BVM; CPAP, continuous positive airway pressure; GCS, Glasgow Coma Scale; NRBM, non rebreather mask; SBP, systolic blood pressure; SpO_2, peripheral capillary oxygen saturation.

only 7 of 15 patients requiring eFONA had an indication for intubation typically taught as potentially needing eFONA (airway obstruction, burns, facial and neck trauma), and only one patient could be sufficiently stabilised and oxygenated for urgent transfer to the operating theatre for definitive tracheostomy.

With multiple attempts at orotracheal intubation, success rates decline and morbidity increases.[8,16] In the present study, the most common complications experienced were desaturation, vomiting with aspiration and cardiac arrest.

Although several cases appear to demonstrate high-quality management of the difficult airway, most cases demonstrated deviations from standard difficult airway practice,[5,17] which suggests that all emergency intubations be considered difficult intubations, generally conducted with a pre-intubation checklist, pre-oxygenation, apnoeic oxygenation, the use of muscle relaxants to facilitate airway management, the use of a supraglottic airway or bag valve mask ventilation after intubation fails. Twelve out of 15 cases reviewed showed a deficiency in these areas, which may have increased the likelihood of eFONA/CICO rescue being required.

Of 15 patients reviewed, one patient was reported to have not received pre-oxygenation prior to intubation being attempted, 11 patients did not receive nasal prong apnoeic oxygenation, nine cases did not utilise an airway checklist, five cases did not receive a muscle relaxant and in two cases external laryngeal manipulation or a bougie or stylet was not utilised prior to eFONA.

Performance of eFONA was more frequent 'out-of-hours'. In some settings, this often correlates with a reduction in staff numbers or staff skill level in comparison to 'working hours'. Such discrepancies in staffing are common even in major referral trauma centres where senior emergency and anaesthetic physicians may be on call but out of the department when an emergency intubation is required. Unlike the rest of ED intubations in ANZEDAR that were predominantly (84%) performed by specialist emergency physicians or trainees,[6] nearly half of the surgical airways (eight cases, 53%) were performed by emergency doctors with the remainder by intensivists (four cases), anaesthetists (two cases) and one episode by a general practitioner, demonstrating the variety of specialties that may be required to perform eFONA and illustrating how training must be targeted at all practitioners likely to be required to intubate a patient.

For five out of the 15 patients, no paralytic agent was administered, and while the administration of a nondepolarizing or depolarising agent can be debated, the administration of an effective dose of a paralytic agent will facilitate a 'best' supraglottic or infraglottic attempt to secure the airway.[13,17,18]

Although eFONA/CICO rescue is a rare event, it needs to be performed quickly and efficiently. A cases series by two experienced retrieval specialists in Australia report the simple 'scalpel-finger-tube' method can be performed in less than 60 s, including preparation.[15] 'Scalpel-bougie-tube' has also been recommended as the fastest technique;[1] however, both scalpel methods are faster than Seldinger techniques.[19,20] Familiarity with the procedure will facilitate the speed at which it is performed. In the present study, mean time to definitive airway after failed first attempt was 20 min and 18 min for third and fourth attempt, respectively. This delay in securing a definitive airway is likely multifactorial. There may have been unnecessary repeated attempts at orotracheal intubation, with failure to

TABLE 2. *Prediction of airway difficulty, airway assessment and use of pre-intubation checklist, and specialty and seniority of staff who performed surgical airway*

	Surgical airway performed on first attempt (n = 4)	Surgical airway performed after two or more failed attempts (n = 11)	Total (n = 15)
Predicted difficult airway	4 (100)	9 (82)	13 (87)
Formal assessment made	3 (75)	8 (73)	11 (73)
Pre-intubation checklist used	1 (25)	4 (36)	5 (33)
Team leader specialty			
Emergency	4 (100)	9 (82)	13 (87)
Intensive care	–	1 (9)	1 (7)
General practice	–	1 (9)	1 (7)
Team leader seniority			
Consultant	3 (75)	8 (73)	11 (73)
Specialty trainee	1 (25)	3 (27)	4 (27)
Intubator specialty			
Emergency	2 (50)	6 (55)	8 (53)
Intensive care	1 (25)	3 (27)	4 (27)
Anaesthetics	1 (25)	1 (9)	2 (13)
General practice	–	1 (9)	1 (7)
Intubator seniority			
Consultant	2 (50)	8 (73)	10 (67)
Specialty trainee	2 (50)	3 (27)	5 (33)

–, not applicable. Data presented as n (% of total).

TABLE 3. *Drugs used for induction of anaesthesia*

	Patients (n = 15)	
Medication at intubation	n (% of total)	Dose†
No drugs given	5 (33)	–
Induction agent		
Thiopentone	4 (27)	2.72 (1.79–3.00)
Ketamine	3 (20)	2.67 (1.00–4.00)
Propofol	2 (13)	0.36 (0.30–0.47)
Fentanyl‡	1 (7)	0.83
Paralysing agent		
Suxamethonium	8 (53)	1.46 (1.00–2.67)
Rocuronium	1 (7)	0.71
No paralysing agent	5 (33)	

Data presented as n (% of total). †Median mg/kg (range; smallest–highest dose). ‡μg/kg.

progress along the difficult airway algorithm and recognise a CICO scenario. This is recognised as a common cause of hypoxic brain injury or death when a difficult airway is encountered.[4,21] Unfamiliarity with the procedure may have potentially prolonged an attempt at performing a cricothyroidotomy, although our study did not specifically assess prior familiarity with surgical or percutaneous procedures. Such a scenario will be a highly stressful, crisis situation, with a changing clinical scenario such as the patient vomiting or deteriorating into cardiac arrest. Elevated levels of stress can be detrimental to the clinical performance of a physician, by impairing their attention, memory and decision making capacity, and ultimately jeopardising patient care and safety.[22]

Cognitive aids have been designed to facilitate decision-making in the difficult airway scenario, such as the 'Vortex Approach',[4] and algorithms produced by other groups.[1,5,17,18,23] A stepwise approach to optimising non-surgical attempts before progressing to an eFONA has been proposed to avoid task fixation;[18,23] however, unidirectional stepwise algorithms have also been questioned for not necessarily compelling the practitioner forward to progress to CICO rescue.[6,24] Simulation training is being increasingly implemented in the critical care environment to enhance practical skills acquisition, skill retention and improve non-technical skills such as crisis resource management, leadership, cognitive decision-making and graded assertiveness.[6,25,26] A study into the effect of simulation training for difficult airway management and skill retention for emergency cricothyroidotomy demonstrated simulation effectively and significantly reduced time taken to perform the procedure from 117 s in the pre-test to 69 s at 3 months, 52 s at 6 months and 62 s at 12 months post-test.[25] Risks of introducing cognitive bias in airway interventions by simulation training sequence should also be considered.[27] 'Just in time Training' has been proposed to train junior staff in high-risk procedures such as tracheal intubation, just prior to the event itself,[28] although we doubt its utility for the unanticipated eFONA.

The introduction of an airway management bundle of care to maximise the conditions for first pass success improved first pass success

TABLE 4. *Characteristics of 15 surgical airway cases*

	Age/sex	Presentation	Predicted difficult	Checklist used	Preoxygenation/ apnoeic oxygenation used	Induction and paralytic agents	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Complication and outcome
1	34M	Facial trauma Neck trauma	Yes	No	Yes/no	None	GP consultant DL G4 No bougie No ELM	GP consultant SGA	GP consultant Cricothyroidotomy	–	Desaturation Cardiac arrest Died in ED
2	59M	Airway obstruction Hypoxia GCS 5	No	No	No/no	None	ICU trainee VL G4 No bougie No ELM	ED consultant VL G4 No bougie ELM used	ED consultant Cricothyroidotomy	–	Desaturation Transfer to ICU
3	77M	Respiratory failure	No	No	Yes/yes	No induction Suxamethonium 100 mg	ICU trainee DL G3 ELM used No bougie	ED consultant DL G3 ELM Bougie	Anaesthetist DL G2 ELM Bougie	Cricothyroidotomy	Desaturation Oesophageal ETT Cardiac arrest ROSC Transfer to ICU
4	31M	Facial trauma Neck trauma	Yes	No	Yes/no	None	ICU trainee Cricothyroidotomy	–	–	–	Desaturation Transfer to theatre
5	59M	Head injury Airway obstruction Reduced GCS	Yes	No	Yes/no	Thiopentone 200 mg Suxamethonium 150 mg	Anaesthetic trainee Cricothyroidotomy	–	–	–	Transfer to theatre
6	51F	Respiratory distress Distorted anatomy due to previous ENT surgery, neck radiotherapy Reduced GCS Airway obstruction	Yes	No	Yes/no	Ketamine 200 mg No paralytic	ED consultant VL No view stated	Anaesthetic trainee DL G4 Bougie	Anaesthetic consultant DL G4	Anaesthetic consultant SGA	Cardiac arrest Tracheostomy after transfer to theatre
7	54M	Head injury Seizure Reduced GCS	Yes	No	Yes/no	Thiopentone 250 mg Suxamethonium 100 mg	ED trainee VL No view stated MILS Bougie No ELM	ED trainee VL G3	ICU trainee VL G3	ICU trainee VL G3 Attempt 5> Cricothyroidotomy	Desaturations 2 × paralytic redosing Transfer to ICU
8	42M	Stab wound to neck Expanding haematoma	Yes	Yes	Yes/yes	Ketamine 200 mg Suxamethonium 200 mg	ED trainee VL G4 No bougie No ELM	ED consultant Cricothyroidotomy	–	–	Transfer to theatre
9	46M	Overdose GCS 3 Aspiration Airway obstruction	Yes	ND	Yes/no	Thiopentone 300 mg Suxamethonium 100 mg	ED trainee VL G1 Bougie ELM	ED trainee VL G1 Bougie ELM	ED trainee 2 VL G4 Bougie ELM	ED trainee Cricothyroidotomy	Desaturation Vomiting Aspiration Transfer to theatre
10	56M	Respiratory failure GCS 3 Obese, beard, short neck	Yes	No	Yes/no	Propofol 50 mg Suxamethonium 200 mg	ICU trainee VL G4 Stylet	ICU trainee VL G4 Bougie	ICU consultant Cricothyroidotomy	–	Desaturation Airway trauma Vomiting Transfer to ICU

TABLE 4. *Continued*

Age/sex	Presentation	Predicted difficult	Checklist used	Preoxygenation/ apnoeic oxygenation used	Induction and paralytic agents	Attempt 1	Attempt 2	Attempt 3	Attempt 4	Complication and outcome
11 37M	Head injury Reduced GCS	Yes	Yes	Yes/no	Fentanyl 50 mcg Ketamine 60 mg Suxamethonium 100 mg	ED consultant VL G4 Bougie MILS	ED consultant VL G4 Bougie MILS ELM	ED consultant Cricothyroidotomy	–	Desaturation Transfer to theatre
12 77M	Head trauma Facial trauma Neck trauma GCS 3	Yes	No	Yes/no	None	ED consultant Cricothyroidotomy	–	–	–	Transfer to theatre
13 54M	Head injury Reduced GCS	Yes	Yes	Yes/yes	Thiopentone 125 mg Rocuronium 50 mg	ED consultant Cricothyroidotomy	–	–	–	Desaturation Transfer to ICU
14 74M	Cardiac arrest	ND	Yes	Yes/yes	None	ED trainee VL G4 Bougie ELM	ED consultant VL G4 Bougie ELM	ED trainee VL G4 Bougie ELM	Cricothyroidotomy	Desaturation Vomiting Died in ED
15 56M	Burns Inhalation injury	Yes	Yes	Yes/no	Propofol 30 mg Suxamethonium 100 mg	Anaesthetic trainee DL G4 Bougie	Anaesthetic trainee DL G4 Bougie ELM	ICU consultant Cricothyroidotomy	–	Desaturation Oesophageal intubation Paralytic redosing Transfer to theatre

–, not applicable; DL, direct laryngoscopy; ELM, external laryngeal manipulation; G, Cormack and Lehane grade of intubation at laryngoscopy; GCS, Glasgow Coma Scale; ICU, intensive care unit; SGA, supraglottic airway; VL, video laryngoscopy (direct or indirect).

rate[29] and demonstrates that negative cycles of increasing intubation attempts leading to an increasing incidence of adverse events can be halted.[11,30] The need to perform eFONA/CICO rescue is not reliably predicted from individual patient characteristics or indication for intubation and is more frequent out of hours in the ED. This underlines the imperative for specific training and practice in CICO management, and in performance of eFONA/CICO rescue, for all providers who may be called to intubate a patient in ED.

Limitations

Given the rarity of eFONA for patients presenting to the ED (15 out of 4806 patients), there is limited statistical power on which to base recommendations. Forty-four EDs were involved in the study across Australia and New Zealand and thus not all cases of emergency surgical airways performed over the designated time period in Australasian EDs were recorded. There may also have been cases where the registry was not completed at participating sites, and possible selection bias in so far as not recording 'failed' intubation. As previously described, we believe the data matching and oversight processes in the study minimise this possibility, and our rate of surgical airway was broadly comparable to other series.[31] The ANZEDAR data collection form was designed to collect information regarding rapid sequence intubation in EDs, and not specifically directed towards collecting data around surgical airway performance. Data collection specific limitations include definitions of apnoeic oxygenation and the cross over with pre-oxygenation/apnoeic oxygenation around the time of induction, which may have been variably interpreted by clinicians submitting data.

Conclusions

Although very rare, with no way to completely eliminate its occurrence, management of a CICO scenario and eFONA/CICO rescue performance are core skills to be learned

and maintained by potential tracheal intubators.

Most cases demonstrated deviations from standard difficult airway practice, which may have increased the likelihood of eFONA being required.

An emergency physician may complete their entire career without the need to perform a surgical airway. Analysing this cohort from the ANZEDAR facilitates learning and reflection and may serve to better equip emergency physicians and others with the skills required to manage a rare highly stressful, life-threatening crisis. All potential tracheal intubators should practice optimisation of their approach to every airway and ensure they mentally prepare for deterioration to CICO and have the knowledge and skills to manage it. It is suggested that learned societies should develop a consensus on simple terminology to describe emergency surgical airways to facilitate clear crisis communication.

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Author contributions

HA and CR drafted the manuscript with SM. HA coordinated the study, provided data and statistical analysis. All authors reviewed the manuscript and approved the final draft. TF is Principal Investigator of the ANZEDAR.

Competing interests

None declared.

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