



# **A Pathway to Optimise Performing an Emergency Tracheostomy in Patients Failing Endotracheal Intubation**

**Wendy Smith<sup>1</sup>, Hemanth Kowdley Subrahmanyam<sup>1\*</sup>, James Sheldon<sup>2</sup> and Phil Watts<sup>1</sup>**

<sup>1</sup>*Kettering General Hospital, NHS Trust, United Kingdom.*

<sup>2</sup>*Leicester Medical School, United Kingdom.*

## **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors WS, HKS, JS and PW designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors WS and HKS managed the analyses of the study. Authors HKS and JS managed the literature searches. JS was the "patient" in the photographs. All authors read and approved the final manuscript.*

## **Article Information**

DOI: 10.9734/AJARR/2020/v10i330244

### Editor(s):

(1) Dr. Fagbadebo Omololu Michael, Durban University of Technology, South Africa.

### Reviewers:

(1) Rudrashish Halder, Sanjay Gandhi Post Graduate Institute of Medical Sciences, India.

(2) S. Sujatha, Kerala University for Health Sciences (KUHS), India.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/57080>

**Received 16 March 2020**

**Accepted 21 May 2020**

**Published 28 May 2020**

**Method Article**

## **ABSTRACT**

Emergency tracheostomy is a timely life saving procedure bringing to the fore the expert skills of the difficult airway team comprising the otolaryngologist, anaesthesiologist and theatre team or emergency department staff. Adequate advanced planning has to be adopted in these situations for achieving a good outcome. We present our optimal pathway practiced within our team to achieve successful outcomes during emergency tracheostomies starting from planning to the use of pressure bag in cases of failed intubations.

*Keywords: Tracheostomy; pressure bag.*

## 1. INTRODUCTION

Emergency tracheostomy is challenging, often with limited time to assess the upper airways and plan how to secure the airway safely causing minimal distress to the patient is demanding. Though majority of airway management is by basic and advanced techniques but however one can find a ‘Can’t Intubate Can’t Oxygenate’ (CICO) situation [1]. CICO situation noted after following the UK Difficult Airway Society (DAS) revised guidelines 2015 require ‘Front –of-neck airway’(FONA) to establish an airway [2,3]. Scalpel cricothyroidotomy is the most reliable and fastest method to secure the airway as the standard approach to FONA [2,4-6]. Although the stepwise use of methods to secure the airway ranging from a laryngeal mask, to endotracheal intubation and then to tracheostomy has been described in some papers [7], no articles have addressed how to optimise an emergency tracheostomy in patients failing endotracheal intubation. Clear communication and good team understanding towards a common goal forms the basis of airway management [1].

## 2. MATERIALS AND METHODS

Our pathway has been developed and utilised on 12 occasions by the senior author alongside the rest of the team to achieve a good outcome amidst crisis. The pathway has been practised in a simulation environment to help understand the

role of the team members in crisis towards achieving optimal results. Even with limited time to secure an airway, it is essential that the theatre team know their allocated roles and the plan can be written on the board (Fig. 1) prior to the start of attempting tracheal intubation. We would like to emphasize the use of a pressure bag placed under the patient’s shoulders (Fig. 2).

The patient lies with their head resting on a pillow and the pressure bag is inflated to create the “tracheostomy position”. The skin is cleaned, the incision marked and local anaesthetic and adrenaline injected. The patient is draped with working suction and bipolar diathermy attached (Fig. 3).

The pressure bag is then deflated optimising the patient position for awake intubation or endotracheal intubation under general anaesthesia (Fig. 4). We do not advocate the use of one anaesthetic technique since the method used must be one that the anaesthetist is comfortable with after assessing each case. This may include an awake intubation, a gas induction or an iv induction with propofol and rocuronium bromide (provided sugammadex is immediately available) but we would avoid the use of suxamethonium owing to its very short duration of action. Should intubation not be possible, the pressure bag can be rapidly inflated and the tracheostomy performed.

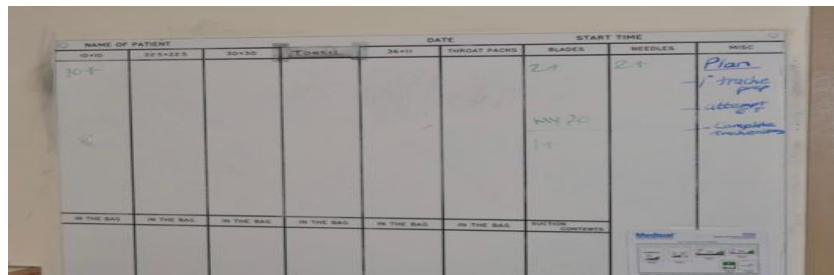


Fig. 1. Plan on the board in Theatres



Fig. 2. Pressure bag initially deflated on operating table positioned to lie under the patient’s shoulders



**Fig. 3. Patient positioned supine, pressure bag inflated to extend the neck, site for tracheostomy marked and lignocaine and adrenaline infiltration performed. Drapes, suction and diathermy ready to use**



**Fig. 4. Pressure bag is deflated and patient's position is optimised for attempted endotracheal intubation**

### 3. RESULTS AND DISCUSSION

Emergency Tracheostomy is performed in airway crisis and adequate teaching, training and planning is crucial in these situations. Simulation training with optimal pre planned pathway is the way to move forward in this scenarios [8]. These skills should be assimilated effectively and retained for a long period as skills decay is problematic putting the patient at risk [9]. Endotracheal intubation rather than emergency tracheostomy may be preferred in anterior neck space infections encroaching on the

tracheostomy surgical field or in supraglottitis or epiglottitis likely to resolve rapidly with antibiotics and where a tracheostomy may delay discharge. There is evidence suggesting that difficult intubation and difficult ventilation occurs in 1.5% of procedures, 0.3% with impossible intubation and difficult ventilation and a can't intubate, can't ventilate (CICV) situation in 0.07% of procedures [10]. Tracheostomy may be difficult in patients with "short fat necks", a significant goitre or with bleeding diatheses or on anticoagulants. The practise of preparing the skin and prior infiltration with local anaesthetic and adrenaline before

endotracheal intubation is attempted results in reduced bleeding and makes it easier to perform a subsequent emergency/crash tracheostomy in cases where endotracheal intubation fails. Emphasis is again laid on the use of pressure bag during planning. The use of this pathway has been invaluable.

#### 4. CONCLUSION

Use of the optimal pathway with pressure bag under the shoulders renders the team with the required preparedness and eliminates the human factor element reducing the stress levels within the team to achieve a positive outcome should there be the need for emergency tracheostomy in case of failed intubation. With simulation based training proving to be an established teaching tool our aim to establish the optimal pathway in managing difficult airways situations needing emergency tracheostomy should be successful.

#### CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

1. Pracy JP, Brennan L, Cook TM, Hartle AJ, Marks RJ, McGrath BA, Narula A, Patel A. Surgical intervention during a Can't intubate Can't Oxygenate (CICO) Event: Emergency Front-of-neck Airway(FONA)?
2. Frerk C, Mitchell VS, McNarry AF, et al. Difficult Airway Society 2015 Guidelines for management of unanticipated difficult intubation in adults. *Br J Anaesth.* 2015; 115:827-48.
3. Cook TM, Woodall N, Harper J, Benger J. Fourth National Audit Project. Major complications of airway management in the UK: Results of the 4<sup>th</sup> National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part2: Intensive care and emergency departments. *Br J Anaesth.* 2011;106:632-42.
4. Lockey D, Crewdson K, Weaver A, Davies G. Observational study of the success rates of intubation and failed intubation airway rescue techniques in 7256 attempted intubations of trauma patients by pre-hospital physicians. *Br J Anaesth.* 2014;113:220-5.
5. Hubble MW, Wilfong DA, Brown LH, Hertelendy A, Benner RW. A meta-analysis of prehospital airway control techniques part II: Alternative airway devices and cricothyrotomy success rates. *Prehosp Emerg Care.* 2010;14:515-30.
6. Mabry RL. An analysis of battlefield cricothyrotomy in Iraq and Afghanistan. *J. Spec Oper Med.* 2012;12:17-23.
7. Avva U, Lata JM, Kiel J. Airway Management. [Updated 2020 Mar 18]. In: Stat Pearls [Internet]. Treasure Island (FL): Stat Pearls Publishing; 2020.
8. Hubert V, Duwaat A, Deransky R, Mahjoub Y, Dupont H: Effect of simulation training on compliance with difficult airway management algorithms, technical ability, Skills Retention for Emergency Cricothyrotomy. *Anaesthesiology.* 2014; 120(4):999-1008.
9. Langeron O, Masso E, Huraux C, Guggiari M, Bianchi A, Coriat P, Riou B: Prediction of difficult mask ventilation. *Anaesthesiology.* 2000;92:1229-36.
10. Arthur W Jr, Bennett W Jr, Stanush PL, Mc Nelly TL: Factors that influence skill decay and retention: A quantitative review and analysis. *Human Performance.* 1998;11: 57-101.

© 2020 Smith et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*  
*The peer review history for this paper can be accessed here:*  
<http://www.sdiarticle4.com/review-history/57080>