Group	Ultrasound examination time (min)	Ultrasound guided tracheostomy time (min)	Total time (min)	Incidence of complications n (%)
1: patient 1–10	13 ± 6	17 ± 8	30 ± 11	2 (2 %)
2: patient 11–20	14 ± 6	17 ± 7	32 ± 11	7 (9 %)
3: patient 21–30	12 ± 7	13 ± 6	25 ± 19	9 (11 %)
4: patient 31–40	11 ± 8	9 ± 3	20 ± 8	4 (5 %)
5: patient 41–50	10 ± 5	10 ± 9	20 ± 12	2 (3 %)
6: patient 51–60	8 ± 3	10 ± 3	17 ± 5	1 (1 %)
7: patient 61–70	9 ± 6	8 ± 3	17 ± 8	0 (0 %)
8: patient 71–80	9 ± 6	9 ± 6	18 ± 5	2 (3 %)

CONCLUSIONS. Our study suggested that a minimum of 30 ultrasound-guided percutaneous tracheostomy was necessary to realize this technique with a low complication rate and a short realization time.
REFERENCE(S). 1. Guinot P, Zogheib E, Petiot S. Ultrasound-guided percutaneous tracheostomy in critically ill obese patients. Crit Care. 2012;16:R40.

0151
A COMPARISON OF THREE ENDOSCOPES IN ASSESSMENT OF TRACHEOSTOMY POSITION IN SIMULATION MANIKINS

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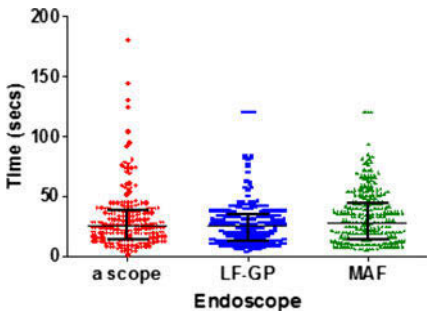
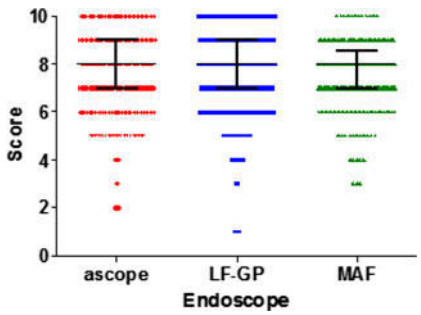
INTRODUCTION. Displacement of tracheostomy tubes causes significant patient harm. Fibreoptic endoscopy can assess the position of a tracheostomy tube within the trachea both in elective and emergency situations and can reduce the incidence of patient harm. Simulation manikins are a useful tool in developing the relevant skills.
OBJECTIVES. To compare the time taken to achieve adequate views for assessment of tracheostomy position and the operator's ease of endoscopy score with 3 different endoscopes in manikins.
METHODS. Twenty five anaesthetic trainees assessed tracheostomy tube placement using the Ambu aScope2, Olympus LF-GP, and Olympus MAF. Observations were made using three training manikin variants: METIman (using both 'standard' and 'difficult' airway settings) and SimMan.
Tube position was assessed via the tube lumen and within the trachea by both the oral and nasal routes. For each assessment of tracheostomy placement, the time taken to achieve satisfactory visualisation (determined by observer) was recorded. In addition, the trainee allocated an 'ease of endoscopy score'- with a score of '1' indicating great difficulty and a score of '10' indicating great ease.
Data were analysed using Friedman test to compare the three endoscopes (observations were matched for trainee, route of visualisation, and manikin variant).
RESULTS. 225 observations were made with each endoscope. Satisfactory visualisation was achieved in 120 s or less in over 99 % of observations and in 60 s or less in 92 %.There was a small, but statistically significant, difference between the endoscopes in the mean time to achieve satisfactory visualisation, with the Olympus MAF taking slightly longer. (Friedman test with Dunn's post-test, $p = 0.01$).



Time taken to assess tracheostomy placement

Generally, trainees perceived the overall procedure as 'easy', allocating a median 'endoscopy score' of 8 for all three endoscopes. No statistically significant differences in 'endoscopy scores' between the endoscopes were demonstrable (Friedman test with Dunn's post-test, $p > 0.05$).



Endoscopy scores by endoscope

CONCLUSIONS. Trainees were able to gain satisfactory views to assess tracheostomy placement in under 60 s in the vast majority of observations regardless of the endoscope used, however procedures using the Olympus MAF took slightly longer. Application of an arbitrary scoring system indicated that trainees generally rated the procedures as 'easy'. Assessment of position is achievable in a clinically relevant timeframe.
REFERENCE(S). 1. McGrath BA, Thomas AN. Patient safety incidents associated with tracheostomies occurring in hospital wards: a review of reports to the UK National Patient Safety Agency. Postgrad Med J. 2010;86(1019):522–5. 2. Rai MR, Popat MT. Evaluation of airway equipment: man or manikin? Anaesthesia. 2011;66:1–3.

0152
TEACHING FOUNDATION DOCTORS ABOUT TRACHEOSTOMY COMPLICATIONS: A 6 MONTH FOLLOW UP STUDY

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INTRODUCTION. Over 50 % of patients who have a tracheostomy in ICU are discharged before decannulation [1] NAP4 showed that 70 % of all airway-incidents and 60 % of all deaths in ICU involved tracheostomy complications. Similar complications occur after discharge from ICU and lack of training is a common factor [2]. How much training junior doctors receive in this area remains unknown.
OBJECTIVES. • Quantify the training medical students receive about tracheostomy management.
• Increase the training on preventing and managing tracheostomy complications (e.g. obstruction, displacement) for junior doctors working in Oxford.
• Assess the effectiveness of this training at 6 months.

METHODS. 81 Foundation Year 1 (F1) doctors (from 22 medical schools) completed a new session on preventing and managing tracheostomy complications. Online surveys were distributed before and 6 months after the course (completion rates 83 and 24 % respectively). A paper survey was distributed immediately after the course (100 % completion rate). Each survey assessed knowledge of current best practice as defined by the Intensive Care Society [4] as well as confidence in managing tracheostomies.
RESULTS. Knowledge and confidence were poor before the course: over 70 % were 'not at all confident' in managing complications; in the event of an obstruction just 20 % would correctly deflate the air cuff and only 72 % would call the emergency airway team. 66 % saw patient(s) with a tracheostomy during their medical degree but only 19 % received formal teaching about managing such patients. Immediately after the course, confidence and knowledge increased significantly. 79 % were 'fairly confident' to 'very confident' in managing an obstruction and 74 % would leave the air cuff deflated. 100 % found the course relevant and useful to their work. In their first 6 months as an F1, 47 % had managed at least 1 patient with a tracheostomy. Knowledge faded after the course, e.g. at 6 months only 65 % would deflate the air cuff. 94 % would call for the emergency airway team to a tracheostomy complication.
CONCLUSIONS. Teaching in this area is rare and variable despite most students seeing tracheostomies. Most junior doctors will manage a patient with a tracheostomy during F1/F2. Teaching about tracheostomy complications is seen as both relevant and useful with long term benefit for patients. To maximise effectiveness, teaching should be given just before it is needed to minimise knowledge fade.
REFERENCE(S). 1. Martinez GH, Fernandez R, et al. Tracheostomy tube in place at intensive care unit discharge is associated with increased ward mortality. Respir Care. 2009;54(12):1644–52. 2. McGrath BA, Thomas AN. Patient safety incidents associated with tracheostomies occurring in hospital wards: a review of reports to the UK National Patient Safety Agency. Postgrad Med J. 2010;86(1019):522–5. 3. MacKenzie S, Murphy P, et al. Standards for the care of adult patients with a temporary tracheostomy, Guidelines from the Intensive Care Society; 2008.

0153
EVALUATING THE AMBU® ASCOPE™ 3 SYSTEM FOR PERFORMING PERCUTANEOUS DILATATIONAL TRACHEOSTOMY IN CRITICAL CARE PATIENTS

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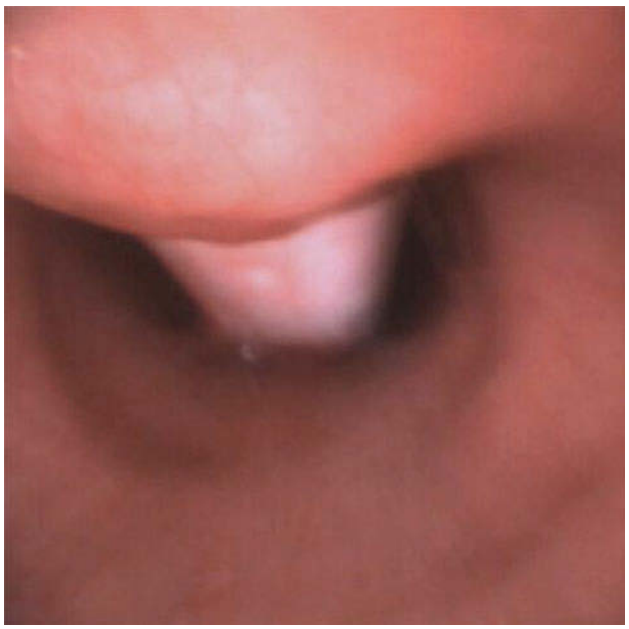
INTRODUCTION. The Ambu® aScope™ 3 system is a novel disposable bronchoscope (5.5 mm maximum external diameter with 2.2 mm suction/working channel) which connects to a separate portable aView™ monitor. We report the first observations in clinical practice of this system for performing percutaneous dilatational tracheostomy (PDT) in critical care patients.
OBJECTIVES. To evaluate the functionality and ease of use of the aScope™ 3 system performing PDT in our ICU.
METHODS. Five CE-marked aScope™ 3 bronchoscopes and an aView™ monitor were supplied by Ambu® for the evaluation. Standard practice for our unit is to use non-disposable bronchoscopy (Olympus® BF-260) to guide PDT insertion, with images displayed on the EVIS LUCERA SPECTRUM 'stack' system. Clinical decision to perform PDT was made by attending clinicians who also performed the procedures. Bronchoscopy to guide the PDT using the aScope™ 3 system was performed by the authors. A 5-point Likert scale was used (1 fully disagree, 3 neutral, 5 fully agree) to evaluate functionality and ease of use of the system, applied to 10 statements (see Table 1). Overall impressions of performance (satisfactory: yes/no) and whether the operator felt that the aScope™ 3 system could replace our existing non-disposable system (yes/no) were also recorded.
RESULTS. All 5 procedures were completed uneventfully between 11/3/13 and 8/4/13 (BAM 4 procedures, AB 1). Data were explored using the Shapiro–Wilk test and the results (median Likert scores for functionality and ease of use) shown in Table 1. Clear images of the needle and guide-wire entering the trachea were recorded in all 5 procedures. The authors agreed in all 5 PDTs that the aScope™ 3 system was satisfactory and that the system could have replaced our existing non-disposable system for guiding the PDT.

Table 1 Median Likert scores for functionality

	Median score	Range of scores (min–max)
Easy to connect and set up the aScope 3 system	5	5
Blood and secretions were easily cleared from the lens	5	4–5
Easy and intuitive to use suction system	5	5
Suction capability was adequate for clearing blood and secretions	5	4–5
Functionality of working channel was satisfactory	4	4–5
Easy navigation and recording of images on aView monitor	3	1–4
Ergonomics of the device satisfactory	4	3–5
Lightweight design was a clear benefit	3	3
Image quality was clear and adequate to verify accurate placement of the tracheostomy	5	5

CONCLUSIONS. Our evaluation demonstrated that the Ambu® aScope™ 3 system was assessed as easy to use and performs satisfactorily for guiding PDT in critically ill patients. The system is portable and easy to position for the bronchoscopist and clinician performing PDT to view. The monitor display is smaller and of lower resolution (800 × 480 pixel, 8.5 inch colour TFT LCD screen) than our non-disposable system, but image quality was good enough to guide the procedures and the smaller monitor could be positioned flexibly at the bedside. Suction capabilities were adequate. The lowest scores were in relation to the functionality of the aView™ monitor, which had pre-release software installed. The lightweight handle was not perceived as a particular advantage. The disposable nature of the system may have cost advantages, especially when considering potential damage to bronchoscopes during PDT. One patient had cavitating lung lesions which illustrates an example of potential infection control advantages over non-disposable equipment.



aScope 3 aView monitor view of PDT

GRANT ACKNOWLEDGMENT. Ambu® provided a donation to our ICU research fund for conducting this evaluation.

0154
TRACHEOSTOMY CARE IN GENERAL WARDS IN RELATION TO DECANNULATION TIME, ADVERSE EVENTS AND LENGTH OF STAY: A RETROSPECTIVE QUALITY OF HEALTH REVIEW

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INTRODUCTION. Timely review and intervention for patients with tracheostomies in the hospital is important to facilitate decannulation and prevent morbidity. Tracheostomy for ICU patients requiring prolonged assisted ventilation provides a safe airway, allows better pulmonary toilet, facilitates weaning and expedites discharge from the ICU. This potentially allows better allocation of ICU resources. The lack of a dedicated team and standardized protocols with regards to management of tracheostomies in the general wards may lead to suboptimal care [1, 2].

OBJECTIVES. We aim to evaluate the prevalence of tracheostomies in the surgical intensive care unit (SICU) and outcomes of these patients upon discharge to the general wards.

METHODS. The SICU patient database was searched for patients who had a tracheostomy while in the ICU from 1st Jan 2007 to 31st Dec 2011. Patients who had a tracheostomy for ear, nose and throat pathologies were excluded. The primary outcome was decannulation time, while secondary outcomes included adverse events related to the tracheostomy and ICU and hospital LOS (length of stay). This study has been approved by the hospital Ethics board.

RESULTS. During these 5 years, 204 patients underwent tracheostomies during their course of SICU stay. There were 54.4 % survivors, 36.8 % died and 8.8 % had incomplete data. The mean age was 57 ± 19.8 and mean APACHE II score was 22 ± 6.2. Prior to hospital discharge, 49 % of patients were decannulated. The time to decannulation was 31.3 ± 29.3 days. Out of the 25 % (51/204) of patients who encountered adverse events, the most prevalent was desaturation due to mucus plugging (51 %, 26/51). ICU readmission due to tracheostomy complication was 5.9 %. The ICU LOS was 21 ± 20.5 days and the hospital LOS was 67.5 ± 48.9 days.

CONCLUSIONS. Decannulation time is long and complications are common. The implementation of specific strategies and a multidisciplinary tracheostomy team for regular review and consensus decisions regarding tracheostomy weaning might improve patient care and decannulation time.

REFERENCE(S). 1. Tobin A, Santamaria J. An intensivist-led tracheostomy review team is associated with shorter decannulation time and length of stay: a prospective cohort study. Crit Care. 2008;12R48. 2. Garrubba M, Turner T, Grieveson C. Multidisciplinary care for tracheostomy patients: a systematic review. Crit Care. 2009;13:R177.

0155
CICATRICIAL STENOSIS OF TRACHEA AFTER PROLONGED ARTIFICIAL LUNG VENTILATION. STRATEGY OF COMBINED TREATMENT

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INTRODUCTION. Thanks to the achievements of the modern resuscitation, saving of the patients that are on long-term artificial lung ventilation (ALV) who were previously considered to be hopeless has been possible.

OBJECTIVES. Thus, the CST being a life-threatening and disabling illness remains to this day to be the most urgent problem of intensive care, thoracic surgery, endoscopy and otorhinolaryngology.

METHODS. 46 patients with the CST have been treated in RSCS Vakhidov:stenoses located in the upper third of trachea in 25 (54.34 %) patients, 6 (13.1 %) had narrowing of the thoracic part of trachea, tracheolaryngeal localization with the affliction of the subglottic part of larynx and the upper third of trachea has been seen in 8 (17.4 %), the combined affliction of the larynx and thoracic part of trachea was present in 3 (6.5 %), and in 4 cases there were cicatricial narrowing of the cervical and thoracic parts of trachea (8.69 %).

RESULTS. Radical method that allows removing the scar-narrowed segment of trachea completely is a circular resection of trachea which was performed by us in 11 patients. So, the patients after severe combined head injuries and polytraumas or after neurosurgical interventions for acute emergency conditions in pathologies of the central nervous system require a long rehabilitation because of the neurological status which does not allow a radical intervention in the form of circular resection of trachea for such patients. In the first stage we have conducted a bronchoscopic laser photodestruction or diathermocoagulation of the stenosis with a subsequent bougienage of the narrowing of trachea. In patients with a total scarry obliteration of the lumen of trachea an endoscopic recanalization has been performed. Afterwards, in order to prevent the growth of granulation and restenosis of the lumen of trachea, as well as for the formation of a stable lumen, stents in a variety of modifications, including linear silicone ones with the spines on the surface- the types of Dumont have been installed, and also the T-shaped endoprosthesis have been used. After removing the T-shaped endoprosthesis the plastics of the defect in the anterior wall of trachea was performed.

CONCLUSIONS. Dissection of stenosis with the excision of scarry tissues and the formation of a lumen on the T-shaped endoprosthesis in patients with cicatricial stenosis of the laryngo-tracheal localization allows to rehabilitate patients from their comorbidities, to eliminate the signs of purulent endobronchitis, to retain the ability of breathing through the natural airways and phonation, eliminating the risk of migration and obstruction of the stent and allows to generate a sufficient lumen of trachea with a subsequent performing of the plastic surgery to close the defect of the anterior wall of trachea and the soft tissues of the neck.

0156
ET TUBE IN EMERGENCY: DOES SIZE MATTER?

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INTRODUCTION. This prospective study is done in continuation of pilot study presented at ESICM 2012 to improve quality of airway management in emergency situation. This communication is a follow up from the same.

OBJECTIVES. To analyze outcomes in unplanned (emergency) intubations using ET tube no.7.5 or 8.5 or any no. for adult patients in three tertiary care hospitals.

SETTING. 70 bedded multispecialty medical and surgical intensive care units (ICUs).

METHODS. Patients requiring emergency intubation in ICU were included and data was collected with a focus on variables such as demographics, APACHE II scores, co morbidities such as diabetes(DM), hypertension(HTN), coronary artery disease (CAD), smoking and duration of stay in ICU. Death/discharge from ICU was considered as end points. They were compared across three groups [A] A 7.5 no ET tube group [B] A 8.5 no ET tube group [C] Random no. ET tube group [random numbers] getting admitted to hospital in the same duration for similar variables. A multivariate logistic regression analysis was done using SPSS version 15.

RESULTS. One hundred and forty patients were included for fixed No. 7.5 ET tube (n = 140, M: F 80:60) and one hundred and forty for 8.5 [n = 140, M: F 86:54] which were compared against a control group of one forty patients where random no. of ET tube were used (n = 140, M: F 78:62) during Nov 12–April 13 in three different tertiary care centers. The results were as follows.

Comparison of using different size ET tubes

Feature	7.5 gr.	8.5 gr.	Random gr.
Age in years	54.3 ± 6.3	52.7 ± 8.3	55.9 ± 7.7
APACHE II	17.0 ± 4.1	15.4 ± 3.7	16.8 ± 2.8
No. of intubation	140	140	140
Stay in ICU (days)	4.8 ± 2.3	3.6 ± 1.8	6.3 ± 5
Within 30 days mortality	9 (6.4 %)	14 (10 %)	12 (8.5 %)
Hypoxic brain injury	0 (0 %)	5 (3.5 %)	3 (2.1 %)

A 7.5 size tube had a lesser likelihood of 30 day mortality and hypoxic injury than tube 8.5 and random sized tube (OR = 0.82 and 5.983 respectively).