Preliminary Evaluation of Ambu® aScope™ 2 for Endoscopic Guidance During Percutaneous Dilatational Tracheostomy

S Jamadarkhana, A Mallick, A Bodenham

Department of Anaesthesia & Intensive Care, Leeds General Infirmary, Leeds, UK

The Leeds Teaching Hospitals NHS Trust

Introduction

Endoscopic guidance during percutaneous dilatational tracheostomy (PDT) is increasingly used on the intensive care unit (ICU)[1]. Reusable flexible fibre-optic bronchoscopes are commonly used for this purpose and there is always a risk of needle damage to the scope during PDT. Bonfil's semi-rigid scopes have been used to avoid this problem. However, manoeuvring of Bonfil's scope through the endotracheal (ET) tube is sometimes difficult because of its distal bend. Both these scopes need sterilisation before use. National guidelines and recommendations should also be strictly followed for the sterilisation process, which is time consuming and expensive[2-4]. There have been reports of bronchoscopy-related infections caused by faulty reprocessing procedures. With increasing risk of resistant bacterial strains, there are increasing indications for the use of disposable bronchoscopes. The Ambu® aScope™ 2 (Ambu Ltd, Ballerup, Denmark) is a single-use flexible scope, which has recently become available for difficult airway intubations (Fig 1). It's external diameter is 5.4mm with a working length of 630mm. We were interested to assess the feasibility of this scope during PDT.

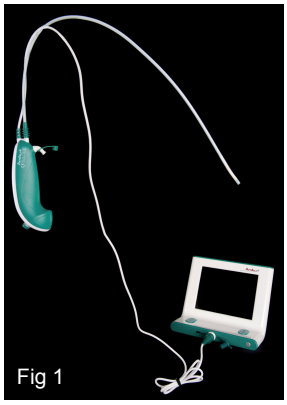

Fig 1

Methods

Ten patients who underwent PDT on the Adult General and Neurosurgical ICUs were enrolled in this study. Ethics committee approval was questioned but not required and informed assent was obtained from next of kin. All patients were anaesthetised with Propofol and Alfentanil infusions, paralysed with atracurium and ventilated with 100% oxygen (using pressure/volume control modes) prior to the procedure. After appropriate positioning, an ultrasound scan of the front of the neck was performed to delinate the anatomy. The existing ET tube was withdrawn until the cuff was just seen at the vocal cords. The site of the procedure was infiltrated with 20 mls of xylocaine 2% with 1:200,000 adrenaline. PDT was performed using Portex Ultraperc™ (Smith Medical, Hythe, Kent, UK) single stage dilator percutaneous tracheostomy set following full aseptic precautions.

The following data was collected during the procedure: a) ease of use of the scope; b) quality of images (brightness, focus, resolution) on a scale of 1-10 (1= poor view, 10= best view); c) arterial blood gases, ventilatory (tidal volume, peak airway pressure, PEEP, arterial Ph, $PaCO_2$, PaO_2, FiO_2, SpO_2) and cardiovascular parameters (heart rate, mean arterial pressure) prior to, during and after the procedure. The correct position of tracheostomy was confirmed using the ambuscope and end-tidal CO_2 monitor. The glottis was also viewed as the endotracheal tube was withdrawn.

Results

The average age of the patients was 62 years (range 55-80). In 90% of the patients PDT was performed between 3 and 6 days after tracheal intubation. The average time to set up the scope and monitor was less than 5 minutes. The procedure time from needle puncture of the trachea to tracheostomy tube placement ranged from 5-10 minutes. In one patient, the procedure time was 45 minutes due to a tracheal ring fracture and cuff damage of the tracheostomy tube.

All the anaesthetists looking after the airway reported easy handling and manoeuvrability because of its light-weight design. The operators performing the procedure scored the clarity and quality of endoscopic view (of needle, guidewire, stomal dilatation and tracheostomy tube placement) to be between 8-10. Cardiovascular and ventilatory parameters were not significantly changed during procedure in all the patients. No complications were reported during the use of the Ambuscope.

Conclusion

We conclude that in our experience Ambu® aScope™ 2 is an alternative to reusable bronchoscopes for PDT on ICU.

The light-weight design makes it very easy to handle and allows the operator to have a clear endoscopic view of the needle, guidewire and the tracheostomy tube.

It's single use design eliminates the risk of cross contamination and delays with sterilisation.

References

1. **Kost KM**. Endoscopic percutaneous dilatational tracheotomy: a prospective evaluation of 500 consecutive cases. *Laryngoscope*. **2005**; 115: 1-30.
2. **Norris A, Wakeling P, Wiles M *et al***. Costs associated with fibrescope inventory: what role for a disposable scope? DAS 2010 (Poster).
3. **Weber DJ, Rutala WA**. Lessons from Outbreaks associated with Bronchoscopy. Infection Control and Hospital Epidemiology. **2001**; 22: 403-408.
4. **Schraag J**. Scope-related Infections, The same challenges have remained for decades, but have the processes improved? **2007**. www.infectioncontroltoday.com. (Date accessed 22/8/2011).

Acknowledgements

We thank Ambu Ltd (Cambridgeshire, UK) for their technical support and all ICU staff for their cooperation during this study

Designed and printed by Medical Illustration Services, The Leeds Teaching Hospitals NHS Trust. Job ref: 2011120102/NR